Interreg Mediterranean

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Mediterranean Biodiversity Protection tools catalogue

Streamlining management efforts in protected areas for better nature conservation in the Mediterranean

This catalogue has been developed through EU co-funded projects namely Interreg MED PANACeA, the Mediterranean Biodiversity Protection Community (MBPC) and ENI CBC MED project ENSERES.

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Biodiversity Protection Tools Catalogue

The projects PANACeA and the Mediterranean Biodiversity Protection Community (MBPC)

This Mediterranean community, MBPC – the successor to the PANACeA project (2016-2019,) is made of more than 300 nature conservation actors working together for environmental sustainability and biodiversity protection. The Mediterranean Biodiversity Protection Community project (2019-2022) is a continuation of the PANACeA project (2016 to 2019) with an aim to advance networking and management efforts inside and outside protected areas (PAs) in the region. The community brings together key public and private players by mainstreaming management efforts for environmental sustainability and increasing the impact of biodiversity protection projects towards common identified strategic goals.

Since 2019, partners and projects of the Mediterranean Biodiversity Protection Community, through three working groups, are promoting collaborative work and helping build capacity in partners and interested actors for effective biodiversity protection. Through the local adoption of management tools and approaches at regional and national levels, particularly around governance mechanisms, public and private sector cooperation and awareness of Mediterranean biodiversity and the challenges, our community continues to find and share solutions for effective biodiversity protection across the whole Mediterranean.

This cooperation project has built a community of nature conservation stakeholders, including managers, policy-makers, socioeconomic actors, civil society, and the scientific community, actively working to protect biodiversity and natural ecosystems in Mediterranean MPAs. Moreover, the initiative seeks further coordination with other funding programmes and projects and undertakes actions to increase the visibility and impacts of the results of different thematic biodiversity protection projects, also with the financial support Interreg MED programme, reaching a common and pre-identified strategic target audience. In 2022, the ENI CBC MED co-funded project ENSERES “ENhancing Socio-Ecological RESilience in Mediterranean coastal areas” contributed to the joint efforts by supporting the identification and addition of additional tools to the Mediterranean catalogue and their transfer to the Southern shore of the Mediterranean, particularly Lebanon and Tunisia.

Several policy aspects are addressed under the umbrella of these projects, covering biodiversity protection, sustainable use of natural resources, ecosystem-based management approaches, including Maritime Spatial Planning (MSP) and Integrated Coastal Zone Management (ICZM) – as well as governance mechanisms. The Community is working to advance more effective biodiversity protection in the Mediterranean through enhanced monitoring and management of coastal and marine ecosystems, specifically targeting more sustainable fisheries, better adaptation to climate change effects, better prevention of marine litter and improved waste management.

The Biodiversity Protection Tools Catalogue

In the framework of the Project PANACeA, the MED Biodiversity Protection Community built the present Catalogue of tools for biodiversity protection in Mediterranean MPAs, covering different needs and requirements for ecosystem-based management.

This Catalogue is an update and extension of a previous report developed in the context of PANACeA, which included a preliminary version of some of the tools for ecosystem-based management in the Mediterranean, being developed by the Biodiversity Protection Community projects during the year 2018.

The tools included in this version of the Catalogue updated in 2022 are classified into several types: monitoring tools; management tools; geospatial tools; financial tools and other tools.

Monitoring tools have been developed to support the data collection and monitoring of specific ecological and socio-economic aspects, such as marine litter presence and distribution, and physico-chemical parameters associated with water quality and climate change.

Management tools aim to support marine protected area (MPA) managers in regulating specific sectors (e.g. small-scale fisheries), ecosystems (e.g. wetlands), or issues (e.g. marine litter, beach management), or in supporting an increased coordination with other maritime socio-economic sectors in the context of the Blue Economy and Marine Spatial Planning.

Geospatial tools have been developed to foster the access and sharing of spatial data and information, which are essential not only to support the informed management of Mediterranean protected areas, but also to generate new knowledge on ecological and natural resource management aspects, to support sustainable growth in Mediterranean protected areas and beyond.

The updated version of the original catalogue published in 2019 includes financial and capacity building tools to further complete the array of support available for more effective biodiversity protection in the region.

Overall, each of these tools is specially targeted to satisfy the specific needs and requirements of an ecosystem-based management, in line with the aim and the activities of the Mediterranean Biodiversity Protection Community and other relevant projects identified. They may be adopted and implemented by a wide range of stakeholders, including MPA managers, local authorities, citizens, researchers, and a diverse range of stakeholders (e.g., fishermen, hunters, business sector).

General information on the target groups of the tool, the theme addressed, the type of tool, the pilot areas where the tools has been tested or is planning to be, applied, and a list of keywords to easily find the tool;

- The main problem that the tool aims to solve;
- The main requirements for the implementation of the tool, in relation to technological infrastructure, training, and investment;
- A brief description on how to use the tool, and the recommended timeline of implementation;
- The main challenges that may arise during the implementation of the tool, and suggestions on how to address them;
- A brief description of the main quantitative results of the tool, and the potential of transfer of this tool into other areas;
- Key numbers that illustrate the need to implement the tool, or its efficiency/effectiveness; and
- Project and pilot areas, including links of interest to platform pages, project results, detailed reports, or any other useful material for further information on the tool.

*This catalogue has been developed through a series of EU co-funded projects since 2016 within the Interreg Mediterranean Biodiversity Protection axis, with the support of the ENI CBC MED project ENSERES since 2022.

**Interreg MED Biodiversity Protection Community and ENI CBC MED ENSERES, engaging a wide array of partners:*

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ACT4LITTER

Monitoring tool

Marine Litter Watch Month

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers, environmental NGOs, local authorities, educators, and students	Marine Litter	Monitoring tool	Marine litter, participatory-science, beach surveys

Pilot areas

1. What problems would this tool solve?

Marine litter is building up in Mediterranean coastal and marine protected areas. The ACT4LITTER Marine Litter Watch Month (MLWM) aims to gather essential data about the amount, composition, types and sources of marine litter on beaches by engaging MPA managers and other actors in a participatory-science campaign. The ACT4LITTER MLWM may not only provide fit-for-purpose data for the effective management of marine litter in Mediterranean coastal and marine protected areas, but may also enhance managers' skills on how to monitor marine litter by using a standardised beach litter monitoring protocol.

2. What is needed for its implementation?

Technological infrastructure

A hand-held GPS tracker to record the exact location of the survey sites, and a camera to document the physical characteristics of the monitoring sites.

Training

Capacity building, including hands-on training activities, are essential in order to enhance the target groups' skills on how to monitor marine litter on beaches in a harmonised way, in accordance with the EU "Guidance on Monitoring of Marine Litter in European Seas".

Investment

The application of beach litter monitoring is not demanding when it comes to financial and human resources. Assuming that four operators are required for each transect surveillance and about 3-4 hours on average are needed to collect, classify and record the items, about 4-6 man-days per year are needed to monitor one survey site. Assuming that results are reported to the European Environment Agency Marine Litter Watch or the EMODNET platforms, no additional resources are needed to process the results However, the preparation of MPA-specific marine litter assessment reports requires additional resources for

gathering, validating, and processing the datasets in order to compile an assessment report.

3. How to use it?

Concept

Survey sites are selected following the criteria described by the EU "Guidance on Monitoring of Marine Litter in European Seas". All litter items larger than 2.5 cm are collected, counted, and categorised in accordance with the 'Marine Strategy Framework Directive (MSFD) TG10 Master List of Categories of Litter Items'. The macro-litter density, expressed in number of items per square metre and number of items per 100-metre stretch, is calculated. The sources of marine litter are determined using the attribution-by-litter type method, which attributes specific items to a certain source, assuming that these are typically used by specific sectors, or are released into the environment via well-defined pathways.

Recommended implementation frequency

The MLWM campaign should be performed in every season, i.e. in winter (mid-December to mid-January), spring (April), summer (mid-June to mid-July), and autumn (mid-September to mid-October) of each year.

4. What challenges may arise?

MPA managers may have problems initially performing data collection and monitoring activities, due to a lack of experience or expertise. A possible solution to this problem lies in the provision of additional technical support in following the methodology and the standardised protocol provided.

5. What are the expected results?

Quantitative results

Reliable, accurate, and comparable fit-for-purpose data that enhance our knowledge of the amounts, types, composition, and sources of marine litter found on beaches in Mediterranean MPAs.

Transfer potential

The MLWM can be quite easily set up and run in diverse settings, enabling the participation of a wide range of actors such as MPA managers, NGOs, local authorities, and the educational community. Not only does it have the potential to engage MPA managers and other actors in gathering essential data on marine litter throughout the Mediterranean, but it can also act as a vehicle for raising awareness on marine litter and its sources, impacts, and solutions.

Key information

- During the winter edition of the MLWM, performed in December 2017-January 2018 in 16 coastal and marine protected areas of Albania, France, Greece, Italy, Slovenia, Spain and Turkey, a total of 17,334 marine litter items were recorded, with an average litter density of 1,048 items per 100-m stretch and 0.6 items per square metre. More than one-fourth of the 22 beaches surveyed were characterised by high litter densities ranging from 681 to 12,896 items per 100-m stretch.
- Main types of litter – 82% artificial polymer materials, mainly small plastic and polystyrene pieces (21.9%). On aggregate, single-use plastics accounted for about one-fifth (21%) of all the items recorded.
- Litter from shoreline sources, such as tourism and recreational activities and poor waste management practices accounted for 26.5% of all litter collected, while the amount of litter from fisheries and aquaculture was in the range of about 10%.

For further information

Project contact

- Thomais Vlachogianni, MIO-ECSDE Programme Officer, MLWM Leader
- Ignasi Mateo, ARC-SCP/RAC
- MedPAN

Links of interest

- Marine Litter Watch Month
- Snapshot Assessment of Marine Litter found on Mediterranean beaches
- EU Guidance on Monitoring Marine Litter in European seas
- VIDEO: Guidelines on how to monitor marine litter on beaches
- Biodiversity Protection Knowledge Platform – Act4Litter project viewer
- Biodiversity Protection Knowledge Platform – Marine Litter resources
- Factsheet on Modular Projects on Biodiversity Protection

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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ACT4LITTER

Management tool

Marine Litter MPA Action Plans

Photo by: M.Cebolla, Arxiu PNDE

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	Marine Litter	Management tool	Marine litter, management plan, MPA

Pilot areas

1. What problems would this tool solve?

The Mediterranean Sea is one of the areas most affected by marine litter worldwide, threatening habitats and species even in pristine coastal and marine environments. MPA managers lack the tools, knowledge, and often the resources to effectively tackle this problem. The purpose of the Marine Litter MPA Action Plans is to support MPA managers in identifying, selecting, and implementing targeted actions to tackle marine litter within the borders of their MPAs, and facilitate their efforts in achieving their conservation goals.

2. What is needed for its implementation?

Technological infrastructure

No particular technological infrastructure is needed; only a PC and an internet connection are required to run the decision-making tool, an innovative system that helps MPA managers to identify the most effective and feasible marine litter measures for their specific context.

Training

The action plans were developed step-by-step, engaging all stakeholders/actors of the area with the aim to reflect the MPA-specific context and characteristics and define the priority measures for preventing and mitigating marine litter effectively. The action plans can be prepared using a quick guide that has been developed for MPA managers.

Investment

It is not easy to estimate the financial resources needed to develop an action plan, as these depend on the specifics of the MPA and the comprehensiveness of the envisaged action plan.

3. How to use it?

Concept

The key objectives of an MPA-specific Marine Litter MPA Action Plan are to:

I. Prevent and reduce marine litter entering the coastal and marine environment of Mediterranean MPAs.
II. Collect and remove marine litter from the coastal and marine environment of Mediterranean MPAs by using sound methods that do not pose any threats to habitats and species, with a specific focus on marine litter hotspots and accumulation areas.

III. Enhance and deepen our knowledge of the marine litter threat (amounts, composition, sources, pathways and impacts) in Mediterranean MPAs.

The development of the Action Plan should be articulated in 4 phases:

1. Establishment: identification and engagement of stakeholders; establishment of a core team with the mandate to prepare and implement the plan.
2. Analysis and Scenarios: collection of all available information on marine litter, possibly also using the Marine Litter Watch Month (MLWM) tool; initiation of stakeholder engagement; generation of a proposed set of measures for marine litter prevention and mitigation. These measures may be identified via the use of an online decision-making tool, which can facilitate the shortlisting of priority measures by matching the MPA-specific content and its marine litter specifics with the features of a comprehensive list of about 100 showcases of best-practice marine litter measures.
3. Setting the Vision: engagement of stakeholders and the wider community in discussing the findings and building consensus on the final set of measures to be included in the plan.
4. Designing the Future: drafting and adoption of the marine litter Action Plan, which should indicatively include: i) the goals and objectives of the plan, ii) a preamble explaining the scope and process followed for its production and approval, iii) the context derived from the analysis, iv) the governance structure, v) the institutional framework for implementation, and vi) the priority marine litter measures agreed upon by the different stakeholders, along with a roadmap for their implementation.

Recommended implementation frequency

A timeframe for implementing each measure included in the Action Plan should be provided.

4. What challenges may arise?

The challenges that may arise in the implementation of the Action Plan can be related to aspects such as the lack of relevant data, difficulties establishing effective collaborations with local actors, and the lack of financial resources.

5. What are the expected results?

Quantitative results

The expected result is to develop a Marine Litter Action Plan, including a set of agreed measures to curb marine litter in the MPA.

Transfer potential

Action plans for marine litter may be developed and adopted by all Mediterranean MPAs, following the example set by the 9 pilot MPAs, and building upon the ACT4LITTER Joint Plan for Action entitled “Top 10 Priority Actions to curb marine litter in Mediterranean Marine Protected Areas”. In this way, coordinated approaches and actions can be established on a Mediterranean scale towards tackling marine litter in MPAs, and achieving the conservation objectives set.

Key information

- Possible measures to be included in the Action Plan are: i) setting up adopt-a-beach schemes; ii) establishing passive fishing-for-litter schemes; iii) carrying out clean-up and removal actions; iv) carrying out awareness and educational campaigns; v) promoting bans or levies on single-use items; vi) setting up selected waste reduction measures; vii) improving waste management; viii) promoting extended producer responsibility schemes; ix) and carrying out participatory-science initiatives to collect marine litter data.
- The decision-making tool is an innovative system that provides essential support to MPA managers who want to address marine litter. The decision-making tool was created in close collaboration with MPA managers and marine litter experts, building upon the ACT4LITTER list of some 100 showcases of best practice marine litter measures. The tool gathers information from users by asking questions, it matches this information with the criteria of the mapped best practice marine litter measures and comes up with a short list of measures that are relevant to the MPA special needs.

For further information

Project contact

- Ignasi Mateo, SCP/RAC
- Thomais Vlachogianni, MIO-ECSDE
- Sant’Anna School of Advanced Studies

Links of interest

- Quick Guide for MPA managers on setting the Action Plan
- Deliverables page with links to the 9 pilot Action Plans
- Decision-Making Tool (DMT)
- List of showcases of measures to tackle Marine Litter in MPAs
- Biodiversity Protection Knowledge Platform – Act4Litter project viewer
- Biodiversity Protection Knowledge Platform – Marine Litter resources
- Top 10 Priority Actions to curb marine litter in Mediterranean marine protected areas

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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MEDSEALITTER

Monitoring tool

Monitoring Protocol for Floating and Ingested Marine Litter

Photo by: Asunción Borrell

To whom is it addressed?	Theme	Type of tool	Key words
Scientists, technicians, Marine protected area (MPA) managers	Marine Litter	Monitoring tool	Marine litter, monitoring, protocol

Pilot areas: Capo Carbonara MPA, Italy; Barcelona–Civitavecchia transect; Livorno-Bastia transect; Palermo-Cagliari transect; Palermo-Tunis transect; Ancona-Igoumenitsa-Patras transect

1. What problems would this tool solve?

Currently available data on marine litter in the Mediterranean and in Europe are often insufficient and not comparable across marine regions and surveys. More consistent, coherent, and comparable marine litter data are needed in order to increase our knowledge, implement concrete actions for marine protection, and monitor their effectiveness. To address this issue, two protocols have been developed in the context of the Interreg MED MedSeaLitter project to provide a standard way to collect data on floating marine litter and on marine litter ingestion by sea turtles (Caretta caretta), fishes (recommended species: bogue, Boops boops), and polychaeta.

2. What is needed for its implementation?

Technological infrastructure

The technical requirements to apply the protocol are higher in the case of the use of aircrafts and drones, and for the ingestion of micro-litter in biota, while they are lower for the visual observations from ferries and small-medium boats, and for the ingestion of macro-litter in sea turtles. A detailed description of the technological infrastructure required for each tool is included in the published protocol.

Training

The training and expertise required depend on the technique used (see the published protocol for detailed specifications). Specialised training and expertise are necessary to use aircrafts and drones, and to apply the methods related to the extraction of ingested litter, while the use of ferries or small-medium boats for visual observations has lower training requirements. Specific training for pilot MPAs has been organised in the context of MedSeaLitter in spring and summer 2019.

Investment

Approximate estimations of the cost of each technique in the protocols have been performed; they are included in the published protocol. These range from the lower cost

of visual observations by ferries (in the 1,000-50,000 Euro range) to the higher cost of using aircrafts and monitoring micro-litter ingestion by invertebrates (higher than 50,000 Euro). The exact cost will depend on staff costs, existing equipment, and whether or not the protocol makes use of existing monitoring programmes and/or maritime operations.

3. How to use it?

Concept

The protocol proposes slight modifications to the basic data collection sheet adopted at the European level. Recommendations are also made on using ferries and sailing boats, and on using automatic photography from UAVs and manned aircrafts. In relation to the ingestion of marine litter, the protocol focuses on the loggerhead sea turtle (Caretta caretta), fishes (recommended species: bogue, Boops boops), and polychaeta. In relation to the loggerhead sea turtle, the protocol addresses only the necropsy in dead animals, slightly modifying the existing European protocol, considering basic and optional parameters proposed to stakeholders according to their logistics and time constraints, and in coordination with another EU-funded project, INDICIT.

Recommended implementation frequency

Seasonality can play a key role in driving the variability in the amount and distribution of litter, which is linked to seasonal variation in oceanographic and anthropogenic factors. Thus, stratification of surveys for the different seasons is required. For floating marine litter, a minimum sampling frequency of one per year is required, although seasonal replication is recommended. A frequency of at least 5 surveys per season can be considered adequate to perform seasonal analyses within one year of monitoring.

