



POLICY BRIEF

FROM TOOLS TO ACTION: SCALING CLIMATE ADAPTATION THROUGH THE MPA4CHANGE TOOLKITS



*Recommendations for
**integrating the full suite of
validated toolkits into MPA
governance frameworks** to
strengthen climate resilience in
the Mediterranean.*



Executive Summary

This document presents the **MPA4Change Climate Adaptation Toolkits**, designed to support **Mediterranean Marine Protected Areas (MPAs)** in the development and implementation of climate change adaptation plans and in operationalising adaptation and mitigation commitments at site level. **Marine Protected Areas** can only function as effective **Nature-based Solutions for climate adaptation** when climate change is systematically integrated into their management plans, in response to the current climate emergency affecting the Mediterranean region and beyond.

Building on pilot experiences and strong regional collaboration, the **MPA4Change** project has validated a suite of complementary and operational climate adaptation toolkits that translate EU and Mediterranean policy objectives into concrete, implementable action at MPA level. To enable the transition from policy ambition to implementation at scale, the **100MPA MedAlliance** provides the overarching framework for scaling up the uptake of these toolkits across the Mediterranean, combining technical support, peer learning, and policy alignment.

#1
Socio-ecological
vulnerability
assessment



#2 Monitoring of
climate change
effects on
biodiversity



#3 Ecosystem
restoration



#4 Citizen science
and public
engagement



#5 Participatory
approach and
stakeholder
engagement



#6 Adaptation
action plan
development



#7 Geographic
Information
Systems for MPAs



#8 Awareness and
communication on
climate change
challenges





Together, these toolkits provide user-friendly guidance, protocols, and training materials that can be applied and replicated across diverse Mediterranean MPA contexts. This policy brief calls on **MPA managers**, policymakers, and funding institutions to support the uptake of these validated toolkits through their integration into MPA management plans, relevant policy instruments, and financing mechanisms.

Such integration will strengthen Marine Protected Areas as climate-resilient Nature-based Solutions, enhance coherence with EU and Mediterranean climate and biodiversity objectives, and contribute to resilient coastal ecosystems and livelihoods across the Mediterranean basin.



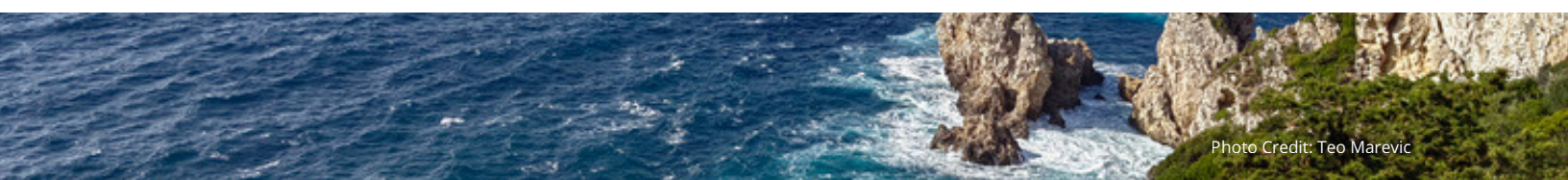


Introduction

The **Mediterranean Sea** is a **global biodiversity hotspot**, supporting unique marine ecosystems, thousands of coastal communities, and a diverse marine economy. However, it is also one of the regions most affected by **climate change**. Rising sea temperatures, sea-level rise, and the increasing frequency and intensity of extreme events are driving habitat degradation, mass mortality events, and shifts in species distribution, with growing implications for ecosystem resilience and coastal livelihoods (Pastor et al., 2020).

Marine Protected Areas (MPAs) are increasingly recognised in European and Mediterranean policy frameworks as key **Nature-based Solutions (NbS) for climate change adaptation**. However, their capacity to respond effectively remains uneven. Regular regional assessments of the Mediterranean MPA network consistently identify structural gaps, including incomplete implementation of management plans, limited enforcement capacity, insufficient coverage of highly protected no-take zones, and the continued lack of systematic integration of climate-change considerations into MPA management frameworks (UNEP/MAP-SPA/RAC & MedPAN, 2020).

The **MPA4Change** project responds directly to these challenges by providing operational and tested **climate adaptation toolkits** that support Marine Protected Areas in translating EU and Mediterranean climate and biodiversity policy commitments into practical, on-the-ground action. This policy brief introduces the MPA4Change toolkits and demonstrates how their integration into MPA governance, planning, and management processes can strengthen implementation capacity and enhance the role of MPAs as effective Nature-based Solutions for climate change adaptation in the Mediterranean.





