MPA4Change

FACTSHEETS

INTERREG EURO-MED MPA4CHANGE (REF: EURO-MED0200736)

MPA4Change - Enhancing Marine Protected Areas as nature-based solutions for adaptation to climate change: from local actions to Mediterranean basin strategy.

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #1
Climate Vulnerability Assessment for Mediterranean MPAs

PURPOSE

To provide Mediterranean MPAs with a robust, science-based methodology to evaluate how climate change affects both ecological and social systems. The toolkit identifies priority risks, sensitive habitats, and vulnerable communities, guiding adaptation planning and management decisions.

TARGET USERS

- MPA managers
- Planners
- Researchers
- Consultants
- Governmental agencies

WHY IT MATTERS

- **Only 8% of MPAs in the Mediterranean** address climate change in their management plans.
- The **CVA empowers MPAs** to become climate-resilient sentinels, integrating scientific and local knowledge.
- **Supports obligations under:**
  - Barcelona Convention / IMAP & SAPBIO
  - EU Adaptation Strategy
  - EU Biodiversity Strategy 2030
  - GBF Target 8 (climate adaptation)
- Creates a **shared, regional approach** to evaluating climate risks.
- **Provides the scientific foundation** for Adaptation & Mitigation Plans.

LEARN MORE

- Applied in Brijuni, Portofino, Pelagie, Zakynthos, and other MPAs
- Built on the proven methodology from MPA-ENGAGE
- Fine-tuning actions include updated guidelines and simplified templates

HOW IT WORKS

The Climate Vulnerability Assessment (CVA) combines ecological and socio-economic indicators to understand how exposed, sensitive, and adaptable an MPA is to climate change. It follows a repeatable and transferable methodology developed in MPA-ENGAGE and refined in MPA4Change.

1. **Define the System**
   - Identify ecological components (species, habitats)
   - Identify social components (communities, activities, governance)
2. **Assess Exposure**
   - Analyse climate drivers (warming, marine heatwaves, extreme events)
   - Integrate temperature records, monitoring data, and local observations
3. **Assess Sensitivity**
   - Evaluate biological characteristics (distribution, functional roles)
   - Evaluate socio-economic reliance on climate-sensitive resources
4. **Assess Adaptive Capacity**
   - Ecological aspects (fragmentation, connectivity, management regime)
   - Social aspects (livelihood diversity, governance, institutional strength)
5. **Score Indicators & Produce the CVA Matrix**
   - Standardised scoring from low to high vulnerability
   - Visual outputs for ecosystem and socio-economic components
6. **Identify Priority Risks & Adaptation Options**
   - Highlight hotspots of vulnerability
   - Provide evidence for climate adaptation plans and management responses

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #2

Harmonised Climate Change Monitoring for Mediterranean MPAs

PURPOSE

To provide Mediterranean MPAs with standardised, cost-effective, and scientifically validated monitoring protocols that detect the main categories of ecological effects and impacts of climate change: changes in temperature regimes, shifts in distribution of of native and exotic species, episodic events (e.gmass mortality events) and phenological changes. The collected information is supporting adaptive management and evidence-based decision-making.

TARGET USERS

- MPA managers
- Monitoring technicians
- Marine biologists
- Research institutions
- Citizen science coordinators

WHY IT MATTERS

- Provides **comparable, long-term data** across the Mediterranean
- Strengthens **regional cooperation** and contributes to MedPAN & SPA/RAC monitoring initiatives
- Required for **climate-ready MPAs**, fully aligned to supporting ongoing monitoring programs including SAPBIO, IMAP, MSFD, and the EU Biodiversity Strategy.
- **Links science to management** by feeding results into vulnerability assessments and adaptation plans
- Helps MPAs function as **operational Nature-based Solutions (NbS)** for climate resilience

HOW IT WORKS

The toolkit includes 11 harmonised monitoring protocols, developed under the Interreg EuroMED MPA-ENGAGE project and refined under MPA4Change project. They offer a complete workflow from data collection, going through management and analysis till data interpretation and assessment uising tailored indicators to support management decisions. Some protocols are supported by the T-MEDNet platform (www.t-mednet.org) with dedicated data management hubs. All protocols are included in an offline Management Tool supporting data analysis, interpretation and assessment.