4. What challenges may arise?

Visual observations and automatic recording through photo/video may be affected by weather/sea conditions. Costs may be high if using dedicated research vessels. Moreover, from large vessels and aircraft it is possible to detect only marine litter that is larger than 20 cm. Finally, the dimension of the objects at sea may be difficult to assess; to overcome this issue, the protocol suggests using a ruler with a string of fixed length, and measuring the apparent length of the object and the degree of distance from the horizon line, in order to have an estimation of the object's real size. The monitoring of ingestion may depend on the geographic coverage of the species and the availability of animals.

5. What are the expected results?

Quantitative results

The application of the protocol allows for the collection of consistent, coherent, and comparable data on floating marine litter on both a large scale (i.e., at the Mediterranean basin level) and local scale (i.e., at an MPA level), and on ingested litter by biota.

Transfer potential

The protocol has been specifically developed for the Mediterranean, but it may be used to collect marine litter data in other marine contexts as well.

Key information

- The protocol developed by MedSeaLitter has been included in the review of the EU Guidance on Monitoring of Marine Litter in European Seas, in 2019.

For further information

Project contact: MEDSEALITTER

- Antonella Arcangeli, ISPRA
- Morgana Vighi, University of Barcelona

Links of interest:

- MedSeaLitter Final Shared Monitoring Protocol
- Comprehensive Framework on Existing Marine Litter Monitoring Practices
- Biodiversity protection Knowledge Platform – MedSeaLitter project viewer
- Biodiversity Protection Knowledge Platform – Marine Litter resources
- Campana et al. (2018). Seasonal patterns of floating macro-litter across the Western Mediterranean Sea: a potential threat for cetacean species
- Arcangeli et al. (2018). Amount, composition, and spatial distribution of floating macro litter along fixed trans-border transects in the Mediterranean basin

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ECOSUSTAIN

Monitoring tool

Short-Term Water Monitoring System (STMS)

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To whom is it addressed?	Theme	Type of tool	Key words
Marine protected area (MPA) managers, scientists	Water quality	Monitoring tool	Water quality, natural park, water pollution, monitoring

Pilot areas

1. What problems would this tool solve?

The effective management of any type of water body requires comprehensive, up-to-date data on its physical, chemical, and biological quality. The Short-Term Water Quality Monitoring System (STMS) can be used in situ to detect an increase of specific pollutants in water. It uses an automatic identification system network that notifies designated recipients in real time. By using the STMS, natural parks can improve their management capacities in relation to biodiversity protection, climate change, and they can also place an economic value on the territory, such as that provided by tourism.

2. What is needed for its implementation?

Technological infrastructure

Availability of electricity and internet connectivity, preferably through mobile networks, in the location chosen to place the sensors.

The hardware components required are the following:

1. Buoy/mast – Available depth/water flow speed. Must be able to hold the multiprobe base unit, battery, solar panels (if used) and the data logger.

2. Multiprobe base unit – Needs to be able to hold the chosen sensor probes. In the case of optical sensor heads, a wiper is recommended (it also takes up one spot in the multiprobe base unit).
3. Sensors (sensor heads) – The resolution and reliability of the measurements are important, so users must make sure they are getting sufficient accuracy based on their needs. Different sensor types require different maintenance – optical sensors can work for much longer unsupervised and there is not much else to be done for maintenance other than cleaning the sensor heads.
4. Power source – In the case of solar panels, keep in mind that the power needs to be able to charge the battery sufficiently when sunlight is available. The number of solar panels can improve the input power and can also influence the percentage of time the panels are getting sunlight (different orientation configurations are available). Solar panels also require a regulator that can provide a suitable output for the battery.
5. Battery – The battery needs to provide the correct voltage and amperage to power the system. The capacity of the battery should be based on the battery life required and the total power drain of the system (the power drain is mostly affected by how often measurements are taken and then sent to the server).
6. Data logger – Should be compatible with the multiprobe base unit to collect the data from the sensors (compatible connections). Preferably contains local storage for situations when an internet connection might not be available. Should send data to the remote location (server) for storage.
7. Internet connectivity module – GSM (2G/3G/4G) in most cases where there is sufficient GSM coverage. Can be integrated with the data logger.

Dedicated software should be chosen to collect, display, and manage the data collected.

Training

Training is recommended to explain the use of the software to all potential users.

Investment

Installing a network of STMS buoys to detect pollution intake would be cost-effective, and cheaper than traditional sampling and analysis. Some guidelines for the cost-benefit analysis of implementing the STMS have been developed; they suggest the indicators to use to assess impact categories, such as revenues, compliance with regulations, costs of remediation in case of pollution events, daily management costs, and water monitoring effectiveness.

3. How to use it?

Concept

The STMS consists of installing a buoy in the water of the protected areas to be monitored, equipped with a multiprobe base unit with battery-powered sensors for relevant water quality parameters, solar panels for charging the battery, a data logger for all measurement values and a GSM modem to send the measurement values to a server. Data are sent both to the Parks' server and to the EcoSUSTAIN server. Thus, the Parks receive data directly on their computers, displayed in tables and graphs, and if measurements are outside the acceptable ranges, an alarm is sent to selected relevant users. Data are also published on the EcoSUSTAIN open online portal, where authorised users can create periodic reports, which are also publicly available on the portal.

Recommended implementation frequency

The first step is to choose the parameters to monitor, which may include a range of physical (temperature, conductivity, turbidity), chemical (dissolved oxygen, pH), and biotic (blue-green algae and Chlorophyll-a pigments) variables. Factors such as the cost of the probes, their duration and robustness in specific conditions, and the maintenance requirements should be considered.
The second step is the choice of locations for installing the buoys, based on several considerations such as the purpose of monitoring, ease of maintenance, and proximity to navigational routes.

Data are then collected and transmitted at predetermined frequencies, which may be set according to the Water Framework Directive (WFD) minimum requirements. Data are then displayed on the screen in the form of graphs and tables. Statistical values are derived from the raw data (e.g. minimum, maximum and average values from the period). The data are only processed while viewed within the application as live data or through the created reports, but the data itself are valuable and can be further processed outside of the STMS solution by using any desired tool.

4. What challenges may arise?

Visual observations and automatic recording through photo/video may be affected by weather/sea conditions. Costs may be high if using dedicated research vessels. Moreover, from large vessels and aircraft it is possible to detect only marine litter that is larger than 20 cm. Finally, the dimension of the objects at sea may be difficult to assess; to overcome this issue, the protocol suggests using a ruler with a string of fixed length, and measuring the apparent length of the object and the degree of distance from the horizon line, in order to have an estimation of the object's real size. The monitoring of ingestion may depend on the geographic coverage of the species and the availability of animals.

5. What are the expected results?

Quantitative results

The application of the protocol allows for the collection of consistent, coherent, and comparable data on floating marine litter on both a large scale (i.e., at the Mediterranean basin level) and local scale (i.e., at an MPA level), and on ingested litter by biota.

Transfer potential

The protocol has been specifically developed for the Mediterranean, but it may be used to collect marine litter data in other marine contexts as well.

Key information

- In the Albufera National Park, more than 4,000 measurements of 6 different parameters have been taken in one year. Using these data, researchers are able to study the changes in water parameters in relation to atmospheric conditions.
- Thanks to the implementation of SMTS, the Krka National Park was able to collect for the first time a continuous data series, 24 hours/day, every day, in every season. These series are very useful, not only to the Park, which for the first time owns the water quality monitoring data, but also to other stakeholders that perform research or data sampling in the area.

The data collected for the four pilot sites and associated information can be found in the spatial viewer created by the project: http://ecosustain.info/

For further information

Project contact: EcoSUSTAIN

- Communication Manager: Samir Jodanovic

Links of interest:

- Water Monitoring implementation Manual
- Costs and Benefits of STMS
- Lessons learnt during the pilot implementation
- Biodiversity Protection Knowledge Platform – EcoSUSTAIN project viewer
- http://ecosustain.info/

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Image by Ivan Ivankovic from Pixabay

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ECOSUSTAIN

Monitoring tool

Long-Term Water Monitoring System (LTMS)

© ECOSUSTAIN

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers, scientists	Water quality	Monitoring tool	Water quality, natural park, water pollution, monitoring, Sar sensor imagery

Pilot areas

1. What problems would this tool solve?

The effective management of any type of water body requires comprehensive, up-to-date data on its physical, chemical, and biological quality. The long-term monitoring system (LTMS) is an integrated solution for monitoring environmental indicators via satellite using Earth Observation techniques and relevant satellite imagery processing/classification, and for preparing meta-information, presented on the client's graphical user interface (GUI). It allows for high-frequency (i.e., more than once per month) screening of a water body, without the need for field visits.

2. What is needed for its implementation?

Technological infrastructure

A PC and the LTMS client application software, which can also be installed remotely if necessary.

Training

A basic knowledge of Geographic Information Systems (GIS) is required. A training session may be useful to learn the use of the software, which is very user friendly.

Investment

The system does not require any maintenance.

3. How to use it?

Concept

The LTMS allows measuring environmental indicators of water quality (i.e., Chlorophyll-a, NO3, NH4, phosphorus, pH, and dissolved oxygen) by using Optical and Synthetic-Aperture Radar (SAR) sensor imagery and data. The LTMS is an important complement to traditional monitoring, as it provides a depiction of trends for water quality-related parameters. It can detect degraded and potentially sensitive areas, such as one-time and diffused sources of pollution.

Recommended implementation frequency

The selected satellite (Landsat 8) passes over the pilot area three times per month, assuming no weather constraints. The images are selected and processed using a pre-set algorithm. Then, the final result is stored in the server and the Protected Area Management Body receives the final image.

4. What challenges may arise?

Cloudy meteorological conditions may negatively affect the clarity of the pictures retrieved by the satellite. A potential drawback lies in the shallowness of the lake. Calibration with field measurements and grading parameters into standardised classes may be useful to offset drawbacks and improve data quality.

5. What are the expected results?

Quantitative results

The LTMS is able to capture monthly and annual trends, and is able to monitor entire water bodies at 30 x 30 pixel resolution.

Transfer potential

The LTMS can be easily used to monitor water quality in any other bodies of water across the Mediterranean. The following recommendations apply:

- Carefully select the parameters to be monitored, based on the needs and requirements of the Park, but also on feasibility with the system provider.
- Verify at an early stage with the provider the frequency of measurements and of data detection;
- Test the accuracy of the measurements under different weather conditions.
- Run the monitoring activities for at least a couple of years, as they provide useful long-term trends.
- Involve all relevant stakeholders in the pilot monitoring, including scientists and research institutions whose area of interest is water quality monitoring, as they can provide useful advice and support, as well as data for the system calibration, comparison and integration.

Key information

- Lake Karla was chosen for the LTMS pilot because it is a heavily modified body of water under the protection of Natura 2000 Network and it hosts important species of fish fauna and avifauna.

For further information

Project contact: EcoSUSTAIN

- Communication Manager: Samir Jodanovic

Links of interest:

- Water Monitoring implementation Manual
- Costs and Benefits of LTMS
- Lessons learnt during the pilot implementation
- Biodiversity Protection Knowledge Platform – EcoSUSTAIN project viewer
- http://ecosustain.info/

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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FISHMPABLUE2

Management tool

Governance Toolkit for managing Small-Scale Fisheries in Marine Protected Areas

Photo by: Helena Volpi from Pixabay

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	Fisheries	Management tool	Small-scale fisheries, governance, toolkit, co-management, MPA

Pilot areas

1. What problems would this tool solve?

Ensuring the effective management of a Mediterranean MPA requires good governance and an ecosystem-based approach that integrates the fisheries sector, particularly small-scale fishers, as legitimate actors in the decision-making process. The Small-Scale Fisheries (SSF) Governance Toolkit is the cornerstone of a bottom-up, "towards co-management" approach; it describes more than 20 actual measures to enhance the environmental and socio-economic effectiveness of MPAs in SSF management, and the degree of feasibility of each.

2. What is needed for its implementation?

Technological infrastructure

No particular technological infrastructure is required for the process of formulating and implementing the SSF Governance Toolkit. Technological requirements may arise involving specific tools that can be adopted, such as the use of video and photo cameras to improve surveillance and patrolling.

Training

Initial training may be required to establish a platform of cooperation between SSF fishers and MPA managers. Specific training activities may be implemented involving specific tools that can be adopted, such as training to enhance the capacity of rangers to enforce fisheries regulations within MPA boundaries, to improve the capacity of fishermen in surveillance activities, and to build the capacity of fishermen to monitor and report catches, sightings of endangered cetaceans and sea turtles, rare sightings and invasive species, and marine litter.

Investment

The cost and time needed to implement each of the tools included in the Toolkit have been assessed on a three-point scale (low-cost, medium-cost and high-cost) by the managers of the pilot MPAs, taking as a reference the annual budget of their MPA, the manpower available to them in their MPA and the number of stakeholders they have to engage in their MPA. Based on the managers' experience, the attributes with the median highest needs (in terms of cost, time and stakeholder involvement) to implement the corresponding tools were Enforcement and Improving SSF sustainability.

3. How to use it?

Concept

All the tools and management measures that are described in the toolkit have been tested in the 11 pilot MPAs. They have been grouped into five main categories:

1. Enforcement – enhancing MPA surveillance and patrol capacities.
2. Engaging fishermen in the decision-making process.
3. Knowledge and ownership – ensuring decisions are based on all forms of knowledge and information, and encourage awareness and education among stakeholders.
4. Environmental sustainability of small-scale fisheries.
5. Economic sustainability, i.e., improving the income of small-scale fisheries.

The SSF Governance Toolkit illustrates the results of testing these measures, and the lessons learned from their implementation.

Recommended implementation frequency

An effective and balanced co-management system must be a dynamic and adaptive process, since MPAs' conservation-related targets can vary over time, fisheries can evolve, like any other economic sector, and, in particular, the status of the environment (including fish stocks) can worsen/improve. For this reason, the system must have a baseline "SSF management plan" and anticipate a shared "control room" (e.g. a formal committee), where MPA managing bodies and fishers meet regularly and take decisions to tackle the changes needed to improve the efficiency of the system and the effectiveness of its actions in relation to the goals set.

4. What challenges may arise?

- A genuine willingness to share power, especially by MPA managers, is a fundamental requirement for co-management to be effective.
- Moreover, local fishers should strive to speak with one voice, or to reach a common position with respect to the MPA proposals.
- The involvement of other local actors, such as government agencies, researchers, NGOs, and other economic sectors such as the diving industry, can be very useful, although these actors cannot replace the decisions of artisanal fishers.

5. What are the expected results?

Quantitative results

By implementing the tools included in the Governance Toolkit for managing Small-Scale Fisheries in MPAs, an effective and shared management system can be built for Small-Scale Fisheries in Mediterranean MPAs.

Transfer potential

The SSF Governance Toolkit can be a useful instrument for any MPA manager who wants to improve governance in their MPA through better cooperation with local small-scale professional fishers. The tested tools can address some of the most recurring problems any MPA manager encounters when dealing with SSF in or around the MPA.

Key information

- In the Telascica MPA (Croatia), thanks to the activities stimulated by the FishMPABlue2 project, the Ministry of Agriculture – Directorate of Fishery has established a Working Group for drafting an "SSF management Plan", and local small-scale fishers are one of the main actors in this working group.
- In the Torre Guaceto MPA (Italy), as part of the meetings for the FishMPABlue2 pilot action implementation, the local small-scale fishers agreed to sign a Memorandum of understanding to enlarge the MPA surface area.
- In the Es Freus MPA (Spain), the Regional government agreed to cover half the costs of the equipment necessary to install video-cameras on the island of S'Espardell, and it stated its willingness to disseminate this tool into other MPAs in the Balearic region, in order to increase the MPA's real-time surveillance capacity.

For further information

Project contact: FISHMPABLUE2

- Luca Santarossa (Federparchi) – Project Manager
- Anne Remy (WWF Med) – Communication Manager
- Paolo Guidetti (University of Nice) – Scientific Coordinator

Links of interest

- Small-scale Fisheries Governance Toolkit
- Small-scale Fisheries Governance Toolkit Leaflet
- Artisanal fishers and MPAs: a partnership for sustainability in the Mediterranean
- Biodiversity Protection Knowledge Platform – FishMPABlue2 project viewer
- Results of the pilot actions implementation (i.e. comparison between results of 2017 and 2018 monitoring campaigns)

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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FISHMPABLUE2

Monitoring tool

Monitoring methodology for small-scale fisheries within and around MPAs

Photo by: Romanos Senikidis on Unsplash

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers, decision-makers, scientists	Fisheries	Management tool	Small-scale fisheries, monitoring, MPA

Pilot areas

1. What problems would this tool solve?

Successful MPA management practices should properly address the complexity of Small-scale Fisheries (SSF) and their impacts, not only on the environment through the extraction of fishing resources, but also on dependent social and economic systems. In this regard, there is clearly a need to collect relevant data concerning multiple aspects of SSFs management in order to develop and adapt sound management plans and strategies.

This document adopts an overall multidimensional approach, and suggests different and integrated methodologies to collect data on the specific variables that should be monitored to support the development of sound SSF management in and around MPAs, the goal being to attain a win-win scenario for both conservation and fisheries goals.

2. What is needed for its implementation?

Technological infrastructure

- A combination of an Underwater Visual Census (UVC) and Horizontal Baited Underwater Video systems (H-BUVs) is suggested to monitor fish assemblages; UVC using strip transects of 25 × 5 m (a standard surface largely used globally, and in the Mediterranean Sea in particular) are performed by divers swimming at constant speed, identifying, counting, and estimating the size of all individuals within 2.5 m on either side of the transect line. Each H-BUVs unit consists of a stainless steel frame with a mesh bag on one end containing a fixed amount of bait (i.e., crushing sardines to ensure greater dispersion of the plume, usually 400 gr of *Sardina pilchardus* per replicate), and supporting, on the other end, two GoPro Hero 3 high-resolution (720p) stereo-video cameras located in a waterproof housing. Each H-BUVs unit is attached by a rope to a large buoy on the surface, along with two small buoys in proximity of the unit.
- Squidpops are also recommended to assess predation intensity related to mesopredatory fishes. Squidpops consist of a 1.3-cm diameter disk of dried squid mantle tethered to a 30-60 cm rod, which is either inserted in the sediment in soft-bottom habitats or secured to existing structures. Underwater, tethered rods are spaced 1-2 m apart in single or double rows and filmed by an underwater camera for the first hour.

- A photo camera to take pictures of fish landings and catches, and image-analysis software (e.g., ImageJ) to assess the length and wet weight of each specimen in the laboratory.

Training

Specific training is required to design monitoring activities and to use the above-mentioned techniques.

Investment

Specific equipment (cameras, software, reels etc.) has to be purchased to perform the suggested methodologies. In addition, normal costs for activities at sea should be planned for.