What the MPA4Change Toolkits Provide

The **Climate Adaptation Toolkits for Mediterranean MPAs**, developed and validated under the **MPA4Change project**, provide operational solutions to support the design and implementation of climate adaptation action in Marine Protected Areas. Rather than introducing new policy commitments, the toolkits focus on how to operationalise existing EU and Mediterranean climate and biodiversity objectives at MPA level.

Each toolkit is composed of a set of complementary resources, including technical documents, practical guidance materials, and training content. Dedicated factsheets act as an accessible entry point for **MPA managers** and decision-makers, providing concise, user-friendly guidance, concrete examples, and key implementation considerations. In addition, selected toolkits are supported by e-learning lessons and guidance modules hosted on the **DAN Europe e-learning platform and EUROPARC's European Nature Academy**, facilitating capacity building and wider uptake across the Mediterranean MPA community.

The MPA4Change Climate Adaptation Toolkits cover the following thematic areas:

1. **Climate Vulnerability Assessment** for Mediterranean MPAs
2. **Harmonised Climate Change Monitoring** for Mediterranean MPAs
3. **Foundations for a Marine Restoration Toolkit** for Mediterranean MPAs
4. **Citizen Science for Climate Change Monitoring** in Mediterranean MPAs
5. **Participatory Approaches** for Co-Creating Climate Adaptation in Mediterranean MPAs
6. **Climate Adaptation and Mitigation Planning** for Mediterranean MPAs
7. **Geographic Information Systems (GIS)** for MPAs
8. **Communication Tools** for Raising Awareness on Climate Change in Mediterranean MPAs



From Evidence to Action: Policy Alignment and Capacity Building

Together, the Climate Adaptation Toolkits provide harmonised, operational methods that enable Marine Protected Areas to assess climate risks and vulnerabilities, support adaptive management, and translate scientific evidence into concrete management responses. By fostering shared approaches and comparability, the toolkits contribute to a coherent knowledge base for climate action across the Mediterranean MPA network.

All toolkits are aligned with key regional and EU policy frameworks, including the **Barcelona Convention Integrated Monitoring and Assessment Programme (IMAP)**, the **EU Marine Strategy Framework Directive (MSFD)**, and the **EU Nature Restoration Regulation (NRR)**. They also contribute to the implementation of broader political initiatives such as The Pact for the Mediterranean (JOIN(2025) 26 final) and The European Ocean Pact (COM(2025) 281 final). Through operational methods, templates, and reporting formats, the toolkits help bridge the gap between high-level policy objectives and practical implementation at MPA level.

Beyond technical guidance and training resources, the Climate Adaptation Toolkits actively support inclusive implementation and long-term uptake at MPA level. Citizen science and participatory approaches embedded within the toolkits promote local engagement, strengthen trust and ownership, and facilitate the integration of Local Ecological Knowledge into climate adaptation processes. By anchoring climate action in local contexts and stakeholder collaboration, the toolkits reinforce the role of Marine Protected Areas as effective and socially legitimate Nature-based Solutions.





Why Implement the Climate Adaptation Toolkits?

Marine Protected Areas are widely recognised as effective Nature-based Solutions for climate change adaptation and mitigation, yet many Mediterranean MPAs still face persistent challenges in translating this potential into practice (Tittensor et al. 2019, IUCN, 2020). Limited access to standardised data, insufficient integration of climate considerations into management plans, and capacity constraints continue to hinder effective climate action (Hopkins et al., 2016).

The Climate Adaptation Toolkits respond directly to these challenges by providing tested, transferable, and policy-aligned tools that support evidence-based decision-making and adaptive management. Their implementation enables MPAs to move from fragmented monitoring and planning efforts towards coherent, climate-smart management frameworks, strengthening their contribution to biodiversity conservation, climate resilience, and sustainable coastal livelihoods.





Strategic Alignment

The adoption of the MPA4Change Toolkits helps to **operationalise existing international and regional commitments**, complementing the policy frameworks already referenced in the “Policy Integration” section. In particular, the toolkits support the implementation of:

Barcelona Convention – Integrated Monitoring and Assessment Programme (IMAP) and Post-2020 SAPBIO

The IMAP and the SAPBIO Post-2020 establish the indicators and roadmap for assessing, conserving and restoring marine biodiversity in the Mediterranean. Within this framework, the MPA4Change Toolkits provide harmonised scientific methods for climate change monitoring, vulnerability assessment, restoration and reporting in MPAs.