1

Temperature Monitoring (T-MEDNet)

- Deploy temperature data loggers to characterize temperature regimes in coastal areas from surface down to 40m depth
- Provide high resolution temperature series (hourly records) able to track long-term warming trends and detect marine heatwaves and thermal anomalies
- Validation with in situ data sea surface satellite observation efforts and to fine tune modelling approaches
  - Support vulnerability assessments of local MPAs

2 Mass Mortality Assessment

- Rapid-response monitoring of benthic species affected by marine heat waves and other extreme events
- Standardised scoring of partial and total mortality
- Supports alert systems and management interventions

3 Fish Visual Census (FVC)

- Simple visual census to monitor climate-sensitive species (native and exotic species)
- Detects tropicalisation trends and fish community changes
- Includes species lists tailored to Mediterranean sub-basins

5 LEK2 -Based Monitoring (Local Ecological Knowledge) for annual monitoring of climate-sensitive native/exotic species

4 LEK1 -Based Monitoring (Local Ecological Knowledge) for historical reconstruction of fish species shifts related to climate change effects.

6 LEK3 -Based Monitoring (Local Ecological Knowledge) for historical reconstruction and detection of mass mortality events in coastal habitats events
Three protocols:

- LEK 1 –
- LEK 2 –
- LEK 3 –

7 Sea Urchin Assessment (URCH)

- Size-frequency analysis of Paracentrotus lividus and Arbacia lixula
- Early detection of ecosystem imbalance (e.g., barrens)

8 Benthic Habitat Rapid Assessment (BHARA)

- Simple photographic monitoring to assess the habitat condition and impacts such as detection non-indigenous species, habitat shifts, mass mortality events and biological changes.

9 Posidonia oceanica Fast Assessment (POFA)

- Shoot density and meadow condition
- Additional transect to evaluate continuity and meadow extension

10 Pinna nobilis Fast Assessment (FAP)

- Abundance, health, and size structure of the endangered fan mussel

11 Structure-from-Motion (Photogrammetry)

- 3D reconstruction of benthic habitats
- Quantifies structural complexity and changes over time

MANAGEMENT TOOL

The purpose of the Monitoring Tool is to easily report and assess all of the data of the 11 monitoring protocols included in the toolkit. The Monitoring Tool provides under a single layout in order to ease the process of revision and quality control as well as to offer a pleasant design to showcase the results for the MPA managers and to a broader audience. The management tool has been developed with PowerBI a free software. The lack of dedicated financial resources hindered the integration of this tool in the T-MEDNet platform.

LEARN MORE

- Based on the complete set of 11 protocols from MPA-ENGAGE
- Tested in >30 MPAs across the Mediterranean
- Under continuous fine-tuning

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #3
Foundations for Marine Restoration Toolkit for Mediterranean MPAs

PURPOSE

The toolkit on marine ecological restoration is dedicated to support Mediterranean MPAs in planning, designing, and implementing ecological restoration actions as part of climate adaptation and Nature-based Solutions (NbS).

TARGET USERS

- MPA managers
- Restoration practitioners
- Researchers
- Environmental authorities
- NGOs
- Consultants
- Project developers

WHY IT MATTERS

Restoration is increasingly recognised as a key part of MPA climate strategies, supported by:

- **EU Nature Restoration Regulation** (NRR) – Article 11 (marine ecosystems)
- **UN Decade on Ecosystem Restoration** (2021–2030)
- **Barcelona Convention SAPBIO & IMAP**
- **Growing demand by MPAs** for Nature-based Solutions
- **Mediterranean MPAs are central actors** for piloting, testing, and upscaling marine restoration, yet they need accessible, science-based guidance.