3. How to use it?

Concept

The Guidelines cover the monitoring of the following variables and techniques:

- Environmental factors: Fish Assemblages, using an underwater visual census with strip transect and Horizontal Baited Underwater Video systems (H-BUVs); and assessing the potential effect of MPAs on predation intensity and related top-down ecological control using squidpops.
- Economic factors: comparison between the catches per unit of effort (CPUE) and the revenue per unit of effort (RPUE) obtained within the MPA, with those obtained in open fishing areas outside the MPA using the same gear and approximately within the same bathymetric range and habitats.
- Other social, cultural, governance, and health factors: other domains (and specific variables) of the human dimension were assessed, related to the human well-being of small-scale fishers' communities, using extensive literature review and expert knowledge assessment through two questionnaires.

Recommended implementation frequency

Multi-year monitoring studies are recommended in order to evaluate the temporal trends of the assessed outcomes. In this context, it is fundamental to stress the importance of planning robust sampling strategies and designs that highlight the effects of MPAs on a set of variables, while accounting for natural and spatial variability in the investigated system.

4. What challenges may arise?

Fishers may be unwilling to participate and answer the questionnaire; hence, some best practices have been identified, which include the recommendation to have a neutral and objective stance, to interview fishers when they are not too busy, and to ensure the confidentiality of the interview. A similar problem could arise for monitoring small-scale fisheries catches at landing.

It is advisable, therefore, that scientific studies and monitoring be conducted in partnership between MPAs scientific or technical personnel and scientific institutions, to make sure that the methods chosen, the way the monitoring is actually conducted in the field, and the way data are analysed, allow for proper conclusions to be drawn.

5. What are the expected results?

Quantitative results

By implementing these methods, essential data can be collected that describes environmental, economic, and social aspects related to SSFs, which are fundamental to support effective management strategies.

Transfer potential

These Guidelines are ready to be adopted and applied by any MPA in the Mediterranean.

Key information

Representative example of the methodology to collect small-scale fisheries catch data.

For further information

Project contact: FISHMPABLUE2

- Luca Santarossa (Federparchi) – Project Manager
- Anne Remy (WWF Med) – Communication Manager
- Paolo Guidetti (University of Nice) – Scientific Coordinator

Links of interest

- Common methodology for the design and execution of sound scientific monitoring of small-scale fisheries within and around an MPA
- SSF Governance Toolkit
- Results of the pilot actions implementation (i.e. comparison between results of 2017 and 2018 monitoring campaigns)
- Biodiversity Protection Knowledge Platform – FishMPABlue2 project viewer

Interreg Mediterranean FishMPABlue 2

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MPA-ADAPT

Monitoring tool

Climate Change Monitoring Protocols

© MPA-Adapt - Project

To whom is it addressed?
Marine Protected Area managers, marine scientists, national oceanographic agencies, hydrographic offices, policy-makers, and the interested general public

Theme
Climate Change

Type of tool
Monitoring Tool

Key words
Climate change, MPAs, seawater temperature, mass mortality

Pilot areas: 70+ sites in Spain, France, Italy, Croatia, Greece, Turkey, Tunisia

1. What problems would this tool solve?

The effects of climate change and global warming are particularly alarming for the Mediterranean Sea, which is warming faster than the global oceans. The MPA-ADAPT project developed five standard protocols as a practical guide to track climate-related impacts in Mediterranean MPAs and beyond, following the requirements of the Ecosystem Approach and in the framework of the UNEP/MAP Barcelona Convention. The resulting outputs of the protocols provide key information to support mitigation strategies and effective adaptation plans in Mediterranean MPAs.

2. What is needed for its implementation?

Technological infrastructure

Materials required to monitor temperature conditions:

1. temperature data loggers HOBOTidbit v2 or HOBO-U22 and related software;
   - a fastening kit (Colson rings, ankles Colson, putty for underwater sealing, plastic gloves, and bag);
   - a tool to scratch the rock prior to attachment, and pliers or scissors for cutting.

2. Materials required to assess mass mortality events:
   - a plastic board to collect data underwater;
   - a diving computer to set the depth of the survey;
   - a reference, such as a 50 x 50 cm quadrat, or a 50-cm bar.
3. Materials required for LEK-1 and LEK-2:
   - printed copies of the questionnaire to do the interviews;
   - a field guide or pictures of fish and other marine species, to assist in identifying the fish species;
   - an Excel file for data collection.
4. Materials required for the fish visual census:
   - a pre-printed board to collect data underwater;
   - a diving computer to set the survey depth, measure transect time (5 minutes) and water temperature.

Training

- Video tutorials are available in the T-MEDNet Platform on how to deploy temperature data loggers for monitoring seawater temperature, and on how to conduct mortality surveys. A video tutorial for fish visual census is also available in the ISPRA and MPA-ADAPT YouTube channel.
- Temperature monitoring can be conducted by certified scuba divers, working in pairs. The mass mortality assessment and the fish census can also be performed by recreational divers with adequate training. For LEK-1 and LEK-2, interviewers should be practitioners skilled in species identification and with good knowledge of local fisheries.

Investment

The necessary material to implement the protocol is estimated to cost 1,800 Euro per MPA.

3. How to use it?

Concept

Five protocols have been developed to:

1. Monitor temperature conditions – temperature is recorded every hour using data loggers deployed every 5 m from surface to a depth of 40 m, and recovered on an annual or semi-annual basis. The resulting data series can be used to build robust baselines and track hydrological changes to better understand the impacts that climate warming has on marine coastal biodiversity.
2. Assess the impact of mass mortality on macrobenthic species dwelling in coastal waters. The aim of this protocol is to track the conservation status of macrobenthic species populations.
3. Explore Local Ecological Knowledge to reconstruct historical changes (LEK-1) – this protocol can be used to interview experienced fishermen or other sea users, to gather information on historical changes in species abundances and distribution, and to detect new species early.
4. Explore Local Ecological Knowledge for periodical monitoring (LEK-2) – this protocol can be used to interview experienced fishermen or other sea users, to regularly monitor climate-sensitive species of both native and exotic origin.
5. Implement a fish visual census of climate change indicators – this protocol can be used to assess the abundance and distribution of specific fish species, chosen as reliable indicators of climate change in Mediterranean MPAs. Local species targets can be added by MPAs, based on local monitoring needs, ease of recognition, interaction with fisheries, increase/decrease in the area, potential impacts on the

environment/fisheries/human activities.

These protocols are inspired by the concept of Essential Climate Variables, and focus on a restricted set of simple measurements to capture greater aspects of environmental change. The indicators have been chosen on the basis of their scientific relevance, feasibility, and cost effectiveness.

Recommended implementation frequency

1. Monitoring temperature conditions: data loggers should be set up and retrieved every 6 months, generally before and after the warm season. A yearly periodicity can be adopted for remote sites.
2. Assessment and monitoring of mass mortality: mass mortality should be monitored every 12 months after summer, i.e. from mid-September to mid-October, or if mass mortality events are observed.
3. LEK-1: interviews can be done at any time of the year.
4. LEK-2: interviews should be done every 12 months; the respondents should ideally remain the same across time.
5. Fish visual census: the fish census should be performed every 12 months, between August and October; for recreational divers, the census can be performed at any time of the year.

4. What challenges may arise?

To ensure the continuity of temperature data series, temperature data loggers should be launched with the correct parameters, prior to being placed again in the field, and solidly attached to the substrate to avoid losing them due to rough sea conditions.

Looking for small gorgonian colonies or specimens (less than 15 cm in height) may not be straightforward during the sampling; hence, they should not be taken into account. Fishermen may distrust researchers and practitioners; for this reason, special attention should be paid to the approach used during the interviews, e.g., by showing a genuine interest in the answers and behaving like a facilitator, not an expert.

5. What are the expected results?

Quantitative results

By implementing the proposed protocols, important physical and biological data can be collected, data that are necessary to understand climate change and seawater warming in the Mediterranean, and to support the drafting and implementation of adequate management strategies by Mediterranean T-MEDNET, Med-IAMER, AWI, and VLIZ, among others.

Transfer potential

The protocols can be shared, downloaded, and printed as needed by Mediterranean MPAs and for use in non-commercial products or services, provided that appropriate acknowledgment of the MPA-ADAPT project as the source and copyright holder is given.

Key information

- MPA-ADAPT has been used to set up new sites for seawater T monitoring, and resulted in over 2 million new T data points from around 30 sites declared by new users along the coasts of Provence, Corsica, Sardinia, as well as in the Tyrrhenian, and in the central and southern Adriatic Sea (http://t-mednet.org/t-sites/t-figures).
- The mass mortality monitoring protocols are currently being applied in several MPAs.
- The Fish Visual Census of climate change indicators has been applied in pilot actions with recreational divers, in collaboration with PADI (the largest recreational divers' organisation), providing promising results. More than 200 censuses were conducted within the MPA-ADAPT project in the Portofino MPA and in the Isole Pelagie MPA.

For further information

Project contact: MPA-ADAPT

- Joaquim Garrabou, ICM-CSIC

Links of interest:

- T-MEDNet Platform
- Biodiversity Protection Knowledge Platform – MPA-Adapt Project Viewer
- Monitoring Climate-related responses in Mediterranean Marine Protected Areas and beyond: FIVE STANDARD PROTOCOLS
- MPA-ADAPT work on climate change and marine protected areas

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Photo by: Bijana Aljinovic IUCN Med

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AMARE

Geospatial tool

AMAre WebGIS Geoportal

Photo by: AMAre

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area managers, decision-makers, scientists, citizens	Ecosystem Approach	Geospatial Tool	MPA, data sharing, Maritime Spatial Planning, management

Pilot areas

1. What problems would this tool solve?

MPAs need coordinated strategies in support of sound Maritime Spatial Planning (MSP) in these areas, and to address conflict "hotspots" that require scientific-based, informed management decisions.

The AMAre WebGIS Geoportal is a web-based portal that provides MPA managers, decision-makers, scientists and citizens with a user-friendly platform for sharing spatial data and information, which is instrumental for taking informed decisions for MPA management.

2. What is needed for its implementation?

Technological infrastructure

A PC and an internet connection are necessary to access the WebGIS Geoportal.

Training

A necessary activity, envisaged in the context of AMAre, is training the personnel to use the geoportal and other tools, targeted especially at MPA managers.

Investment

No cost is associated with accessing and using the WebGIS Geoportal.

3. How to use it?

Concept

The Geoportal is an HTML5 application (ArcGIS server + Moka kit) that allows sharing, integrating and displaying data, printing maps, and other functionalities. It combines intelligent web maps with graphs, charts, tables, and text to unlock, provide access to and re-use the data relevant for managing MPAs in a coordinated manner.

The data layers are organised by themes and are described by proper metadata. Their accessibility and preservation will be guaranteed through the ISMAR Metadata Portal (ESRI Geoportal).

Recommended implementation frequency

The AMAre WebGIS Geoportal Is already online and can be consulted at any time.

4. What challenges may arise?

The main challenges to using the Geoportal are related to the implementation of more advanced functions and in the free download of the data. Spatial data are covered by a data policy defining the request protocol to retrieve data, and the community is not ready yet to meet completely the open data concept.

5. What are the expected results?

Quantitative results

Massive use of the AMAre Geoportal would have an effective impact on conservation, management and marine science. This tool can help in maritime spatial planning, in the monitoring plan implementation, to support the management plan and for dissemination purposes.

Transfer potential

To date, the WebGIS Geoportal covers only the 5 pilot MPAs involved in the AMAre project. Its coverage may be extended to include relevant data and information to support the management of other Mediterranean MPAs and to share information between MPAs at the basin level.

Photo by: AMAre

For further information

Project contact: AMAre

- https://amare.interreg-med.eu/special-pages/contact/

Links of interest:

- AMAre Geoportal
- ISMAR Metadata Portal
- Biodiversity Protection Knowledge Platform – AMAre Project Viewer

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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POSBEMED

Management tool

Sustainable management of Posidonia beach systems

Photo by: Bruno Glätsch from Pixabay

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area managers, beach managers	Beach management	Management Tool	Beach, *Posidonia oceanica*, Marine Protected Area, banquettes, coastal erosion,

Pilot areas: Spain, France, Italy, Greece, and Cyprus

1. What problems would this tool solve?

Although there is clear scientific evidence and consensus of the ecological role and relevance of *Posidonia oceanica* and dunes in coastal ecosystems, the lack of a consistent legal framework and existing social perceptions are preventing their sustainable management. Moreover, many municipalities and local stakeholders are demanding sustainable solutions for the management of banquettes. New management approaches are needed, which have to focus on the conservation of the integrated coastal ecosystem, considering how management practices affect the health of the entire ecosystem and the resilience of the coastline.

These Guidelines include a Governance Strategy and Action Plan to address these challenges, by providing:

- An update to the existing perceptions by different stakeholders and the existing policy framework for the management of Posidonia banquettes
- A Guide on existing methods and tools for the sustainable use of seagrass banquettes and associated dune systems; and
- An action framework for the Mediterranean and a locally oriented toolkit with recommendations for the sound management of Posidonia and dune systems.

2. What is needed for its implementation?

Technological infrastructure

No technological requirements are specified in the Guidelines.

Training

Personnel should receive training each year on beach cleaning policies, characteristics of the Posidonia littoral zone and how to recognise and mitigate impacts.

Investment

An approximate estimate of the costs associated with each removal option (high-low) is included in the Guidelines.

3. How to use it?

Concept

The Guidelines include a framework of reference for decision making, particularly for large Posidonia banquettes, that considers beach functions (protection and recreation) and the integration of the ecosystem. The strategic objective is to achieve the sustainable management of Posidonia beaches, while maintaining the environmental value in some areas (e.g. Protected Areas), and the recreational value in others. The tactical level reflects beach typologies in order to take into consideration the (local) social expectations and present perceptions while also maintaining the integrity, ecological function and environmental values of the Posidonia coastline. At the local level, before any activities are undertaken, benchmarking will help to define a base line: the existing dynamics of the coastal zone and the seagrass deposition and formation of banquettes on the beach/es.

At an operational level, measures for managing Posidonia banquettes are identified and implemented: a) to maintain the ecosystem (minimise interference with the process of sand and nutrient deposition from banquettes); b) to improve the situation if erosion is present or restoration activities are needed and c) to limit the impact on the recreational value of surrounding areas and to ensure that existing and planned recreational uses are balanced with maintaining ecosystem integrity. Feasibility a ssessments for each option should be carried out for the evaluation. Finally, the monitoring and evaluation of interventions consists of selecting a series of indicators to monitor the status of the coastal environment, including the beaches and associated dunes.

Recommendations are included on beach cleaning (avoiding the use of mechanical methods whenever possible), on disposal options, access of transportation vehicles to the beach, use of the banquettes, and on the issue of beach certification schemes.

Recommended implementation frequency

The management framework proposed by these Guidelines should be periodically reviewed to account for any variation in the ecological and socio-economic systems involved in the assessment and the outcomes of Posidonia banquette management.

4. What challenges may arise?

Each approach to remove Posidonia banquettes may encounter specific limitations, which should be carefully considered in advance. Some of these have been identified in the Guidelines for the following techniques: disposal offshore, relocation to a point higher in the beach, disposal off-site from the beach, use of heavy machinery on sandy beaches, and the use of machinery on dunes. As an indicative example, the disposal offshore of the banquettes removed from beaches may threaten the persistence and productivity of seagrass and other marine habitats and reduce water quality. As another example, the relocation to a higher point on the beach may reduce the recycling of nutrients and sand back to the sea, with higher maintenance costs.

5. What are the expected results?

Quantitative results

The effective implementation of these Guidelines will considerably improve the management of Posidonia banquettes in Mediterranean beaches and dunes.

Transfer potential

These Guidelines may be applied by any Mediterranean MPA manager, as they include general recommendations that are applicable to the whole Mediterranean basin. The Guidelines also include a transnational integrated strategy and action plan, which aims to orient regional and national policies and fund bodies and research institutions towards creating suitable conditions for implementing sustainable beach and coastal management practices across Mediterranean areas.

Key information

- Posidonia oceanica forms large meadows that are widely distributed along the Mediterranean coastline between the surface and 44 m depth in the clearest waters. Recent estimates suggest that its overall known distribution is about 12,247 km^2, with more than 50% within EU territory (Telesca et al., 2015).
- It has been estimated that on some Mediterranean beaches, up to 7,000 tonnes of seagrass deposits can be present during the winter.

For further information

Project contact: POSBEMED

- https://posbemed.interreg-med.eu/special-pages/contact/

Links of interest:

- Governance and Management of Posidonia beach-dune systems (in English, Spanish, French, and Greek)
- Biodiversity Protection Knowledge Platform – POSBEMED project viewer
- Poster, leaflet and videos
- Telesca et al., 2015. Seagrass meadows (*Posidonia oceanica*) distribution and trajectories of change.

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AMARE

Monitoring tool

Common Monitoring Approach for Marine Protected Areas

Photo by: AMAre

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area managers, scientists	Ecosystem Approach	Monitoring Tool	MPAs, monitoring, human activities

Pilot areas

1. What problems would this tool solve?

Mediterranean MPAs are in need of data to identify key pressures, to understand the effects of human activities, plan concrete actions to protect coastal and marine ecosystems, and monitor the effectiveness of the protection measures implemented.

To address this need, the AMAre project adopted a common monitoring approach to assess the effect of human stressors on three specific habitats: Cystoseira spp., *Posidonia oceanica*, and coralligenous formations.

2. What is needed for its implementation?

Technological infrastructure

The common monitoring of the three habitats does not require very expensive or significant technological infrastructures. The automatic acquisition of biological data by specific sensors and robots is under study in many EU projects and will be the future challenge in the framework of the Blue Growth, in keeping with the Marine Strategy Framework Directive (MSFD) vision. At the moment, well-trained MPA staff focusing on a few response variables (macroalgal and seagrass canopy cover, Posidonia shoot

density, cover and number of conspicuous species and functional groups in coralligenous formations) can provide the solution to ensure MPA monitoring. These response variables can be assessed by visual estimates, macro-photographic records and video by ROV.

Training

Training activities are recommended for MPA staff to continue with the direct monitoring, based on continuous interactions with research institutions and environmental agencies that can also support data acquisition and analyses.

Investment

Recent large-scale assessments showed that MPAs often lack of budget dedicated to monitoring. In the Management Plan, the costs of monitoring should be included and constant (operating) external financing should be ensured to support long- term monitoring. In addition, a greater exchange of information between MPA managers and MSFD managing authorities to be fully aware of each other's monitoring objectives, plans and actions is largely advised to optimise costs.

3. How to use it?

Concept

Monitoring is an integral component of marine area management because it provides the data required to evaluate changes in marine habitats and species as a result of the implementation of MPAs. All MPAs should have monitoring sites to track changes in vulnerable species/habitats, inside and outside MPAs. Methods should be consistent across MPAs to yield comparable results. Monitoring should not be confined to the biological components. It should be linked to environmental variables, human uses and to the socio-economical benefits coming from managing MPAs.