EU Marine Strategy Framework Directive (MSFD)

The MSFD requires Member States to monitor, assess and reduce pressures on marine ecosystems. The MPA4Change toolkits offer practical tools that can be integrated into their monitoring and management programmes, especially for climate-sensitive habitats and species.

EU Nature Restoration Regulation (NRR)

The NRR requires the restoration, monitoring and long-term maintenance of key marine and coastal habitats and species. The MPA4Change protocols provide methods for defining restoration targets, timelines and indicators in Mediterranean MPAs.

EU Biodiversity Strategy to 2030 and EU Strategy on Adaptation to Climate Change

Both strategies promote ecosystem approaches and nature-based solutions as key instruments for biodiversity conservation and climate resilience, which the MPA4Change toolkits help to integrate into marine and coastal governance.



GreenerMed Agenda 2030 and UfM SBE Roadmap

The UfM Environment/Green economy Agenda, so called 2030 GreenerMed Agenda, and the UfM Sustainable Blue economy Roadmap are the implementation tools of the 2021 UfM Ministerial Declaration on Environment and Climate Action and of the 2021 UfM Ministerial Declaration on Sustainable Blue Economy respectively. Adopted by the 43 member countries of the UfM, they provide a regional, structured framework for the coordination of regional initiatives, programmes and projects, thus creating political, financial, technical and operational convergence around the priority areas of work agreed at EuroMed level. For GreenerMed, out of three main joint axes of work, Axis 3 is dedicated to biodiversity and ecosystem conservation and restoration. Over the past decade, the UfM's Environment, Green, and SBE dossiers has bridged between the green and blue dimensions of Sustainable Development at Med level, as currently reflected in recent policy developments, namely the EU Ocean and Med Pacts.

Kunming-Montreal Global Biodiversity Framework (Targets 3 and 8)

The Kunming-Montreal Global Biodiversity Framework sets the goal of conserving and effectively managing at least 30% of marine and coastal areas by 2030 through connected and climate-resilient MPA networks, a goal to which MPA4Change and the 100 MPA MedAlliance initiative contribute.

European Ocean Pact

The European Pact for the Oceans strengthens marine governance and provides for an Oceans Act in 2027, which supports maritime spatial planning and an effective network of MPAs — currently 12.3% of EU waters, with a target of 30% by 2030 — based on science and local participation.

Pact for the Mediterranean

The Mediterranean Pact, under the Barcelona Convention, promotes climate resilience, coordinated financing and implementation of the Global Biodiversity Framework, with a focus on strengthening MPAs.



Lighthouses of Change: Case Examples

This section presents selected “Lighthouses of Change” Mediterranean Marine Protected Areas that illustrate how climate adaptation can be operationalised in practice when adaptive management and ecosystem-based approaches are applied.

These examples demonstrate how MPAs can move beyond policy commitments and pilot concrete actions using climate monitoring, stakeholder engagement, and evidence-based decision-making.

Recent research and assessments confirm that the resilience of MPAs to climate change is significantly strengthened when systematic monitoring and adaptive management are embedded in management frameworks, and when climate considerations are recognised in legislation and planning processes (Hoppit et al., 2022). The case examples below translate these principles into real-world applications, showing how MPAs can function as sentinel sites and learning hubs for climate adaptation across the Mediterranean.

- **Portofino MPA (Italy).** The combined use of the Climate Change Monitoring Toolkit and the Citizen Science Toolkit has strengthened the MPA’s role as a climate-change sentinel site. Continuous temperature logging and citizen-science observations of mass-mortality events and fish assemblages provide complementary data streams that support near-real-time alerts on marine heatwaves. While early detection cannot prevent extreme events, it allows managers to rapidly communicate risks, temporarily adapt tourism and diving activities in the most affected sites, and prioritise emergency monitoring and restoration in vulnerable habitats.



- **Brijuni National Park (Croatia).** Application of the MPA4Change monitoring protocols to *Posidonia oceanica* meadows and *Pinna nobilis* populations, combined with citizen-science observations and participatory planning processes, has helped integrate climate risks into zoning and tourism management. Monitoring data and Local Ecological Knowledge (LEK) are used to identify the most sensitive sites, adjust visitor use, and support nature-based restoration actions.