LEARN MORE

mpa4change.interreg-euro-med.eu

WHAT THIS TOOLKIT CONTAINS

Restoration Toolkit include:

1. **Restoration Booklet (Core Element)**

   A short booklet compiling:
   - Key principles of marine ecosystem restoration
   - Steps for planning restoration projects
   - Criteria for selecting appropriate restoration actions
   - Links to existing protocols and Mediterranean best-practices

2. **Summary of Existing Mediterranean Protocols**

   The toolkit mainly compiles restoration methodologies already tested through major EU and Mediterranean projects such as:
   - LIFE AFRIMED – Macroalgal forest restoration
   - Horizon 2020 MERCES – macroalgal, coralligenous habitats, gorgonians, sponges
   - FORESTA – seagrass and habitat restoration techniques

   The listed restoration protocols serve as a resource center to guide MPA managers that decide to include restoration actions in their management plans.

3. **Governance, Permitting & Feasibility Insights**
   - Identification of governance actors involved
   - Overview of necessary permits
   - Assessment of feasibility, risks, and constraints
   - Integration of restoration into MPA zoning and planning

4. **Integration with Monitoring & Adaptation Plans**

   The toolkit guide MPAs on:
   - How to use climate monitoring results to identify candidate sites
   - How to connect restoration needs to adaptation measures
   - How to embed restoration priorities in Climate Adaptation Plans

5. **Monitoring of Restoration Success**

   The Deliverable highlights the need to include:
   - Indicators for ecological success
   - Long-term monitoring protocols
   - Links to the harmonised monitoring toolkit (11 protocols)

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #4

Citizen Science for Climate Change Monitoring in Mediterranean MPAs

PURPOSE

To engage divers, fishers, and local communities in collecting standardised, science-based data on climate impacts, expanding monitoring capacity and improving early detection of ecological changes in Mediterranean MPAs.

TARGET USERS

- MPA managers
- Diving centres
- Citizen science coordinators
- NGOs
- Educators
- Volunteer observers

WHY IT MATTERS

Citizen Science:
Expands monitoring coverage beyond MPA staff capacity
Provides early alerts on:
mass mortality events
warming-driven species shifts
non-indigenous species
Strengthens community ownership of MPAs
Integrates local knowledge with scientific protocols
Supports indicators for IMAP, MSFD, SAPBIO, and the EU Adaptation Strategy

Citizen science data, especially through OdM, is explicitly recommended as useful for MPA managers, even when observations occur outside MPA boundaries (for comparison and early warning).

LEARN MORE

- Citizen science protocols are part of the 11 monitoring protocols described in MPA-ENGAGE
- Currently used by dive centres and volunteers across the Mediterranean
- OdM ensures long-term data accessibility and validation

HOW IT WORKS

The Citizen Science Toolkit builds on the three monitoring protocols originally developed in MPA-ENGAGE and maintained in MPA4Change. These protocols allow trained volunteers to gather data that complements professional monitoring.

1. **Mass Mortality Monitoring (Citizen Science Module)**
   - Divers report observations of affected benthic organisms
   - Standardised categories for partial vs. total mortality
   - Data uploaded to Observadores del Mar (OdM) for validation
2. **Climate Fish adapted from Fish Visual Census (FVC) Monitoring toolkit**
   - Easy-to-use species identification boards
   - Focus on climate-sensitive and indicator of native and exotic fish species
   - Designed for repeated surveys across MPAs and depth ranges
3. **Pinna nobilis Fast Assessment**
   - Divers identify presence, abundance, and health condition of Pinna nobilis
   - Supports conservation actions for this critically endangered species

DATA UPLOAD & VALIDATION: OBSERVADORES DEL MAR

All citizen-science data must be uploaded to Observadores del Mar marine citizen science platform: www.observadoresdelmar.es.