Recommended implementation frequency

One sampling date (May-June) is often enough to support long-term monitoring on biological variables.

4. What challenges may arise?

The challenge is to have a network of protected sites that are monitored using the same approach to common response variables within the framework of the MSFD. There is still a clear challenge in reaching a threshold between overall scientific relevance, the need for (EU) legislation without compromising interoperability at the Mediterranean level, and the feasibility when defining the variables to be monitored. Sharing this information is also challenging since it requires more communications among MPAs managers and dedicated platforms.

5. What are the expected results?

Quantitative results

At present, MPAs managers are often not aware of the current status of their protected areas and the efficacy of conservation measures. Fine- scale, quantitative information provided through monitoring is crucial to inform management about the effects of protection and the sustainability of human uses. This quantitative information should be gathered by using appropriate sampling designs with the necessary statistical power to detect ecologically, economically and socially relevant changes compared to external, non-protected areas.

Transfer potential

The Interreg project AMAre (https://amare.interreg-med.eu/) is showing that close collaboration between scientists and the MPA managers is leading to in-depth knowledge on the distribution of biodiversity and on the distribution of human uses, through the creation of a spatial geoportal that can be used within each MPA and across MPAs. This is a good example of the tools suggested to increase and share knowledge and support monitoring in MPAs.

Photo by: AMAre

For further information

Project contact: AMAre

- https://amare.interreg-med.eu/special-pages/contact/

Links of interest:

- Biodiversity Protection Knowledge Platform – AMAre Project Viewer

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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AMARE

Management tool

Guidelines for drafting a standard Marine Protected Area Management Plan

Photo by: AMAre

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area managers	MPA management	Management Tool	MPAs, management, conservation targets

Pilot areas

1. What problems would this tool solve?

The existing international context, represented by the Convention on Biological Diversity (CBD) and the Barcelona Convention - SPAMI Protocol of the UNEP-Mediterranean Action Plan, among others, requires that MPAs apply governance models that ensure their effectiveness in reaching the established conservation targets.

The purpose of these Guidelines, developed by the AMAre project, is to provide standard models for the governance and management of Mediterranean MPAs, to improve their effectiveness, as well as to support the establishment of a network of MPAs.

2. What is needed for its implementation?

Technological infrastructure

Some software can be used to draw the Conceptual Model: Microsoft Visio, Open Office Draw, Miradi, or any other open-source technology stack for building diagramming applications such as www.draw.io.

Training

Training activities are recommended for MPA staff and regional protected area managers, on the methodology to be applied for drafting standard management plans.

Investment

No investments are clearly identified at the outset; rather, the Management plan should include an estimation of the costs associated with each activity envisaged, as well as the monitoring costs.

3. How to use it?

Concept

Standardis ation is the sharing of a common language between node managers (directors) and network managers (public administration, consortia), to evaluate and compare the results of an action. It is not a limitation to the management action itself. In fact, every single area is adaptively managed at the local level, but the distribution and dissemination of the results must necessarily operate in a standardis ed manner. This approach helps to preserve biodiversity by making clear the conservation action that is taking place.

At the heart of the Guidelines lies the Conceptual Model, which is a diagram that represents the relationships between the main drivers and pressures that have an impact on one or more identified Key Targets of conservation (KTs), e.g., species, species groups, ecological systems such as habitats, or ecological or cultural processes. The first step is to identify the KTs, their pressures and drivers; strategies are then chosen, and actions are selected to reduce the risks to which KTs are exposed.

Recommended implementation frequency

The Guidelines should be prepared in five subsequent steps: (1) conceptualisation, (2) planning of the actions & monitoring, (3) implementation, (4) analysis/a daptation, and (5) sharing. These actions describe an iterative, participatory process that includes the identification of conservation targets, a threat analysis, the determination of actions, the monitoring plan, an analysis of the effectiveness of the actions, communication and adaptive management.

4. What challenges may arise?

The knowledge level and the legal processes may be improved through periodic interface between regional level, managers, technicians, practitioners.

5. What are the expected results?

Quantitative results

The expected results of the implementation of these Guidelines lie in the adoption of a standard MPA management plan, following the envisaged iterative, participatory and adaptive approach.

Transfer potential

These Guidelines support the establishment of standard management plans across all Mediterranean MPAs. The adoption of a common management approach at the Mediterranean level is expected to yield the following benefits:

1. Assessment of biodiversity values, favourable conservation status of habitats with common indicators.
2. Clustering of main threats or pressure factors to implement regional mitigation strategies.
3. Implementation of network strategies to increase effectiveness and optimise costs.
4. Empowerment of management bodies - From public officials to practitioners.
5. Persuading politicians, funders and stakeholders that the results are tangible.
6. Increase the management effectiveness of regional networks by identifying improvement actions.

Photo by: AMAre

For further information

Project contact: AMAre

- https://amare.interreg-med.eu/special-pages/contact/

Links of interest:

- AMAre project website
- Biodiversity Protection Knowledge Platform – AMAre Project Viewer

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WETNET

Management tool

Wetlands Contract

Photo by: Marisa04 from Pixabay

To whom is it addressed?
Local communities, farmers, fishermen, irrigation boards, hunters, herders, birdwatchers, ecotourism companies, NGOs, research centres, cultural associations, and local, regional and national government agencies

Theme
Wetlands

Type of tool
Management tool

Key words
Water management, wetlands, participatory approach

Pilot areas

1. What problems would this tool solve?

The Wetlands Contract is a voluntary governance tool, an innovative methodology for water and wetlands management. Based on the active participation of local stakeholders, its aim is to improve coordination and stimulate the effectiveness of the management and planning of protected wetlands in the Mediterranean. It consists of a series of shared, specific, and detailed commitments and actions. The Wetland Contracts take into account the problems and needs of the people, plants, and animals that live in, or benefit from, wetlands, either permanently or temporarily. Its objective is to ensure proper governance to protect wetlands and their surroundings.

2. What is needed for its implementation?

Technological infrastructure

The use of citizen participation tools for participatory processes is advised, wherever possible.

Training

5-10 should be trained people on management tools and citizen participation processes, and on action plans and management in Natural Areas.

Investment

An estimation of the overall cost to set up and implement the Wetlands Contract is currently not available. The final cost

will likely depend on factors such as the type and length of the course, the number of people to involve, and whether previous training was provided.

3. How to use it?

Concept

The Wetland Contract is composed of several elements: the legal and regulatory framework; the assessment of the wetland area; the development of alternative scenarios; stakeholders' mapping; questionnaires; and a memorandum of understanding. The contract is based on a shared vision, an action plan and the legal framework. It consists of an agreement between the stakeholders.

It is built using a participatory process, through workshops and working groups on themes such as agriculture, hydrology, environment, and tourism, focusing on 3 strategic areas: governance; environment; and economic and social development.

Recommended implementation frequency

The implementation timeline of the Action Plan that supports a Wetland Contract is 5 years. The first phase, "Participation", is divided into several consecutive steps: stakeholder mapping; preliminary diagnosis; memorandum of understanding; targeted diagnosis; and an assessment of alternatives. The second phase, "Negotiation", is divided into two consecutive steps: specification of measures; and the adoption of the Wetland Contract.

4. What challenges may arise?

The main challenges revolve around the need to involve all the relevant stakeholders and public authorities, to link the Wetlands Contract to government tenders, and to keep national authorities as "observers" and not necessarily as contract signatories. Moreover, in the implementing phase it is necessary to prioritise the activities and clearly identify dates, budgets, and responsibilities.

5. What are the expected results?

Quantitative results

The main result of the Wetland Contracts is the improved effectiveness of wetland management through the active involvement and participation of all relevant stakeholders.

Transfer potential

The Wetlands Contract may be adopted by any Mediterranean wetland.

Key information

- It is essential that each different type of stakeholder be involved in the process to ensure improved water quality, quantity and management for the benefit of all actors that are involved or impacted by the wetland.

For further information

Project contact: WETNET

- Italian Centre for River Restoration - Giancarlo Gusmaroli

Links of interest

- WETNET project website
- Biodiversity Protection Knowledge Platform – WetNet Project Viewer
- Wetlands contract Video

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Engaged partner: MedPAN

Financial tool

Sustainable Financing of Marine Protected Areas in the Mediterranean: a Guide for MPA Managers

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?
Local authorities, Marine Protected Area (MPA) managers.

Theme
Fisheries, MPA management

Type of tool
Financial tool

Key words
Business planning, co-management, concession fees, finance, fisheries, management, management plan, Marine Protected Area, Mediterranean, MPA, revolving fund, visitor fees

1. What problems would this tool solve?

Historically, Mediterranean MPAs have relied on government and donor funding. However, these financing sources are generally insufficient and are often inconsistent and unsustainable. This can be largely attributed to the lack of reliable information on costs to establish and manage MPAs and on the methodology to establish an effective financial strategy. Climate change and increasing pressures from tourism and coastal development, may further amplify the funding problem. Therefore, there is an urgent need for Mediterranean MPAs to find diversified and sustainable self-generated financing mechanisms to close this financing gap and to sustain their conservation activities.

Aim of the tool

This Guide, developed in 2020 by BlueSeeds, aims to strengthen the financial sustainability of the MPA network in the Mediterranean Sea with a step-by-step approach. This guide is a continuation of work initiated in 2015 by Vertigo Lab, MedPAN, SPA/RAC and WWF Mediterranean.

Main objectives

The objectives of this Guide are to help MPA managers establish:

1. A financial strategy, including how to identify the financing gap between existing resources and financial needs and prepare an MPA Business Plan, using MedPLAN, a business plan tool specifically developed;

2. A set of three market-based sustainable financing mechanisms to close the financing gap: visitors fees, concession fees and revolving funds for sustainable fisheries.

2. What is needed for its implementation?

Technological infrastructure

No technological infrastructure is required to design and implement this Guide except for a computer with

a spreadsheet editor and an internet connection to run the MedPLAN Tool (necessary to elaborate the financial strategy). A current management plan with clear conservation objectives is a prerequisite for developing a sustainable financing strategy. In the absence of such a plan, it is necessary to at least have a clear vision of your main conservation objectives and a temporal roadmap to achieve them.

Training

A series of training videos and tutorial tools have been prepared by BlueSeeds to explain how to use the MedPLAN Tool for the purpose of preparing an MPA Business Plan. These videos and tools are freely available on YouTube. Concession revenues require technical capacity to identify viable concession opportunities, negotiate contracts and to establish appropriate concession fees. In addition, technical capacity for the management and monitoring of concessionaires to ensure compliance and environmental sustainability, is also required.

Investment

No investments are necessary to implement the provisions included in this Guide. The MedPLAN Tool is freely available and can be downloaded from MedPAN's website. An initial investment in terms of budget, time and staff, however, is necessary to implement the visitor fees mechanism. In general, dedicated MPA staff should be available to plan and implement the three proposed market-based self-financing mechanisms (visitor fees, concession fees and revolving funds for sustainable fisheries).

3. How to use it?

Concept

This Guide includes a step-by-step approach to help MPAs to develop a financial strategy and Business Plan. The objectives of the proposed financial strategy are to:

1. Provide an overview of costs and revenues,
2. Improve the administrative management and performance of funding,
3. Integrate and strengthen capacities, and
4. Develop a diversified and stable or secure income portfolio.

This process is supported by the MedPLAN tool, a spreadsheet that contains formulas to automatically calculate the financing gap of an MPA as the difference between revenues and costs.

Moreover, this Guide proposes three methodologies for the implementation of sustainable financing mechanisms that allow MPAs to reduce their costs and generate additional revenues: visitor fees, concession fees and a revolving fund for sustainable fisheries. For each of these market-based self-financing mechanisms, a detailed description is proposed of the opportunities, prerequisites, implementation process, and of a case study where the measure has been implemented.

Pilot areas

In the process of preparing this Guide, the MedPLAN Tool was first used by nine MPA management organisations over the course of one month. Activities alternated between phases of independent work on their business plans using also video tutorials, and bilateral work sessions with the trainers.

Recommended timeline of implementation

Financial Strategy: the process to develop a financial strategy is articulated along the following phases:

1. Planning future costs, necessary to achieve the conservation objectives of the MPA management plan;
2. Assessing past and present funding sources;
3. Planning future revenues of your MPA;
4. Assessing the financing gap (i.e. the difference between the financial means and the financial needs) using the MedPLAN tool;
5. Cost reduction (i.e. minimise planned costs);
6. Reviewing income from existing funding sources, establishing a strategy to secure and increase these revenues; and
7. Implementing new financing mechanisms, to close the financial gap and diversify the revenue portfolio.

Market-based mechanisms: a detailed description is included of each step to follow to implement the three market-based self-financing mechanisms proposed.

4. What challenges may arise?

A toolbox is proposed with possible issues and solutions for each proposed market-based self-financing mechanism.

5. What are the expected results?

Quantitative results

By applying the principles and tools proposed by this Guide, it is expected that MPA managers will improve the financing of their MPAs and better support their management measures.

Key deliverables

The Guide provides useful practical knowledge for improving managers' financial planning skills. It also provides guidance on potential sources of funding which may supplement current funding, including innovative financial mechanisms.

Transfer potential

This Guide can be used by managers of all Mediterranean MPAs in order to strengthen and sustain their conservation activities over time. The wider use of this Guide and of the MedPLAN tool may contribute to the achievement of Strategic Objective no.5 of the Post-2020 Mediterranean Roadmap on financial sustainability: ' Provide support for the long-term financial sustainability of MPAs through capacity development and sustainable financing mechanisms including trust funds'.

Key information

- A 2015 Vertigo Lab study indicated that only 12% of the financial needs to ensure the effective management of Mediterranean MPAs are covered by current financial resources.
- In the Bonaire National Marine Park (Netherlands Antilles), about 80-90% of revenues come from park use fees, for example, US$ 45/year for scuba divers and US$ 25/year for other users, while only 10-20% of funds come from grants.
- The Brijuni National Park (Croatia) has been financially independent for several years, thanks to the successful development of a concession programme around tourism activities such as boat tours, diving and kayaking.
- In the Al Hoceima National Park (Morocco), a revolving fund to promote artisanal fisheries was implemented, including the ban of use of drift gillnets, with more than 450 boats, 12 thousand tonnes of fish caught each year and 59,000 boat trips per year.

For further information

This guide is a continuation of work initiated in 2015 by Vertigo Lab, MedPAN, SPA/RAC and WWF Mediterranean (Binet et al. 2015a and 2015b). The guide can be accessed through the link below.

Contact: medpan@medpan.org

Citation:

BlueSeeds (2020) Financing mechanisms: A Guide for Mediterranean Marine Protected Areas. BlueSeeds, MAVA Foundation.

Link of interest:

- Sustainable financing of Marine Protected Areas in the Mediterranean – A guide for MPA managers
- blueseeds.org/en/guide-financing-mechanisms/
- MedPLAN tool

Online training materials:

The financial needs of MPAs

Business Planning for MPAs (MedPLAN tool)

Reducing costs and optimising revenues of a marine protected area

Choosing appropriate financing mechanisms for one's marine protected area

Examples of self-financing mechanisms for one's marine protected area

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Engaged partner: MedSea

Geospatial tool

MARISTANIS Local Wetland Observatory

Profile by **ENI CBC MED ENSERES**

Photo by: Massimo Corradi

To whom is it addressed?
Citizens, environmental NGOs, local authorities, local communities, NGOs, policy-makers, public authorities (MSP), researchers, scientists, wetland managers

Theme
Wetlands

Type of tool
Geospatial tool

Key words
Governance, Ramsar, restoration, wetland contract, wetlands

Pilot areas: Stagno di Sale'e Porcus (Sardinia, Italy), Stagno di Cabras (Sardinia, Italy), Stagno di Mistras (Sardinia, Italy), Stagno di S'Ena Arrubia (Sardinia, Italy), Stagno di Corru S'Ittiri, Stagni di San Giovanni e Marceddì (Sardinia, Italy), Stagno Pauli Maiori (Sardinia, Italy)

1. What problems would this tool solve?

Sustainable wetland management requires a new and integrated spatial management approach to preserve unique environmental, economic and landscape features. This process should be supported by the provision of quality spatial data through a dedicated web-based GIS platform and a governance structure to guarantee the implementation and monitoring of the Maristanis Coastal Wetlands Contract (CWC): the Local Wetland Observatory (LWO).

Aim of the tool

The aim of the Local Wetland Observatory (LWO) is to improve the conservation and management of wetlands by monitoring their status through a web-based GIS platform, and by providing technical support for the achievement of a homogeneous governance of these areas through the Maristanis Coastal Wetland Contract (CWC).

Main objectives

The specific objectives of the LWO are to (i) provide timely and quality information on wetlands' status and trends, (ii) track threats to wetlands and identify actions that promote their protection, wise use and restoration, (iii) assess the dimension of wetlands in the context of sustainable development, and (iv) monitor the Maristanis Coastal Wetland Contract (CWC) implementation progress, to achieve a homogeneous.

2. What is needed for its implementation?

Technological infrastructure

A PC with stable internet connection is necessary to access all the documents regarding the Wetlands Observatory (web GIS and Maristanis project webpage).

Training

No particular training is necessary to access and explore the data and all the CWC documents of the Wetlands Observatory.

Investment

Access to the Wetlands Observatory is free-of-charge.

3. How to use it?

Concept

The LWO has been included on the activities list in the Action Plan of the Coastal Wetland Contract. A catalogue was built, including all the spatial/geographic data on a Geographic Information System catalogue, and published through the Maristanis webgis.

It is articulated along 4 monitoring themes, one for each specific objective:

1. Biodiversity and ecosystem integrity
2. Drivers and pressures on wetlands
3. Ecosystem services and integration of the environment into development processes
4. Status of governance

A list of 20 indicators associated with each monitoring theme and objective has been developed. In addition, five socio-economic indicators have been identified to support the territorial analysis and correlation with main development sectors, including urbanisation, agriculture and livestock fisheries and aquaculture, irrigation, public infrastructures, and tourism; and for the investigation of cross-cutting issues (see Annex 1).

Data are gathered at a local scale (municipalities, province, region), and other scales (including biomes, coastal zones and coastal wetlands, rivers, Natura 2000 sites, watershed, rural/urban, ecological zones).

Pilot areas

The LWO covers the Gulf of Oristano in Sardinia, Italy, which includes the six Ramsar sites and other coastal lagoons and ponds included in the Nature 2000 Network.

Recommended timeline of implementation

As a first phase, necessary data were collected and technical reports and factsheets were elaborated that reflected knowledge of the Wetlands Observatory to be disseminated to relevant stakeholders. Following this, the GIS platform was elaborated and published through a dedicated website.