These examples show that, although MPAs cannot avoid marine heatwaves or fully prevent mass-mortality events, combining scientific monitoring with citizen engagement improves spatial and temporal coverage of data, supports more targeted biodiversity management (e.g. focusing protection and restoration on the most impacted or most resilient sites), and generates evidence that can be shared across the wider Mediterranean MPA network.

Recommendations

The following recommendations translate the findings of this document into targeted actions for key stakeholder groups involved in Mediterranean MPA governance and financing. They aim to support the effective uptake of the validated climate adaptation toolkits, strengthen policy coherence across scales, and ensure that MPAs can deliver their full potential as Nature-based Solutions for climate change adaptation and mitigation.



For Policy Makers

- **Integrate the validated MPA4Change Toolkits** and monitoring protocols into national MPA frameworks and climate adaptation strategies.
- **Harmonise monitoring standards** regionally through the Barcelona Convention's Integrated Monitoring and Assessment Programme (IMAP).
- Ensure that **climate and biodiversity data inform marine spatial planning, fisheries management, restoration policies**, and the implementation of the EU Nature Restoration Regulation (NRR).
- Promote **cross-border cooperation** and knowledge exchange to accelerate the uptake of harmonised methods across the Mediterranean MPA network.
- Follow up on the **European Pact for the Oceans** and participate in the implementation of the **Oceans Act planned for 2027**.
- Promote the **Mediterranean Pact**, within the framework of the **Barcelona Convention**, focusing on strengthening MPAs.

For MPA Managers

- **Adopt the MPA4Change Toolkits** to detect climate impacts, guide adaptation and mitigation actions, and fulfil national, EU, and Barcelona Convention reporting obligations.
- **Benefit from integrated regional platforms** that enhance data quality, interoperability, and visibility:
 - **T-MEDNet** for temperature and mass-mortality monitoring
 - **ORMEF** for observations of exotic and thermophilic species
 - AMARE Plus Geoportal for spatial data visualisation
 - Observadores del Mar for citizen-science reporting
- Use these platforms to strengthen harmonised monitoring, improve data sharing, and increase the visibility of climate impacts and biodiversity change



change across the Mediterranean MPA network.

- Showcase **best practices**, share results, and contribute to regional learning processes to support replication and collective resilience across Mediterranean MPAs.

For Donors & Institutions

- **Provide multi-year funding** to scale the full suite of MPA4Change Toolkits, including climate-change monitoring, citizen science, vulnerability and risk assessment, restoration planning, participatory approaches, and communication.
- **Invest in regional digital** platforms that underpin harmonised data collection and interoperability, such as T-MEDNet, ORMEF, the AMARE Geoportal, and citizen-science infrastructures like Observadores del Mar.
- **Support capacity building** through training, mentoring, and expert deployment to accelerate toolkit adoption within MPAs across EU and non-EU Mediterranean countries.
- **Align financial support** with key EU and regional policy frameworks, including the EU Nature Restoration Regulation, EU Biodiversity Strategy 2030, the EU Climate Adaptation Strategy, and Barcelona Convention mandates.
- **Contribute to and utilise the MPA4Change Roster of Experts**, a key pillar of the 100 MPA MedAlliance, to provide specialised technical support on monitoring, vulnerability assessment, restoration, stakeholder engagement, and communication.
- **Prioritise investments** that strengthen long-term data management, reporting systems, and cross-MPA learning processes to ensure continuity, comparability, and sustained regional impact.



MPA4Change

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Contact & Endorsement

This policy brief is produced under the Interreg Euro-MED MPA4Change project.

Contact:

- info@100mpamedalliance.org
- <https://mpa4change.interreg-euro-med.eu/contact-us/>

Website:

- MPA4Change: <https://mpa4change.interreg-euro-med.eu/>
- 100MPAMedAlliance.org: 100MPAMedAlliance.org

Toolkit access: <https://doi.org/10.20350/digitalCSIC/14672>

Mailing list: signup-mpa4change.getresponsewebsite.com

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It has been prepared by **Patricia Puig Martí** and **María Giménez (Oceanogami)**, in coordination with **Fernando Pinillos (EUROPARC Federation)**, **Joaquim Garrabou (ICM-CSIC)**, **Nicolas Lecomte** and **Anna Ospital (MedPAN)**, and with inputs from **MPA4Change** partners and reviewers.



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