This platform, launched in 2012, has over more +10 years of sustained activity, has consolidated a community of participants with more than 6,000 citizens and over 500 organizations whose observations are validated by scientific teams (+100 scientists from +40 research institutions):

- Ensure quality control
- Allow expert validation
- Centralise access for MPA managers
- Improve comparability across regions

www.observadoresdelmar.org

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #5

Participatory Approaches for Co-Creating Climate Adaptation in Mediterranean MPAs

PURPOSE

To guide Mediterranean MPAs in engaging stakeholders through a structured, science-based participatory process that integrates local knowledge, builds trust, and supports the co-design of effective climate adaptation and mitigation actions.

TARGET USERS

- MPA managers
- Local authorities
- Communities
- NGOs
- Private sector actors
- Researchers
- Governance bodies

WHY IT MATTERS

Participatory processes are essential for successful climate adaptation in MPAs because they:

- **Increase** legitimacy, fairness, and community ownership
- **Reduce** conflict and improve governance relationships
- **Facilitate** implementation of adaptation measures
- **Support** obligations under:
  - SAPBIO 2020–2030
  - Barcelona Convention
  - EU Climate Adaptation Strategy
- **Help** bridge scientific data, local realities, and policy requirements

LEARN MORE

- Based on MPA-ENGAGE Participatory Guidelines
- Tested in Brijuni, Portofino, Pelagie Islands, Kuriat, Zakynthos and others.

HOW IT WORKS

The Participatory Approach Toolkit is based on the MPA-ENGAGE Quintuple Helix model, designed to ensure all relevant stakeholders contribute to climate decisions.

1 Stakeholder Identification & Mapping

- Identify key groups from the five helixes:
  - Science – Policy – Society – Economy – Environment
- Categorise stakeholders by:
  - influence
  - interest
  - vulnerability
  - relevance to climate actions
- Use mapping templates to visualise priorities and engagement needs

2 Engagement Strategy

- Updating guidelines so they clearly explain benefits for MPAs
- Providing instructions on how to prioritise stakeholders
- Including criteria such as influence, impact, and relevance
- Capacity Building & Citizen Science

3 Participatory Workshops & Co-Creation Sessions

- Facilitate inclusive dialogues
- Present climate monitoring and vulnerability results
- Jointly define climate risks, adaptation options, and conflicts
- Build consensus for climate action plans

4 Integration of Local Ecological Knowledge (LEK)

- Use LEK 1, 2, and 3 insights to complement scientific results
- Include fishers, divers, and local communities in assessments
- Strengthen legitimacy and social acceptance of decisions

5 Feedback Loops & Follow-Up

- Maintain transparent communication
- Ensure stakeholders see how their input informs final decisions
- Support long-term involvement in implementation

Interreg Euro-MED

Co-funded by the European Union

FACTSHEET #6

Climate Adaptation & Mitigation Planning Toolkit for Mediterranean MPAs

PURPOSE

To support Mediterranean MPAs in developing, updating, or aligning Climate Adaptation and Mitigation Plans (CAMPs) that translate scientific monitoring, vulnerability assessments, and stakeholder engagement into operational, fundable, and governance-ready actions.

TARGET USERS

- MPA managers
- Planners
- Consultants
- National and Regional authorities
- NGOs

WHY IT MATTERS

This toolkit helps MPAs:

- Operationalise climate adaptation at site and network levels
- Align with major policy frameworks including:
- EU Nature Restoration Regulation (NRR)
- EU Adaptation Strategy
- EU Biodiversity Strategy 2030 (Targets 2, 3, 8)
- Barcelona Convention SAPBIO and IMAP
- GBF Target 8 (Resilient ecosystems by 2030)
- Serve as Nature-based Solutions (NbS) for climate adaptation and biodiversity recovery
- Develop fundable and implementation-ready plans
- Ensure actions are socially accepted and co-created

RECOMMENDED ADAPTATION & MITIGATION ACTIONS

- Apply the Climate Adaptation Toolkit to identify priority actions
- Integrate Nature-based Solutions (seagrass restoration, eco-mooring, dune recovery)
- Strengthen monitoring to detect climate impacts
- Engage local communities and governance actors
- Align proposals with EU and regional funding instruments
- Reduce MPA operational emissions (mobility, facilities, energy)

HOW IT WORKS

This toolkit enables MPAs to move from assessment to action by following a standardised planning process developed under MPA-ENGAGE and refined by MPA4Change.