4. What challenges may arise?

A main challenge is to ensure the provision of the necessary human and economic resources to put into force the Wetland Observatory in the long-term.

5. What are the expected results?

Quantitative results

The data included in the LWO are used to support the production of reports based on results and analyses, as well as diversified products for targeted communications.

Key deliverables

- Technical reports on wetland status conservation.
- Factsheets aiming to strengthen the management and networking of wetland protected areas for local stakeholders and public authorities.
- A report on the implementation and monitoring of the CWC Action Plan and the participatory process.

Transfer potential

The LWO has been developed specifically for the Gulf of Oristano; however, its methodology and approach can be replicated to any other wetland areas in the Mediterranean, to support their integrated and sustainable conservation and management.

Key information

- The socio-economic macro-indicators selected in the logical framework of the Wetlands Observatory include Income, Enterprises per sector, Tourism trends, Ecolabel/EMAS and other environmental certifications, and Demography, density and population structure.
- The web-based GIS platform includes a total of 21 layers that show information such as Ramsar sites, bird protection areas, intangible human and cultural heritage, wastewater treatment plants, SPAMI areas, fish landing sites and fishing fleets.

ANNEX 1 - INDICATORS

Biodiversity and ecosystem integrity

- Diversity and abundance of species (fauna and flora)
- River flow
- Water quality (wetlands and rivers)
- Wetland surface area

Drivers and pressures

- Climate (Precipitations, droughts, temperatures)
- Salinization
- Land use and land conversion (agriculture and urbanization around wetlands)
- Irrigated hectares and type of culture
- Volume of fishing

Eco-system services (TESSA methodology)

- Role of wetlands in water purification
- Educational and touristic role of wetlands
- Role of wetlands in mitigating flood and drought
- Integration of wetlands in development decision
- Surface of protected wetlands
- Integration of environment in local development planning
- Level of implementation of integrated water resources management
- Effectiveness of the management in the Ramsar sites
- Strategic efforts in wetland protection (PAC/PSR)

Status of the Governance

- Update of Wetland management plans
- mplementation of the activities included in the CWC Action Plan.
- Rapid Assessment tool developed by (PAP-RAC)

Additional socio economic indicators

- Income (IRPEF)
- Enterprises per sector
- Tourism trends
- Ecolabel/EMAS and other environmental certifications
- Demography, density and population structure environment into development processes.

For further information

Project Contact: Piera Pala

Email: pierapala@medseafoundation.org

MARISTANIS project

Link of interest:

- MARISTANIS Wetland Observatory Webgis
- MARISTANIS Wetland Contract

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Management tool

Underwater Trails Handbook

Profile by **ENI CBC MED ENSERES**

Photo by: Massimo Corradi

To whom is it addressed?
Local authorities, managers of coastal environment, Marine Protected Area (MPA) managers, public authorities, public authorities (MSP)

Theme
Beach management, MPA management

Type of tool
Management tool

Key words
Awareness raising, management, management plan, recreational area, tourism, Underwater trails, water management

1. What problems would this tool solve?

Underwater trails have swiftly gained recognition as a practical and effective tool to educate and raise public awareness on the environment in MPAs. An underwater trail is a concrete example of action taken for the sustainable development of a territory. It is a multi-purpose instrument for land-use management and environmental conservation, environmental education and awareness-raising, promoting a quality recreational nature area, developing an economic resource and responding to social needs such as access to water and discovery.

Aim of the tool

This handbook proposes a framework to develop the activity and organisation of underwater trails as tools for managing the territory. It is the Mediterranean version of the "Methodological and Technical Guide to Underwater Trails" published by Atelier Bleu in 2008.

Main objectives

The Handbook is a methodological and technical reference document for the creation and management of underwater trails. Its specific objectives are to inform and train local managers in the concept of underwater trails and their role in addressing pressures on Mediterranean ecosystems, and to guide them on how to design trails considering legal, organisational, economic and financial aspects.

2. What is needed for its implementation?

Technological infrastructure

Some technological tools may be necessary for education and awareness raising, such as FM radio snorkels with transmitters on the beach, emitting buoys with an FM radio snorkel, ready-to-use cameras and marking buoys at the site and for the users.

Training

The appropriate training of operators involved in running underwater trails is fundamental for its successful implementation. Existing laws and regulations may require staff to have certain qualifications and skills-specific training in environmental, biodiversity, educational and safety aspects. Moreover, the job of an underwater trail guide requires specific expertise that cannot be found in a traditional training manual, although in France, some local authorities provide training without certification.

Investment

The set-up and running of underwater trails requires investments in infrastructure and start-up as well as user equipment and educational materials, which will vary in amount depending on the site's features, the manager's objectives and the available resources (e.g. premises, buoy

system). It also requires that operating costs are in place to run, maintain and promote the activity.
Underwater trails generate market and/or non-market income and benefits to the local population, tourists, professionals and institutional stakeholders.

3. How to use it?

Concept

This Handbook is a manual to help local managers and authorities design and implement underwater trails. It addresses the following aspects:

1. Definitions of underwater trails and criteria to characterise and recognise the various existing types;
2. Their role in addressing existing pressures on Mediterranean ecosystems;
3. The regulatory aspects to consider before designing an underwater trail;
4. The educational aspects and methods;
5. How to design an underwater trail – including identification of the site, target groups, partners, organisation, necessary resources and cost; and
6. The economic approach, including the various business models that can be considered.

Pilot areas

The concept first emerged among French marine protected areas around the 2000s. Since then, it has been applied to several sites along the French coasts.

Recommended timeline of implementation

Underwater trails can be included in the existing management plan of an MPA or local coastal/marine area. They should be developed following a step-by-step approach:

- Definition of the project content and targets;
- Identification of the institutional partners and other sea users to involve;
- Analysis and choice of the site;
- Choice of the type of trail (guided-unguided), organising entity, components of the activity, and identification of means (staff, user facilities, equipment); and
- Monitoring the impact of the underwater trail activity.

4. What challenges may arise?

While designing and implementing underwater trails, organisers should take into account several aspects, including the need to respect marine life, monitor the impact of visits on the area, the link with the territory and cohabitation with other sea uses and users, followed by the training of operators.

Risks related to the type of activity, the environment in which it takes place and other users of the environment, should also be taken into account. In this regard, the Handbook proposes a list of key factors that should be considered to properly address these risks.

Finally, advantages and drawbacks of the proposed types of underwater trails (free access or guided), the means used for the equipping phase and the educational tool proposed, are detailed in the dedicated chapters of the Handbook.

5. What are the expected results?

Quantitative results

By applying this tool, it is expected that coastal and marine managers and local authorities plan, develop and implement underwater trails in their territory, which will enhance ecosystem protection, awareness raising and education.

Key deliverables

Key deliverables are knowledge and know-how for the creation and management of underwater trails.

Transfer potential

Underwater trails can be implemented to foster sustainable development at a local level of the marine and coastal environment throughout the Mediterranean. The aim of this Handbook is exactly to encourage the transfer of this tool across all Mediterranean countries.rwater trails generate market and/or non-market income and benefits to the local population, tourists, professionals and institutional stakeholders.

Key information

- Almost 20 entities involved in environmental education currently organise underwater trails in the French Mediterranean: two-thirds are local authorities or public institutions and the others are associations, working mainly in partnership with an environmental management organisation.
- About 15,500 people every summer do the Peyrefite underwater trail in the Cerbère Banyuls nature reserve, Easter Pyrenees.
- Being accessible to local populations, an underwater trail can be a concrete tool for securing stakeholder involvement in a project to create a marine protected area. For existing marine protected areas, an underwater trail is naturally in line with the objective of managing visits to the site.

For further information

The MedPAN North project was a transnational European project with the general aim of improving management effectiveness of marine protected areas in the Northern Mediterranean. It was conducted under the stewardship of the MedPAN network and was coordinated by WWF-France. It involved 12 partners from 6 European countries bordering the Mediterranean : Spain, France, Greece, Italy, Malta and Slovenia. The project was co-funded by the European Regional Development Fund through the Med Programme, with a budget of €2.38 million. The project ran between July 2010 and June 2013.

Contact: medpan@medpan.org

Citation:

Baude J.L., Blouet S., Dupuy de la Grandrive R., Jourdan E., Piante C. (2012). Underwater Trails Handbook. MedPAN North Project. WWF-France. 80 pages.

Link of interest:

- Underwater Trails Handbook

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Management tool

Fishermen Engagement in Mediterranean MPAs

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?
Marine Protected Area (MPA) managers

Theme
MPA management

Type of tool
Management tool

Key words
Fisheries, management, Marine Protected Area, MPA, MPA managemen, recreational fishing, small-scale fisheries, stakeholders, sustainable use of marine resources

1. What problems would this tool solve?

Artisanal fishing, although often considered as a relatively environmentally-friendly activity, has the potential to seriously impact fishing resources, especially in Mediterranean MPAs. Traditional "top-down" approaches based on centralised government interventions have proven to be inadequate in managing local stocks, limiting resource depletion and solving user-group conflicts. MPAs, as a potential tool for sustaining artisanal fishing and related human communities, may have a role to play in supporting co-management, a bottom-up management approach as opposed to more conventional top-down approaches for the management of natural resources.

Aim of the tool

The general aim of the study is to support Mediterranean MPA managers in assessing and managing artisanal fisheries by introducing a co-management approach.

Main objectives

The specific aims of this study are to:

- Provide an outline of the current situation of artisanal fishing in Mediterranean MPAs; and
- Identify the potential variables influencing the success of artisanal fishing management in Mediterranean MPAs, including the level of fishermen engagement in artisanal fishing management in each MPA.

2. What is needed for its implementation?

Technological infrastructure

No requirements

Training

Training may be needed for MPA personnel to implement the envisaged co-management approach and for fishermen who wish to be involved in pescatourism activities.

Investment

No requirements

3. How to use it?

Concept

The study provides a descriptive analysis of the status of artisanal fishing management in the Mediterranean Sea. It focuses on MPAs and provides a series of recommendations that could help MPAs to implement a co-management approach with local artisanal fisheries.

A total of 26 case studies are described, reporting the status of artisanal fisheries, the process of fishermen engagement and the lessons learnt. Data gathered are compared and discussed to identify the potential factors that may determine the success or failure of artisanal fishing management in Mediterranean MPAs.

Recommendations are proposed to improve artisanal fishing management in MPAs. These recommendations are derived from the study results and the author, and relate to four main aspects: (i) research and monitoring, (ii) fishermen involvement, (iii) management, and (iv) communication and awareness raising.

Pilot areas

The research provided in this analysis focused on 26 case studies of Mediterranean MPAs from seven Mediterranean countries, with the intention of providing both specific analyses of each single case, and generalities for the whole Mediterranean.

Recommended timeline of implementation

No specific timeline is indicated to implement the proposed recommendations. In general, it is strongly advised to include a fisheries management plan as part of the wider MPA management plan.

4. What challenges may arise?

Knowledge of, and data on the ecological status of fish resources including catches, revenues, fleets, fishing effort and social and economic aspects, are limited. It is crucial to collect such data and disseminate them at both local and broader scales, so as to legitimise the co-management process in the eyes of all the stakeholders involved, and to provide examples to other MPAs.

Moreover, fishermen engagement is a time-consuming process, which requires major efforts in building trust between fishermen and MPA management bodies. The role of civil society organisations is extremely valuable. The leadership of influential fishermen is also instrumental, as they can convince other fishermen in the community of the benefits of participating in co-management schemes.
Finally, as the establishment of an MPAs may involve lower yields, or higher costs in the short term for fishermen displacement towards fishing grounds open to fishing, efforts should be made to assess impacts and identify potential alternative livelihoods and strategies.

5. What are the expected results?

Quantitative results

By applying the recommendations included in the study, it is expected that MPA managers increase their knowledge of the status of artisanal fisheries inside their MPA, and improve their management approaches toward the establishment of effective co-management schemes.

Key deliverables

Knowledge and know-how

Transfer potential

The proposed recommendations can be applied by all Mediterranean MPAs as a successful bottom-up approach for sustainable artisanal fisheries and to promote adoption of co-management.well as diversified products for targeted communications.

Key information

- About 80% of the 35,000 vessels comprising the Mediterranean fishing fleet belong to 280,000 artisanal fishermen.
- The analysis of artisanal fisheries in 21 Mediterranean MPAs demonstrated that the most important variable determining high values of success of artisanal fishing management in MPAs is the level of fishermen engagement in management practices.
- 76% of the MPAs analysed, showed high or moderate add-on conservation benefits with artisanal fishermen acting as environmental stewards or participating in environmental/research projects.

For further information

Contact: medpan@medpan.org

Citation:

Di Franco A., Bodilis P., Piante C., Di Carlo G., Thiriet P., Francour P., Guidetti P. 2014. Fishermen engagement, a key element to the success

Link of interest:

- Fishermen engagement in Mediterranean marine protected areas A key element to the success of artisanal fisheries management

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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Engaged partner: MedPAN

Management tool

Recreational Fishing within Marine Protected Areas in the Mediterranean

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?
Coastal wetlands managers, local authorities, Marine Protected Area (MPA) managers, public authorities, wetland managers

Theme
Fisheries, MPA management, Tourism

Type of tool
Management tool

Key words
Fisheries, management, Marine Protected Area, MPA, MPA managemen, recreational fishing, small-scale fisheries, sustainable tourism, tourism

Pilot Areas

1. What problems would this tool solve?

Recreational fishing is increasing rapidly, particularly across Mediterranean coastal areas where it represents more than 10% of the total production of all fishing. It entails a significant impact due not only to the extraction of natural resources, but also to pollution, waste generation and excessive numbers of people. This commands the need for further research and proactivemanagement with regard to recreational fishing in Mediterranean MPAs.

Aim of the tool

The overall aim of the study is to provide an outline of the current situation of recreational fishing in Mediterranean MPAs and to propose measures for its sustainable management, in line with the conservation objectives of the MPAs.

Main objectives

The specific objectives of the study are to:

- Assess the socio-economic characteristics and biological

impacts of recreational fishing on marine resources in MPAs, particularly on the most vulnerable species; and

- Propose recommendations for monitoring and management actions within MPAs for recreational fisheries.

2. What is needed for its implementation?

Technological infrastructure

The use of a telephone and/or email to interview fishers is recommended in cases where low funding does not allow for aerial surveys to be performed. A computer and Internet connection are necessary to develop and regularly maintain a database of collected data.

Training

In relation to sampling recreational fisheries and fishers' interviews, training is recommended for interviewers. This training should focus on sampling methods; the recognition of species, fishing techniques and baits; and other key factors such as how to formulate the questions to avoid bias in the responses.

Investment

Adequate funding is necessary to carry out regular monitoring using traditional methods. If this is not possible, some means should be available to evaluate the distribution of fishermen and fishing modes for example, using the observations of park rangers via some kind of log, in which the presence of recreational fishermen can be written down. Another method worth considering is the use of telephone or email interviews. A good balance between cost and reliability are Roving-access (or Access point) and Roving-roving, where census and interviews are usually conducted on foot or by boat.
Questionnaires are recommended as the most effective method for data collection on recreational fisheries in MPAs.

3. How to use it?

Concept

The first part of this study presents the methodologies followed and the results of recreational fisheries monitoring in the Mediterranean. Data includes: fishing effort and yield; direct and indirect impacts on coastal and marine resources; the social profile and economic importance of recreational fishers; and the legal regulation of the sector.

The second part presents recommendations to the MedPAN network, managers and technical staff of the MPAs and European, national and regional authorities. Recommendations aimed to improve the monitoring, evaluation and management of impacts generated by recreational fishing, and provide new ideas for environmental education campaigns addressed to recreational fishermen. They combine a bottom-up approach (getting fishermen involved, co-management, etc.) with a top-down approach (European regulations, fishing permits, centralised data-bases, etc.)

Pilot areas

The assessment of recreational fisheries included data collected from a questionnaire distributed to managers of 31 Mediterranean MPAs in Spain, France, Italy, Slovenia, and Croatia, as well as from scientific literature and other documents.

Recommended timeline of implementation

Given the large variations that can be found in the results from one year to another, it is recommended to repeat studies or monitoring efforts year after year, or at least every certain number of years, in order to assess how the impact on fishing resources is developing. Simpler studies carried out annually could be combined with more

extensive studies every three to five years, to produce a reliable series of surveys over time that would help to fill the gaps in our information regarding this activity.

4. What challenges may arise?

The study thoroughly addresses the weaknesses and challenges involved in each step of implementation of the recommended measures. This includes, for example, the need to combine different methodologies for data collection to avoid the drawbacks of single methods, the positive and negative aspects of catch and release, and challenges related to the involvement of fishers in management and educational and awareness raising activities.

5. What are the expected results?

Quantitative results

By applying the recommendations included in this study, it is expected that MPA managers will have a better overview of the status and pressures of recreational fisheries in their MPA, and will thus improve their management by minimising the adverse environmental impacts while at the same time raising the awareness and education of recreational fishers.

Key deliverables

Key deliverables are the knowledge and know-how for the monitoring and management of recreational fishing in MPAs.

Transfer potential

The list of recommendations is directed at the MedPAN network as a whole, managers of MPAs and their technical staff and European, national and regional authorities that are responsible for the evaluation and management of recreational fishing.run, maintain and promote the activity. Underwater trails generate market and/or non-market income and benefits to the local population, tourists, professionals and institutional stakeholders.

Key information

- Some studies estimated the presence of 21.3 million fishermen in 22 European countries, a total expenditure on recreational fishing exceeding €25 billion and a total catch of commercial fishing worth about €20 billion.
- Generally, across Mediterranean MPAs, an average of 30% of all species caught by recreational fishing are vulnerable species. The species most often caught by both boat and shore fishermen belong to the Sparidae and Serranidae families.

For further information

The MedPAN North project was a transnational European project with the general aim of improving management effectiveness of Marine Protected Areas in the Northern Mediterranean. It was conducted under the stewardship of the MedPAN network and was coordinated by WWF-France. It involved 12 partners from 6 European countries bordering the Mediterranean : Spain, France, Greece, Italy, Malta and Slovenia. The project was co-funded by the European Regional Development Fund through the Med Programme, with a budget of €2.38 million. The project ran between July 2010 and June 2013.

Contact: medpan@medpan.org

Citation:

Font T., Lloret J., Piante C. 2012. Recreational fishing within Marine Protected Areas in the Mediterranean. MedPAN North Project. WWF-France. 168 pages.

Link of interest:

- Recreational fishing within Marine Protected Areas in the Mediterranean

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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Management tool

ICZM Decision Support System

Profile by **ENI CBC MED ENSERES**

Photo by: Massimo Corradi

To whom is it addressed?	Theme	Type of tool	Key words
Environmental NGOs, local authorities, managers of coastal environment, Marine Protected Area (MPA) managers	MPA management	Management tool	DSS, ICZM, management, Marine Protected Area, MPA, MPA managemen, participatory approach, stakeholders

Pilot areas: Italy (Golfo di Corigliano), Jordan (Gulf of Aqaba), Lebanon (Tyre Coast Nature Reserve) and Tunisia (Kneiss Islands), Caribbean in Montecrist and the north west coast of the Dominican Republic

1. What problems would this tool solve?

The widespread incorporation of Ecosystem-based management (EBM) into Integrated Coastal Zone Management (ICZM) processes is currently limited by (i) the intense and continuous effort needed by decision makers and professional teams involved to coordinate management actions across a wide array of stakeholders and application sectors, (ii) the intensive work to adjust the available guidelines to the specificities of the relevant ecological and socio-economic systems, as well as in operationalising them for their effective application in area of interest, and (iii) the significant amount of data needed.

Aim of the tool

The aim of this Tool is to develop Decision-Support Systems (DSS) to support the effective implementation of Ecosystem-Based ICZM (EB-ICZM) through a participatory and evidence-based approach.

Main objectives

TThe specific objective of this Tool is to support EB-ICZM multi-stakeholders' analytical processes, helping to identify and quantitatively assess the relationships between ecosystem components, functions and services, as well as their interactions with relevant socio-economic dynamics.

2. What is needed for its implementation?

Technological infrastructure

A computer with stable internet connection is necessary to run the dedicated software. The use of remote team-working-channels and webinar tools (Microsoft Teams) is possible, in case training is to be performed remotely.

Training

In Phase 1, a preliminary training needs assessment for the functioning of the EBM Local Units should be carried out. Training is also necessary to introduce the methodological and software tools that will be used to apply the DSS.

Investment

EB-ICZM applications require a significant investment in data collection, management and their retrieval in databases. The Ecosystem Context Analysis method reduces this investment to the minimum possible for a successful application, because the assessment of data needs and relevant gap analysis are systematically executed against the specific set of objective indicators identified through the Ecosystem Context Analysis.

Other costs include the organisation of dedicated workshops with identified stakeholders to perform multiple steps for implementing the DSS.

3. How to use it?

Concept

The ICZM-DSS is built around the PROGES-ISP (Integrated Spatial Analysis) package, which includes two categories of instruments: an operational protocol for the execution of multidisciplinary ecosystem-based environmental assessments, and a software application linked to spatial and tabular databases for handling relevant ecological data and for preparing synoptic data-aware reports. The operational protocol implements EB-ICZM applications through the sequential execution of two multidisciplinary analytical methods: the Ecosystem Context Analysis and the System Cause-Effect Analysis. The PROGES-ISP software package allows for the synchronised integration of multi-window environments, facilitating the ecosystem-based analysis of spatial and tabular datasets and the compilation of data-aware advanced reports.

The set of management measures resulting from the System Cause-Effect Analysis are then mainstreamed into the existing plans of relevant institutions and management authorities for the establishment of an effective multi-level ICZM governance protocol (EB-ICZM-GP).

Pilot areas

The ICZM-DSS is currently piloted in four coastal areas of Italy (Golfo di Corigliano), Jordan (Gulf of Aqaba), Lebanon (Tyre Coast Nature Reserve) and Tunisia (Kneiss Islands). Other applications have been piloted in the Caribbean in Montecristi, the north west coast of the Dominican Republic.

Recommended timeline of implementation

The implementation of the PROGES-ISP methodological protocol to create the ICZM-DSS consists of six main phases:

1. Inception activities: Partner's base training thematic scoping and stakeholder analysis.
2. Ecosystem Context Analysis: Recognising connections within and across ecological and human systems spanning over the focused area.
3. Development of indices and indicators for the

quantitative assessment of EB-ICZM social, economic and ecological dynamics.

4. Data gathering and construction of tabular and GIS databases.
5. System Cause-Effect Analysis: Assessment of ecological risks and socio-economic stresses and identification of management interventions.
6. Mainstreaming EB-ICZM measures into local development plans.

The Ecosystem Context Analysis is implemented in several progressive steps: (i) identification of the major characteristics of the area, (ii) development of the collective understanding of the EBM scenario described in the system matrices and its transposition into a diagram, (iii) development of a set of quantitative indicators to characterise each component and sub-component of the system diagram, (iv) systematic analysis of all the components of the system diagram resulting from the Ecosystem Context Analysis using the System Cause-Effect Analysis to the define an integrated set of management measures coherent with the principles of EB-ICZM and (v) analysis of other pairs of components to identify a new management measure. Possible side-effects of the previous measure are inevitably considered when the analysed pair includes one of the two components of the previous pair.

4. What challenges may arise?

EB-ICZM applications require significant investment in data collection, management and their retrieval in databases. The Ecosystem Context Analysis method however, reduces this investment to the minimum possible for a successful application, since the assessment of data needs and relevant gap analyses are systematically executed against the specific set of objective indicators identified through the Ecosystem Context Analysis. In turn, the System Cause-Effect Analysis allows the identification of i) components which, in order to avoid hampering the effectiveness of the EB-ICZM application, must be assessed with quantitative indicators and ii) components that could be safely characterised by qualitative indicators. The PROGES-ISP software tools facilitate the efficient handling of the large datasets that EB-ICZM requires.

5. What are the expected results?

Quantitative results

Using the EB-ICZM-DSS will ensure that each human activity is managed in the context of all the ways it interacts with marine and coastal ecosystems, and that multiple activities are being managed for a common outcome.

Key deliverables

- Modelisation of the EBM scenario (system matrices, diagrams, etc.)
- GIS database
- Indices and indicators for a quantitative assessment

Transfer potential

This tool can be applied across the whole Mediterranean, in any circumstance, where there is the need to strengthen the implementation of ICZM through DSS.assessment of EB-ICZM social, economic and ecological dynamics.

Key information

- The PROGES-ISP software package [PROGES 2009] is a user-friendly Microsoft Windows application that can support the implementation of several planning and management pursuits. It gives the opportunity to visualise different kinds of data and information with the view to compare the various system components targeted by a possible management action. The software also includes a tool (hyperlink) that automatically links the name of the components in a report to the components shown in the DSS, as well as their related maps, tables or charts, in order to support the decision-making process.
- The main causes for the offences committed in Mediterranean MPAs relate to: ignorance or misinformation (33%), economic interest (32%), weak surveillance (29%), weak enforcement (26%) and general opposition to the MPA (8%).

For further information

Contact:

MED4EBM Med4EBM Project page

Amel Bellaaj zouari_amel@yahoo.fr

Link of interest:

- Technical and methodological references and operational framework for the implementation of the ICZM Decision Support System
- PROGES-ISP

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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Management tool

A Guide to Surveillance and Enforcement of Regulations in Mediterranean MPAs

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers.	MPA management	Management tool	Enforcement, management, Marine Protected Area, monitoring, MPA, MPA managemen, surveillance

1. What problems would this tool solve?

MPAs are established by law but often lack the necessary capacities and resources to enforce this law. This hampers the capacity of the MPA to reach its objectives, and contributes to losing social credibility and stakeholder collaboration.

Although marine surveillance is necessary, it is usually the most expensive management activity in an MPA. It is not generally considered the most important factor for good enforcement, since there are many other complementary activities that contribute significantly.

Aim of the tool

The Guide aims to support MPA managers in improving surveillance and enforcement of regulations in MPAs. As such, its intention is to be a practical resource document for MPA managers.

Main objectives

The objective of this Guide is to provide fundamental elements for analysis and recommendations to improve surveillance and enforcement in MPAs.

It should help them identify their needs and maximise the efficiency of their actions, adapting to different situations in particular in cases of low human resources and financial capacities in particular.

2. What is needed for its implementation?

Technological infrastructure

Although there are no strict technological requirements to use this Guide and to implement its proposed actions, some technological requirements may be required for some of the recommendations. For example, the use of an internet connection and the necessary software for website management, and online reservation of mooring buoys. In addition, the Guide recommends the use of available technologies that help to reduce surveillance costs and staff needs, such as AIS, Wimax, tetra, VTMIS, radar, geo-referenced cameras, drones and night vision devices.

Training

No specific training is necessary to follow the recommendations provided in this Guide. However, in terms of surveillance and law enforcement, capacity building is fundamental to keep a high level of interest in MPA agents for what they are doing. For example, involving them in scientific monitoring motivates them and helps them develop sensitivity to issues, thereby increasing their overall efficiency.

Investment

Marine surveillance is usually the most expensive management activity in an MPA. To help mitigate the high costs involved in surveillance at sea, land-based methods are proposed such as patrolling from the beach and the use of specific technological equipment.

3. How to use it?

Concept

This Guide presents and discusses best practices and lessons learnt regarding MPA surveillance and enforcement and focuses on the following specific topics: political support, legal development and MPA regulation, institutional and operational coordination, monitoring and control of activities, surveillance patrols, sanctions and prosecuting, voluntary compliance, and information and communication. For each topic, recommendations are proposed. Case studies are also presented to illustrate the successful application of the proposed actions.
Moreover, this Guide includes a decision-support matrix, listing key questions to help determine the strategy, needs and priorities in terms of enforcing regulations. After filling in the matrix, it may be necessary to conduct a SWOT or a DPSIR analysis, identify priorities to develop a realistic calendar, list and approach potential collaborators, establish specific indicators and expected results, and review progress once a year.
This Guide is mainly focused on the marine aspects, but does include land-based activities related to surveillance and compliance at sea, (e.g. public accesses, beach services, fish landings, beach and harbour infrastructures, patrolling of the marine area from land and so on).

Pilot areas

The recommendations included in this Guide address the practical experience of several Mediterranean MPAs, which participated in a 2013 experience exchange workshop of the MedPAN network, devoted to monitoring and enforcement of regulations in Mediterranean MPAs. This workshop was in turn, based on a study of the “Surveillance and the enforcement of regulations in Marine Protected Areas in the Mediterranean” which focused on identifying regional level gaps, best practices, needs and strengths with a view to strengthen the capacity of Mediterranean MPAs in this domain. The study was based on the responses of 54 MPA managers across 15 Mediterranean countries. The results of the study are included in this guide.

Recommended timeline of implementation

No specific timeline is required to implement the recommended actions of this Guide. The decision support matrix, which guides managers to assess their needs, priorities and objectives, should be integrated in the process of elaborating or revising the MPA management plan.

4. What challenges may arise?

The Guide proposes recommendations on how to address and solve each of the identified problems, including a description

of possible challenges that may arise. More generally, the successful engagement and collaboration of various stakeholders in MPAs has shown to be a key factor for the successful implementation of surveillance and enforcement.

5. What are the expected results?

Quantitative results

It is expected that applying these recommendations and best practices in Mediterranean MPAs, will improve surveillance and law enforcement capacity, which in turn will help reach their conservation and sustainable development objectives.

Key deliverables

Key deliverables are knowledge and know-how to improve the surveillance and the enforcement of regulations in MPAs.

Transfer potential

The best practices and recommendations can be implemented in all Mediterranean MPAs. In particular, the decision-support matrix is adapted to the Mediterranean context; it is an operational tool that points out recommendations which may apply to everyone, including both consolidated, and newly-established MPAs.

Key information

- In the Gökova MPA in Turkey, the lack of surveillance resulted in poaching and local community distrust. Conversely, the well-known co-managed fisheries reserve in Os Miñarzos (Spain) had good results for biodiversity and for fishermen for years, that is until surveillance was reduced due to budget constraints, which led to conflicts, the immediate return of illegal activities and a deep social distrust.
- In a questionnaire answered by 54 MPA managers from 15 Mediterranean countries, managers indicated the most frequent infringements of their MPA regulations as coming from recreational fishermen (87%), artisanal-professional fishermen (82%), marine users from outside the MPA (68%), marine-based tourism operators (66%) and land-based offences affecting marine ecosystems (53%).
- The main causes for the offences committed in Mediterranean MPAs relate to: ignorance or misinformation (33%), economic interest (32%), weak surveillance (29%), weak enforcement (26%) and general opposition to the MPA (8%).

For further information

This guide was developed within the framework of the MedPAN network regional experience-sharing workshop that was held on this topic in 2013.

Contact: medpan@medpan.org

Citation:

López Ornat A., Vignes P. 2015. Surveillance and enforcement of regulations in Mediterranean MPAs, Practical guide. RAC/SPA, Port-Cros National Park, National Marine Park of Zakynthos. MedPAN Collection. 40 pp

Link of interest:

- Surveillance and enforcement of regulations in Mediterranean MPAs – A practical guide
- Proceedings of the 2013 experience exchange workshop on monitoring and enforcement of regulations in Mediterranean MPAs

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Management tool

Monitoring and Management of Marine Turtles in MPAs

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	Marine Turtles	Management tool	Conservation, IMAP, marine turtles, monitoring, MSFD, training

Pilot areas: Calanques National Park in Marseille, France; Port-Cros National Park in Hyères, France; Septentrion Environnement in Marseille, France; Zakynthos National Marine Park, Greece.

1. What problems would this tool solve?

In the Mediterranean, marine turtles are threatened by habitat deterioration as well as direct impacts from humans such as incidental capture in fisheries and pollution. MPAs play an important role in conserving marine turtles, helping achieve good conservation status for all populations in all countries. For this purpose, knowledge on the status of marine turtle populations is essential to support the implementation of successful management strategies.

Aim of the tool

The "Marine Turtles in MPAs: A monitoring and management guide" and the related training package, aim to support the assessment and development of actions to protect marine turtles, by gathering management-relevant data that feed into regional monitoring requirements of the EU's MSFD and the Barcelona Convention's IMAP EcAp approach.

Main objectives

The specific objective of the Guide is to provide extensive but not exhaustive advice on factors to consider for the conservation of marine turtles in MPAs. Accordingly, the training module's objective is to provide MPA managers and practitioners with further knowledge of marine turtles and their pressures, and to provide methodological guidance for planning monitoring and management activities for their protection.

2. What is needed for its implementation?

Technological infrastructure

In the Guide, for each proposed protocol, a description of the necessary equipment, including technological equipment, is provided. This includes: equipment for PIT tagging; underwater cameras for photo ID; a GPS unit for nest and track identification and fisheries interactions; specific software for beach nesting suitability assessments; temperature loggers; drones; hard drives; and photogrammetric software for beach mapping.

A computer with a stable Internet connection is sufficient to access the training course.

Training

Full time employees of an MPA may not always be the ones to carry out the monitoring work. However, MPAs should have the infrastructure and capacity to recruit, train and supervise a number of external researchers/practitioners for specific monitoring tasks. The implementation of some protocols should be performed by personnel that have received appropriate training, for example, in cases of PIT and flipper tagging, tissue sampling, nest and track identification, identifying clutch location and relocation, stranding response and necropsies. Fishermen may also be trained and permitted to tag and measure bycatches before release.

No particular training requirements are required to access and follow the training course. The online course is a prerequisite for more advanced field training courses provided in the MedPAN training catalogue. It is part of the “Species and Habitats” training cycle.

Investment

A detailed indication of the costs of each proposed protocol is included in the Guide, ranging from “€” to “€€€€€”. Costs relate mainly to equipment and running costs, and less to staff time. Protocols listed with € require only minimal costs of a few Euros. Those listed with “€€€€€” however, may cost tens of thousands of Euros. If a Euro range is given, the lower value identifies the costs for carrying out the protocol once, alternatively it can mean that the costs to implement the protocol can vary.

The training course is provided free-of-charge by MedPAN through a dedicated page on their website.

3. How to use it?

Concept

The “Marine Turtles in MPAs: A monitoring and management guide” proposes a suite of Decision Trees to systematically deal with the assessment and management of marine turtles in MPAs. Annexed to this guide are internationally-approved scientific protocols for data gathering, analysis and use. Additionally, the Guide suggests collaboration with external agencies as a means to reduce the need for in-house capacity and extend the potential for population assessments using relatively expensive hi-tech research tools and techniques.

The online training course is articulated into multiple sessions, consisting of either video courses (uploaded in YouTube, with French and English subtitles) or supervised online sessions with trainers. The main topics include the biology of marine turtles, their threats, the need for MPA management, tools and resources for turtle monitoring and management and financing and sustainability. At the end of some sessions, self-assessment quizzes and references to hands-out and literature are provided.

This course is a prerequisite for more advanced field training courses provided in the MedPAN training catalogue. It is part of the “Species and Habitats” training cycle.

Pilot areas

It is recommended to supplement and complement information and guidelines presented in the Guide, by referring to tools produced by other authoritative scientific and management bodies at Mediterranean level. This will help broaden the understanding of the conservation status and monitoring methods applicable to Mediterranean marine turtles. The Guide has been developed for the monitoring and management of marine turtles found in the Mediterranean.

Implementation dates

The first step is to formulate the assessment and management questions that are most relevant for MPA management in relation to marine turtles. Data gathering (design and implementation) will build on these questions. Once collected, data should be interpreted to identify status, trends and threats. From the results of this analysis, management actions should be carefully selected and implemented.

The fully online training course runs over a 7-day agenda alternating supervised online sessions and self-directed learning (video tutorials and exercises).

4. What challenges may arise?

In the Guide, the main challenges of marine turtle monitoring are discussed in relation to implementing the proposed protocols and how to overcome them. These include the need to ensure that management actions are appropriate and in accordance with the MPA's capacity and objectives. Any ethical considerations raised during the implementation of each protocol are also raised and any means to address them, proposed.

5. What are the expected results?

Quantitative results

It is expected that MPA managers improve their knowledge and capacities to monitor marine turtles in their MPAs. Monitoring will provide the critical information needed to support targeted and effective management strategies for marine turtles and the conservation of their critical habitats .

Key deliverables

Key deliverables are knowledge and know-how on the monitoring and management of marine turtles in MPAs

Transfer potential

The protocols and methodologies proposed by this Guide can, and should, be followed and adopted by MPAs all over the Mediterranean, to which the related training course is addressed.

Key information

- All marine turtle species are listed on the IUCN red lists of endangered species and included in Annex 1 of CITES. Populations considered to be faring relatively well, such as the Mediterranean loggerhead Caretta caretta, are only doing so because of the vast amounts of effort put into long-term monitoring and conservation activities.
- A 2018 survey conducted by MedPAN among Mediterranean stakeholders (scientists, managers, NGOs…) showed that only 57% of those involved with marine turtles performed any monitoring or management activities for marine turtles.

For further information

The guide was developed within the framework of a project on the Conservation of marine turtles in the Mediterranean region funded by the MAVA Fondation. This guide also benefited from support from the UNEP/MAP project "MedMPA network" financed by the European Union.