1. **Integrate Climate Monitoring Results**
   - Use outputs from the 11 monitoring protocols
   - Identify trends: warming, species shifts, mass mortalities
   - Detect ecosystem thresholds and early-warning indicators
2. **Use the Climate Vulnerability Assessment (CVA)**
   - Combine ecological and socio-economic vulnerability
   - Identify priority risks, hotspots, and sensitive sectors
   - Generate a risk profile for the MPA
3. **Co-Design Adaptation Actions**
   - Engage stakeholders using the Participatory Approach Toolkit
   - Integrate scientific data with local knowledge
   - Define ecological, social, and governance priorities
4. **Build the Adaptation & Mitigation Plan (CAMP)**

   The toolkit provides templates and guidance to define:
   - Objectives (ecological, socio-economic, governance)
   - Measures and actions
   - Responsible actors
   - Indicators for monitoring progress
   - Timeframe & feasibility
   - Necessary resources
5. **Integrate Mitigation**

   The plan includes measures to reduce the MPA's own carbon footprint:
   - Sustainable mobility & vessel operations
   - Energy efficiency in facilities
   - Reduction of waste and emissions
   - Enhancement of blue-carbon ecosystems
6. **Link to Funding**

   Includes an overview of available funding mechanisms:
   - EU LIFE, EMFAF, Interreg, MedFund
   - National restoration and climate adaptation funds
   - Applicable blue-economy or NbS financing instruments

Interreg Euro-MED | Co-funded by the European Union

FACTSHEET #8

Communication Tools for Raising Awareness on Climate Change in Mediterranean MPAs

PURPOSE

To provide Mediterranean MPAs with accessible communication materials that help explain climate impacts, monitoring results, and adaptation needs to local communities, visitors, and stakeholders.
These materials come from **MPA-ENGAGE** and **were not updated within MPA4Change,** but remain highly valuable for awareness and outreach.

TARGET USERS

- MPA managers
- Communication officers
- Educators
- NGOs
- Visitor centres
- Local authorities
- Outreach teams

HOW IT SUPPORTS MPAS

Although not updated, the Communication Toolkit remains important because it helps MPAs:

- Explain climate change impacts in an accessible way
- Support citizen science and participatory processes
- Improve transparency and trust with communities
- Mobilise support for adaptation actions
- Link monitoring results to easy-to-understand messages
- Raise awareness of mass mortality events and "climate signals"

It contributes to the engagement needs of:

- SAPBIO
- Barcelona Convention
- EU Climate Adaptation Strategy
- GBF Target 8 (awareness & climate resilience)

WHAT THIS TOOLKIT INCLUDES

The Communication Toolkit consists of **legacy materials** developed under **MPA-ENGAGE.**

1. **"Boiling Mediterranean" Awareness Booklet**
   - Illustrated guide explaining climate change impacts in the Mediterranean
   - Multi-language versions
   - Designed to support community outreach
2. **Visual & Social Media Materials**
   - Communication templates
   - Infographics used for campaigns in partner MPAs
   - Social media content packages for awareness raising
3. **Climate Animation & Educational Videos**
   - Short animated cartoon explaining warming, mass mortality, and species shifts
   - Educational video clips for visitor centres and school activities
4. **Expert Webinars & Recordings**
   - Public webinars held during MPA-ENGAGE
   - Recordings available online
   - Useful to explain monitoring and adaptation concepts
5. **"MED-Together" Video Campaign**
   - Short clips sharing climate messages from Mediterranean stakeholders
   - Designed to build shared regional awareness
6. **Access to Deliverables & Materials Database**

   All communication materials are hosted on the MPA-ENGAGE website, including:
   - Communication guidelines
   - Infographics
   - Visual identity assets
   - Awareness tools developed for MPAs

LEARN MORE

- Communication materials are available from the MPA-ENGAGE project: www.mpa-engage.eu

MPA4Change