Project contact:

Contact: medpan@medpan.org

Citation:

ALan F. Rees 2020. Marine Turtles in MPAs : a monitoring and management guide. MedPAN Collection. 68 ppLinks of interest

Link of interest:

- "Marine Turtles in MPAs: a monitoring and management guide"
- Training Course: "Getting started with marine turtle conservation across Mediterranean MPAs" main page

Project

Donor

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Monitoring tool

Snorkel Surveys of the Marine Environment – Methodology Guide

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	MPA management	Monitoring tool	Bio-constructors, biodiversity, conservation, fish, habitats, Marine Protected Area, monitoring, MPA, MPA managemen, Posidonia oceanica, protocol, snorkel, snorkel fins, species

1. What problems would this tool solve?

MPA managers must find the right balance between the preservation of species and habitats, and the sustainable development of human activities, by taking into account the natural evolution of the ecosystems. Monitoring is important in this respect as it creates a standardised repetition of data collection over time, and supports the adoption of targeted tools for decision-making within the management plan.

Aim of the tool

The aim of this Guide is to support the implementation of long-term monitoring activities in MPAs as a basis to adjust management actions and initiate new, more in-depth studies adapted to MPA needs

Main objectives

The objective of this tool is to describe and guide MPA managers in designing and implementing simple monitoring methods for the marine areas of their MPAs.

2. What is needed for its implementation?

Technological infrastructure

In situ observations of the underwater environment requires specific scuba diving equipment: a wetsuit, a pair of fins, boots, a mask, a snorkel and a weight belt. For shallow coastal simple and compact equipment, such as fins, mask and snorkel, are sufficient. It is important to have a specialised 100m waterproof watch to monitor time and duration. Moreover, it is advised to have a digital camera to take a large number of photographs at low cost, a portable waterproof GPS receiver for data geo-referencing, and geodetic buoys to mark out a transect or a permanent area.

Training

Adequate scientific training is required for specific phases of the monitoring activities. Training exercises and prerequisites are proposed and explained in the Guide for fish visual censusing, calibrating an inventory corridor, assessing the size of individual fish and for species identification.

Investment

Investments are necessary to buy and maintain equipment costs (which may be significant for example wetsuits) and to provide training. In addition, there are likely to be time costs associated with mobilisation and the time spent on the ground.

3. How to use it?

Concept

This Guide explains the role of environmental monitoring inside MPAs and its importance. It also provides the specifics of snorkelling (describing the necessary equipment), free-diving methods and safety principles and guidelines.
Specifically, six methods are proposed:

1. Fish visual census. Monitoring target species.
2. Settlement of Diplodus spp. on rocky shores.
3. Mapping and evaluation of the vitality of bio-constructors.

4. Inventory and monitoring of the Pinna nobilis.
5. Mapping the upper limit of the Posidonia meadow.
6. Monitoring the populations of the edible sea urchins on rocky sea bottoms.

In each factsheet, the necessary equipment, methodologies and protocols for sampling as well as how to use the data, and training exercises and prerequisites are detailed. Training videos have also been prepared to support the implementation of some of these proposed methodologies. Finally, five other methods are also illustrated, where snorkel surveys have been used to monitor several MPAs:

1. Mapping the abundance of algae and invertebrates in the medio-littoral and shallow sub-tidal zones.
2. Observations on users' impact along an underwater trail.
3. Collection of biological material or sediment.
4. Census of macro-waste on the seabed.
5. Non-native species, detection and inventory.

All these methods must, however, be adapted to each MPA's specificities and problems. It is also advised to include problematic invasive marine species as part of the monitoring programme in the Mediterranean.

Pilot areas

This Guide is a collection of existing methodologies and protocols, which have long been established and applied to perform sampling and data collection in MPAs.

Recommended timeline of implementation

This Guide recommends the integration of long-term monitoring into existing MPA management plans. In fact, monitoring creates a standardised repetition of data collection over time, and is therefore an important tool for decision-making.

4. What challenges may arise?

A naturalistic approach from managers and operators is an essential prerequisite to implement monitoring protocols. The sampling strategy is a complex process and must be carefully designed with the help of the scientific community. This will ensure it is representative of the whole MPA area (given technical and financial constraints), and will avoid or control bias in sampling, thereby ensuring reliable and robust results, as well as temporal relevance of the data analysis.
Although the Guide did not set a depth limit to perform snorkel surveys, it would be advised to consider that greater depths entails a higher difficulty for implementation. Further, at greater depths, it would also be more difficult to not disturb the species sampled, which could hinder the quality of the data collected.

5. What are the expected results?

Quantitative results

By applying the methodologies and protocols proposed in this Guide, it is expected that MPA managers will increase their knowledge of the status of key habitats and species, so as to support tailored and more effective management actions for their MPAs.

Key deliverables

Key deliverables are knowledge and know-how on the characteristics of the monitoring of marine natural heritage in MPAs.

Transfer potential

The methodologies and protocols proposed in this Guide have been already applied to perform sampling in marine areas and MPAs, and can be applied to any other MPA in the Mediterranean.

Key information

- There are several benefits to using this type of method such as lower equipment costs, mobilisation time, time spent on the ground, the surface area covered and an easy communication between participants.
- This document is the first step in achieving a methodological compilation for Mediterranean MPAs. However, the Guide is not complete, as species, habitats, and management issues differ from one corner of the Mediterranean to the other. The idea is to introduce a collaborative approach within the managers' network (i.e., MedPAN and the French MPA Agency) so that this work can be enriched by each MPA's expertise.

For further information

This guide is the product of a small project funded by MedPAN in 2013 that was led by the Conservatoire d'Espaces Naturels of the Provences-Alpes-Côte d'Azur region that was at the time in charge of the management of the Frioul archipelago Maritime Park which is now entrusted to the Calanques National Park.

Contact: medpan@medpan.org

Citation: Imbert M., Bonhomme P. 2014. Snorkel surveys of the marine environment, methodological guide. Parc national des Calanques, CEN PACA, GIS Posidonie. MedPAN Collection. 68 pp

Link of interest: Snorkel surveys of the Marine Environment – Methodology guide

Supporting training videos (in French, with English subtitles):

- Monitoring of the marine environment with snorkel fins – Introduction
- Mapping and evaluation of the vitality of bio-constructors
- Mapping the upper limit of Posidonia meadows
- Fish visual census. Monitoring target species

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
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Engaged partner: MedSea

Management tool

MARISTANIS Wetland Contract

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?
Coastal wetlands managers, local authorities, Marine Protected Area (MPA) managers, public authorities, wetland managers

Theme
MPA management, Wetlands

Type of tool
Management tool

Key words
Environmental contract, integrated management, management, Marine Protected Area, MPA, MPA managemen, Ramsar, stakeholders

Pilot areas: Stagno di Sale'e Porcus (Sardinia, Italy), Stagno di Cabras (Sardinia, Italy), Stagno di Mistras (Sardinia, Italy), Stagno di S'Ena Arrubia (Sardinia, Italy), Stagno di Corru S'Ittiri, Stagni di San Giovanni e Marceddì (Sardinia, Italy), Stagno Pauli Maiori (Sardinia, Italy)

1. What problems would this tool solve?

Wetlands are not only the "terminal" area of a larger hydrographic basin. A new relationship between these areas and the surrounding territory is necessary to overcome the traditional spatial management approach, and move more towards a focus on processes. Wetlands carry important environmental, economic, and landscape values and therefore should be managed beyond administrative borders.

Aim of the tool

The Oristano Coastal Wetlands Contract (CWC) is a voluntary act of a shared commitment by stakeholders to improve the protection and integrated management of wetlands of the Gulf of Oristano (Ramsar and Natura 2000 sites).

Main objectives

The Contract intends to implement a multidisciplinary and concerted policy action that involves all stakeholders towards effective management and sustainable development of the territory. This will facilitate alignment between the various plans and programs that create the current fragmented situation in the coastal wetland areas concerned, and it will allow a convergence between the various public policies involved.

2. What is needed for its implementation?

Technological infrastructure

No specific technological requirements are required to prepare and deliver the Wetlands Contract.

Training

No training requirements were raised during the implementation of the participatory process for the creation of Wetland Contracts.

Investment

The Contract specifies that signatories commit to finding the necessary financial contributions to implement the activities of the Programme of Action at regional, national and European levels.

3. How to use it?

Concept

This Contract is a tool based on a voluntary agreement between local authorities and private stakeholders as a form of negotiated and shared planning procedures, and marine and coastal resources management. It is an open agreement in which all parties with a specific interest in the wetlands management can participate if they wish.
The Contract action program is developed along seven strategic directions:

1. Participatory territorial governance and capacity building.
2. Improvement of the ecological status of water systems.
3. Protection of biodiversity and natural heritage.
4. Landscape requalification and enhancement of cultural heritage.
5. Green economy – towards a sustainable and responsible territorial development model.
6. Strengthening resilience by addressing climate change.
7. Communication and environmental awareness.

Pilot areas

This Contract was developed for the Oristano Gulf, in Sardinia, Italy and includes six Ramsar sites as well as Natura 2000 network sites.

Recommended timeline of implementation

This contract was developed in several stages:

1. Municipalities started a participatory decision-making process aimed at the integrated and sustainable management of the coastal marine wetland habitats of the Gulf of Oristano.
2. Signing of a Declaration of Intent.
3. Drafting a preliminary analysis as a basis for the Action Programme.
4. Bilateral and plenary meetings between the local authorities (including mayors and the province).
5. Definition of the Action Programme of the Contract and establishment of the coordination group.
6. Signing of the Wetlands Contract by 11 Municipalities, the Regional Government, The Province and the Water Management Authority.

4. What challenges may arise?

Action 1 of the Action Plan provides for the establishment of a Natural Regional Park in order to ensure a unique management body for the six Ramsar sites and the Natura 2000 network sites of the Oristano's Gulf. However, the establishment of the Regional Park, according to the Italian legislation, is subject to a complex administrative procedure that requires expertise and financial resources in the long-term, that are not readily available. The Action Plan includes specific actions already financed and others for which the municipalities involved will have to take action to find additional funding.
Finally, local technical municipal offices do not always have the necessary skills to implement a specific project or actions.

5. What are the expected results?

Quantitative results

At the end of the participatory process, a Wetland Contract was drafted and signed by all participating stakeholders. A series of meetings have been scheduled to inform local communities of the Contract and to engage more stakeholders.

Key deliverables

Narrative and technical reports on the implementation and monitoring of the Maristanis CWC Action Plan.

Transfer potential

The Contract is open to all public and private stakeholders that are interested in the management of the Gulf of Oristano wetland area. Moreover, this Contract stands as one example of the successful creation of a Wetlands Contract, which can be replicated in any other wetland area in the Mediterranean

Key information

- The Gulf of Oristano, consisting primarily of coastal lagoons and marshes, includes 6 Ramsar wetland sites covering 77 km2, 1 MPA/SPAMI and 25 Natura 2000 sites.
- A total of 46 measures are included in the Programme of Action, specifying the type of action (priority or integrative), the responsible body and the financial coverage.

For further information

MARISTANIS project

Project Contact: Piera Pala

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Link of interest:

- MARISTANIS Wetland Contract

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Management tool

ISEA Scheme to standardise MPA management

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Citizens, cultural associations, environmental NGOs, local authorities, local communities, Marine Protected Area (MPA) managers, NGOs, public authorities, public authorities (MSP)	MPA management	Management tool	Aichi target, conservation, conservation targets, management, management plan, participatory approach, SPAMI, water management, wetlands

Pilot areas: Habibas islands marine reserve (Algeria), Isole Egadi MPA (Italy), Karaburun-Sazan national marine park (Albania), Kneiss islands natural reserve (Tunisia), Tavolara-Punta Coda Cavallo MPA (Italy), Torre Guaceto MPA (Italy)

1. What problems would this tool solve?

To reach the conservation targets established at international, Mediterranean and national levels, Mediterranean MPAs must apply governance models that ensure the effectiveness of their actions and measures. Currently there are no unambiguous methodologies in planning the management of MPAs.

Standard approaches to management must be developed to embrace the geographical and legal heterogeneity of the system of Mediterranean MPAs, which are characterised by different management models and hard to compare. Standardised approaches will also facilitate the development of an effectively managed and ecologically representative MPA network across the Mediterranean area.

Aim of the tool

The aim of the Interventi Standardizzati di gestione Efficace in Aree protette (ISEA) Scheme is to increase the effectiveness and standardisation of management in Mediterranean MPAs, to support the achievement of the established conservation targets.

Main objectives

The specific objective of the ISEA scheme is to define and develop a standardised model for the management of MPAs through a shared approach, in order to enforce their effectiveness.

2. What is needed for its implementation?

Technological infrastructure

Some software can be used to draw the Conceptual Model of the ISEA scheme, such as Microsoft Visio, Open Office Draw, Miradi, or any other open-source technology stack for building diagram applications such as www.draw.io.

Training

Training sessions have been developed in the context of the "SPAMI Twinning Programme" to assist SPAMI/MPA managers in the preparation and implementation of the ISEA scheme. Recorded sessions are freely available on the website of the SPAMI Collaborative Platform (https://spami.medchm.net/en/management-tools).

Investment

The ISEA scheme should include an indication of the amount of financial resources and manpower required for implementing the planned strategies.

3. How to use it?

Concept

The ISEA scheme is a standard approach based on a graphic Conceptual Model that permits a visual understanding of the governance of a protected area, along with an easy identification of the ecological values, the direct and indirect threats operating on them and the strategies and actions developed by the management body to pursue its objectives and goals. It represents the relationships between the main factors believed to have an impact on one or more key targets for conservation.

The drafting of the Conceptual Model is a participatory process and should involve stakeholders to select in a transparent way, the most appropriate strategies and actions. The identification of pressures and drivers should also benefit from sharing knowledge and experiences of all staff involved in the management of the MPA.

The Conceptual Model is articulated in three sections:

1. Description of the MPA
2. Situation analysis
3. Management plan

Training sessions have been developed to assist SPAMI/MPA managers to create and implement the Conceptual Model.

Pilot areas

The ISEA scheme has been developed in the context of the "SPAMI Twinning Programme" in the following SPAMIs/MPAs: Karaburun-Sazan national marine park (Albania); Habibas islands marine reserve (Algeria); Isole Egadi MPA (Italy); Tavolara-Punta Coda Cavallo MPA (Italy); Torre Guaceto MPA (Italy); and Kneiss islands natural reserve (Tunisia).

Recommended timeline of implementation

The approach to develop the ISEA scheme is based on a process that involves a series of steps with a purely systematic approach to management actions. These actions are applied according to a circular process that goes from the determination of conservation targets, to the analysis of threats, to the determination of actions, to the monitoring plan of the same, to the analysis of the effectiveness of actions, to communication and of adaptive management, up to the re-evaluation of the state of the threats and to restart the cycle according to a quantifiable and tangible process.

4. What challenges may arise?

A possible challenge lies in the concept of standardisation as a limitation to the actions of MPA managers. In this regard, it should be considered that standardisation consists of sharing a common language between MPA managers (directors) and MPA network managers (public administration, international organisations), to plan, evaluate and compare the results of a set of actions. Every single manager has, in fact, the freedom to manoeuvre with a view of adaptive management, adjusted to the local context.

5. What are the expected results?

Quantitative results

The application of the ISEA scheme's methodological approach not only allows a more efficient and effective action in the conservation of marine habitats and species, but also reinforces a network structure between Mediterranean MPAs.

Key deliverables

Standardised management plans.

Transfer potential

The ISEA methodology and management solutions constitute best practices which will be transferred and disseminated to other MPAs and stakeholders, leading to effectively managed and ecologically representative areas (aiming at achieving the Post-2020 GBF targets) to be developed into transboundary management plans.

Key information

- The SPA/BD Protocol to the Barcelona Convention implies a clear definition of the conservation and management objectives of SPAMIs, which constitute the basis for assessing the adequacy of the measures adopted and the effectiveness of their implementation in the periodic reviews.
- The ISEA initiative was managed by a technical coordination panel made up of representatives of the Italian Ministry of Ecological Transition, WWF Italy and the managing bodies of the MPAs that have obtained the recognition of SPAMI. The technical panel operated according to the following sequential actions: i) Training on the standard management plan, ii) MPA information gathering (completion of the checklist), iii) outlining the conceptual model and iv) completion of the standard management plan (text document).

Training Video

Training Panel #1: Central Planning of ISEA

Training Panel #2: the Management Cycle

Training Panel #3: the Conceptual Model

Training Panel #4: the ISEA Manual

Training Panel #5: Case Study: Torre del Cerrano MP

Training Panel #6: Management Effectiveness

For further information

Project Contact :

SPAMI Twinning Programme Officer, Saba GUELLOUZ: saba.guellouz@spa-rac.org

Specially Protected Areas Officer, Souha EL ASMI: Souha.asmi@spa-rac.org

- SPAMI Collaborative Platform
- SPAMI Twinning Programme

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Management tool

SPAMI Twinning Programme

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?
Citizens, environmental NGOs, local authorities, managers of coastal environment, Marine Protected Area (MPA) managers, NGOs, public authorities, public authorities (MSP), the interested general public

Theme
Beach management, MPA management

Type of tool
Management tool

Key words
Collaborative platform, conservation, management, management plan, SPAMI

Pilot areas: Habibas islands marine reserve (Algeria),Islands Egadi MPA (Italy),Karaburun-Sazan national marine park (Albania),Kneiss islands natural reserve (Tunisia),V (Slovenia),Tavolara-Punta Coda Cavallo MPA (Italy)
Torre Del Cerrano MPA (Italy),Torre Guaceto MPA (Italy)

1. What problems would this tool solve?

A List of Specially Protected Areas of Mediterranean Importance (SPAMI List) was established in 2001 by the Contracting Parties of the Barcelona Convention through the SPA/BD Protocol to promote cooperation in the management and conservation of natural areas, as well as in the protection of threatened species and their habitats. This List may include sites that are of importance for conserving the components of biological diversity in the Mediterranean; contain ecosystems specific to the Mediterranean area or the habitats of endangered species; and are of special interest at the scientific, aesthetic, cultural or educational levels.

However, the protection of marine habitats and biodiversity in the Mediterranean requires efforts not only to increase the area under protection, but also to enhance the effectiveness of protected areas management.

Aim of the tool

The SPAMI Twinning Programme aims to develop and strengthen the effective management of SPAMIs, contributing to the implementation of the SPA/BD Protocol of the Barcelona Convention. It also aims at contributing to the achievement of the Post-2020 Global Biodiversity Framework Target 3, and SDG 14.5 in the Mediterranean.

Main objectives

The specific objective of the Twinning Programme is to promote networking, standardise management and support capacity building, best practices and experience sharing among the SPAMIs and MPAs.

2. What is needed for its implementation?

Technological infrastructure

No particular technical requirements are in place for the implementation of the Twinning Programme.

Training

On-the-job training is organised for SPAMI managers during exchange visits.

In-person training on ISEA (Interventi Standardizzati di gestione Efficace in Aree protette) to improve management plan elaboration and implementation has been organised and is available on the SPAMI Collaborative Platform.

Investment

The Twinning programme is financed by the Ministry for Ecological Transition (MiTE) in the framework of the cooperation agreement between MiTE and the UN Environment/MAP. After 2020, SPA/RAC capitalised on the twinnings implemented in 2018 and 2019, with the support of MiTE by planning more twinning under the MAVA NoTakeZone and ENSERES Projects.

3. How to use it?

Concept

Coordinated by UNEP/MAP SPA RAC, the SPAMI Twinning Programme revolves around the following activities:

- Setting up monitoring programmes to contribute to the Integrated Monitoring and Assessment Programme (IMAP) of the Barcelona Convention.
- Sharing of best practices, management strategies and exchange visits of SPAMI/MPA managers to support the implementation of effective models and strategies.
- Carrying out participatory processes aiming at involving stakeholders in the identified management strategies and organising on-the-job training sessions for better operational management.
- Implementing concrete management actions in the field.
- Involving NGOs in SPAMI/MPA activities through calls for projects and the implementation of small projects' activities in the field.
- Creating communication and capitalisation material about lessons learnt and innovative approaches of the small projects implemented by civil society organizations.
- Establishing a collaborative platform for SPAMIs/ MPAs based on experience gained during the twinning activities.

Pilot areas

The beneficiary countries of this programme are Albania, Algeria, Italy, Slovenia and Tunisia.

The following Twinning Programmes have been implemented in 2018-2019:

- Tavolara-Punta Coda Cavallo MPA (Italy) / Habibas islands marine reserve (Algeria)
- Islands Egadi MPA (Italy) / Kneiss islands natural reserve (Tunisia)

- Torre Guaceto MPA (Italy) / Karaburun-Sazan national marine park (Albania)
- Torre Del Cerrano MPA (Italy) / Strunjun landscape park (Slovenia)

Recommended timeline of implementation

The Twinning Programme, coordinated by SPA/RAC, was developed along the following phases:

1. Identification of the twinning partners.
2. Definition of specific contents of each twinning programme and the signature of twinning agreements between 4 Italian SPAMIs/MPAs and 4 other SPAMIs/MPAs.
3. Holding a kick-off meeting.
4. Implementation of the Twinning Programme activities.

4. What challenges may arise?

A possible challenge is in-field implementation of the transferred best practices by the twinned SPAMI / MPA managers.

5. What are the expected results?

Quantitative results

With the Twinning Programme implementation, it is expected that the involved SPAMIs/MPAs will improve their management effectiveness by drawing on the experience and capacities of other protected areas.

Key deliverables

Improved management plans and their implementation.

Transfer potential

The SPAMI Twinning Programme is a successful initiative that concretely addressed the needs and challenges in marine habitats, as well as biodiversity conservation and management in selected SPAMIs/MPAs in the Mediterranean. As such, it stands as a positive example upon which further twinning programmes may be launched involving other protected areas in the Mediterranean.

Key information

- A total of 39 SPAMIs, among the 1,233 MPAs and other effective area-based conservation measures, are located in the Mediterranean. To be included in the SPAMIs List, candidate marine and coastal protected areas must demonstrate a set of ecological, scientific, aesthetic, cultural or educational features of interest as part of formal submissions made by the concerned Contracting Parties. Once they make it to the list, SPAMIs are monitored as part of rigorous periodic reviews that take place every six years.
- SPAMIs offer a multitude of benefits. They serve as frameworks for regional, bilateral and multilateral cooperation, for sharing and exchanging good practices and transferring sustainable solutions between the different sub-regional contexts of the Mediterranean. Moreover, they generate “spillover benefits”, such as healthier and bigger catches for fishers operating in surrounding zones.

For further information

Project Contact :

SPAMI Twinning Programme Officer, Saba GUELLOUZ: saba.guellouz@spa-rac.org

Specially Protected Areas Officer, Souha EL ASMI: Souha.asmi@spa-rac.org

- SPAMI Collaborative Platform
- SPAMI Twinning Programme

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Management tool

Stakeholder Participation Toolkit for the Identification, Designation and Management of MPAs

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	MPA management	Management tool	Management, MPA, MPA management, stakeholders

1. What problems would this tool solve?

The importance of adopting a participatory approach, i.e. ensuring the participation of key stakeholders when planning, identifying, creating and managing MPAs, is supported by the obligations set by the Aarhus Convention for public consultation. Moreover, since the Rio De Janeiro Conference of 1992, public participation and the adaptation of proposal contents to local conditions and situations, have been recognised as necessary elements of all environmental procedures. Involving stakeholders in their formulation, ensures better implementation of recommendations and measures.

Aim of the tool

The aim of this Guide is to support priority needs for legal, policy and institutional reforms to strengthen the creation processes and management of MPAs.

Main objectives

The objective of this Guide is to provide strategic orientations for stakeholder participation in MPA management and planning with a view to improving good governance of MPAs.

2. What is needed for its implementation?

Technological infrastructure

The Internet may be necessary to allow widespread access to resources on issues and for the participation of a geographically broad audience.

Training

Training may be necessary to implement some Internet-based technologies to engage participants from a distance, such as chat rooms, on-line bulletin boards, e-mail and Web conferencing. Other tools, such as charrettes, polls and surveys need adequate training of the staff to conduct these processes.

Investment

No cost indications are given to implement the tools proposed by this Guide. However, polls or surveys to solicit community impressions about issues at a specific moment in time, may entail high costs.

3. How to use it?

Concept

This Guide provides basic definitions and principles for stakeholder identification and their engagement, which will depend on the type of MPA governance, and their involvement in the various phases of MPAs planning, identification, creation and management.
Moreover, this Guide presents the participatory tools commonly used, including SWOT and PESTLE analysis, to define clear objectives and the role of stakeholders; and Focus Groups to obtain information on people's preferences and values, as the basis for stakeholders' identification.

Other methods and tools that have been commonly used are presented in the Annexes. These include, for example, tools for conflict resolution while designing species conservation strategies (Annex I), participatory methods for ICZM implementation (Annex II) and tools for consultation and active participation in decision-making (Annex VI).
Choosing the particular participatory method to be used will

depend on project goals and parameters, as well as team and community characteristics.

Pilot areas

This Guide is the main output of a collaboration between UNEP/MAP RAC/SPA and IUCN-Med to support Eastern Adriatic countries' priority needs for legal, policy and institutional reforms, in order to strengthen the creation processes and the management of marine protected areas.

Recommended timeline of implementation

Stakeholder involvement is crucial for all steps of integrated management: for example, baseline reviews of situations, target setting, political commitment, implementation and monitoring the process, and reporting and evaluation.
The steps of integrated management are incorporated in the different phases of MPA management, which include: the preparatory phase, the negotiation phase for each site, the declaration phase and the management phase. For each phase, this Guide specifies the actions, involvement of stakeholders and topics to be analysed.

4. What challenges may arise?

Understanding who should be involved, and on which level within an environmental management process is a complex issue. It is very important to understand how different stakeholders are related to each other and how they are related to the resources to be managed.
The involvement and participation of stakeholders should take place at different political levels (national, regional and local) and be applied in a vertical and horizontal direction in order to achieve sustainable decisions.

5. What are the expected results?

Quantitative results

In applying the tools proposed in this Guide, it is expected that MPAs improve stakeholder involvement across all phases of MPA management, so as to contribute toward a shared, participatory and sustainably managed marine and coastal environment of the MPA.A conflict may generate personal and professional growth, provided it is resolved effectively. Otherwise, the results could be damaging, teamwork may break down and collaboration will stop. To address this, the Guide proposes some tips and recommendations, based on both theoretical concepts and practical experience.astly, the main advantages and limitations for common stakeholder participation techniques are also presented.

Key deliverables

Knowledge and know-how.

Transfer potential

The methods and tools proposed in this stakeholder participation toolkit can be adopted by all the pilot countries of the Eastern Adriatic, in addition to all other MPAs throughout the Mediterranean. However, a comprehensive consideration must be given to differences in the social, environmental and political contexts and the resources (both human and financial) available.

Key information

- The Aarhus Convention (UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters) grants the public rights regarding access to information, public participation and access to justice, in governmental decision-making processes on matters concerning the local, national and transboundary environment.
- Participation can be implemented by means of:
  - Approaches: Systematic combinations of tools and strategies/concepts, held together by a guiding principle and serving the achievement of a certain goal.
  - Methods: A structured way of realising a particular participatory intervention.
  - Tools: Certain exercises to cultivate and implement collaborative research, analysis, planning and action.

For further information

Project contact: MedMPANet Project

UNEP MAP Specially Protected Areas Regional Activity Centre (SPA/RAC)

Contact: Ms. Souha EL ASMI & Mr. Atef LIMAM

Links of interest

- Stakeholder Participation Toolkit for Identification, Designation and Management of MPAs (download)

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Management tool

Handbook for Coastal Wetlands Governance

Profile by **ENI CBC MED ENSERES**

To whom is it addressed?	Theme	Type of tool	Key words
Coastal wetlands managers, local authorities, Marine Protected Area (MPA) managers, public authorities, wetland managers	Wetlands	Management tool	Adaptive governance, environmental contract, management, Marine Protected Area, MPA, MPA managemen, Ramsar

Pilot areas: Char El Melh Lagoon (Tunisia), Delta of the Buna Bojana (Albania & Montenegro), Oristano Gulf (Italy), Prespa Lakes (Albania, Greece & North Macedonia)

1. What problems would this tool solve?

Despite national and international efforts, wetlands' loss and degradation are increasing at a rapid rate and their biodiversity is highly threatened. This is particularly true for the Mediterranean where there is an increased demand for land and waters, and where climate change impacts on human well-being and future generations are already evident. Good, effective and equitable governance must be in place to support the protection and sustainable use of wetlands ecosystems. However, user-friendly tools to help deliver better site governance are missing, and the political, economic, cultural and natural environment climate constantly changes.

Aim of the tool

This Handbook aims to improve coastal wetland governance in the Mediterranean, irrespective of their status: i.e. whether they are formally protected as Ramsar sites, designated under national or local legislation, or lacking any formal protection.

Main objectives

The specific objective of this practical handbook is to provide clear guidance on how to achieve the elusive common vision for sustainable coastal wetlands, as well as how to move forward effectively in partnerships.

2. What is needed for its implementation?

Technological infrastructure

Generally, no particular technological requirements are required to design and implement the governance models presented.

Training

During the creation of the preliminary plan to establish governance models, the time and training required by partners, staff, and key stakeholders can be identified in a participatory manner.

Investment

Governance models need to secure adequate core funding to support the long-term implementation of planned activities. International donors have proved to be fundamental to 'kick start' transboundary cooperation, but its continuation beyond the initial funding period depends on the robustness of the institutions created, the long-term resources and political commitment.

A preliminary identification of key potential funding sources for subsequent implementation is essential. The identification of potential major funding sources will help create favourable preconditions for the delivery of a plan or programme for the wetland by linking them with the results of the scenarios and vision.

3. How to use it?

Concept

This Handbook proposes a simple, universally applicable roadmap, which allows to measure, shape, and report progress over time in a creative and innovative way. The process described can be used to test and review existing arrangements or to design new ones. The Handbook can be used as a quick, self-assessment tool by a site management team for training or reporting, or by anyone tasked with the care and management of these vital sites, whether on the ground or at government level. It is best used therefore as part of a wider process involving stakeholders looking to achieve effective, fit-for-purpose governance of Mediterranean coastal wetlands for which they have an important duty of care.

The Handbook proposes a three-stage process designed to build effective and robust governance arrangements, which can include:

- Self- assessment, prioritising and planning, through linked excel files,
- Training of partners, staff and key stakeholders,
- Reporting on progress,
- Building a shared vision,
- Compare alternative ways forward,
- Developing best practice.

An innovative 'Vitality and Adaptivity Scorecard' is also provided for those seeking to address and measure more challenging dimensions of governance. Practical tips to make governance effective are provided based on the real-world experiences, helping users design the way forward for the governance of their wetlands.

Pilot areas

The four Mediterranean wetlands that have provided valuable insights and reflections for the preparation of this Handbook are the Oristano Gulf (Italy), Char El Melh Lagoon (Tunisia), Delta of the Buna Bojana (Albania & Montenegro), and Prespa Lakes (Albania, Greece & North Macedonia

Recommended timeline of implementation

This Handbook provides a self-build governance process comprising of 3-stages:

1. Preparation – Identification of the broad foundations of a governance body for coastal wetlands in the Mediterranean.
2. Mapping and planning – Tools based on the common methodology of self-assessment traffic lights to assess progress.
3. Towards excellence – A scorecard to measure that elusive adaptive and vital governance, which responds to evolving conditions in the ecosystems of the site and its wider cultural context.

While the duration of stage one may vary depending on local conditions, stages two and three at their simplest, can be substantially completed in one to two days, or slightly longer if wider consultation is undertaken. Subsequent repeat exercises may be a little quicker.

4. What challenges may arise?

The preparation stage is arguably the most difficult unless national legislation or precedents are available for an off-the-shelf solution. Political and community soundings will be required to establish the limits of the possible – and the 'I wouldn't start from here' response is to be expected. In particular, the challenge is to design a governance body whose size allows it to operate efficiently yet encompasses all those with a legitimate interest in the governance of the area.

For example, the application of the Wetlands Contract to transboundary areas may be challenging as these typically involve and affect many parties. Often there are multiple legal systems at play, which may confer different sets of rights and obligations upon institutions and individuals.

Governance structures should be as robust as possible and should not be abolished or lose their mandates by eventual changes in government, in partners' participation, or through leadership replacement.

5. What are the expected results?

Quantitative results

Regardless of the model used, it is expected that each structure creates, as a minimum, a **foundation document** that may be referred to as a locally appropriate 'Constitution' or 'Terms of Reference. ' It should set out a vision, goals and objectives; establish the decision-making process; confirm the commitment of partners and define their responsibilities; and detail functional aspects of the model (e.g. frequency of meetings).

It is expected that the governance models contribute towards meeting international and national legal obligations and responsibilities for the protection of wetlands, which is to ensure that there is a shared, common vision at all levels of society, along with a mechanism to secure the future sustainability and resilience of coastal wetlands.

Key deliverables

Knowledge and know-how.

Transfer potential

This Handbook is designed for use across the whole Mediterranean. Adaptation to local circumstances may be necessary by adding to or qualifying relevant questions. Its application is particularly important and necessary for wetlands that are not currently protected by international conventions or national legal systems.

Moreover, although primarily targeted at wetlands in the Mediterranean, the methodology set out in the Handbook transcends this habitat and is transferable to the governance of other important natural sites around the world

Key information

- The Mediterranean region has been identified as one of the 34 world hotspots for biological diversity. Mediterranean wetlands have a disproportionate importance for biodiversity: 30% of vertebrate species in the Mediterranean are supported by wetlands. At the same time, 51% of wetland habitats may have been lost between 1970 and 2013.
- Mediterranean wetlands, particularly coastal wetlands, are important for helping to mitigate climate change as they help to manage extreme weather events through buffering floods and coastal storm-surges and providing water in droughts.

For further information

The Handbook has been developed as part of the overarching initiative of the MAVA Foundation 'Coastal Wetland Action Plan'. Its preparation was initiated by the Priority Actions Programme Regional Activity Centre (PAP/RAC), coordinated and published under its leadership. It was supported by the International Union for Conservation of Nature (IUCN) and the MAVA Foundation for Nature.

Contact: PAP/RAC paparac@paprac.org

Links of interest

- Downloadable Handbook
- MARISTANIS Wetland Contract

Project

Donor

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

Engaged partner: MBPC

Other tool

Ecosystem-based management and Marine Spatial Planning e-learning program

To whom is it addressed?
Marine Protected Area (MPA) managers, Mediterranean stakeholders, policy-makers, researchers

Theme
MPA management

Type of tool
Capacity building

Key words
Biodiversity protection, climate change, co-management, cross-border cooperation, cross-sectoral cooperation, Ecosystem-based Management, marine litter, Maritime Spatial Planning, sustainable use of marine resources

1. What problems would this tool solve?

The Mediterranean basin has a number of human pressures that threaten marine and coastal ecosystems and biodiversity. These pressures arise from several sectors such as maritime traffic, fishing, industry and tourism.

Aim of the tool

This tool is designed to educate a large scope of stakeholders. It aims to give its target groups knowledge in terms of Ecosystem-based Management and Marine Spatial Planning and to share case studies. Ecosystem-based Management is considered the best practice to effectively deal with threats to the Mediterranean basin since this approach considers the different stakeholders, factors affecting ecosystems and the mechanisms involved, to find solutions.

Main objectives

It is expected that participants will learn new monitoring, geospatial and management tools that have been developed through Ecosystem-based Management best practices and applied to Marine Spatial Planning at local, regional and international levels. Through case studies, course participants will also learn about new governance approaches and actions that are based on the involvement and strong collaboration among public and private stakeholders.

2. What is needed for its implementation?

Technological infrastructure

A computer/tablet, an Internet browser (Firefox or Google Chrome recommended) and an internet connection are required to access the Ecosystem-based Management and Marine Spatial Planning e-learning program.

Training

Training is not required, a user-friendly platform ensures that all targeted audiences can use it.

Investment

Access to the Interreg Euro-MED Academy website is free.

3. How to use it?

Concept

The Ecosystem-based Management and Marine Spatial Planning e-learning program is a tool available through the Interreg Euro-MED Academy website. The learning program is divided into four different modules with an expected combined workload of 7-10 hours, including videos, reading activities, questionnaires, quizzes, webinar

attendance, podcasts, and a final assignment. A tutor will assist participants during the course and seek networking opportunities to support the interaction between speakers and students during the webinars.

Pilot areas

The Interreg Euro-MED Academy is available all over the world, with a focus on Mediterranean cases (north and south basins).

Implementation Dates

A first edition took place in April and May 2022. Further editions may come depending on the results.

4. What challenges may arise?

The e-learning program is only available in English and for a short period of time (4-5 weeks).

5. What are the expected results?

Quantitative results

Number of participants who enrol in the course and finish it.

Key deliverables

No key deliverables are expected for this tool, further editions with other speakers may come.

Transfer potential

The e-learning program is accessible to anyone interested in biodiversity protection and the implementation of an Ecosystem-based approach in Maritime Spatial Planning in the Mediterranean.

Key information

Such a tool is needed to support the implementation of Ecosystem-based Management and Marine Spatial Planning approaches which combine biodiversity protection, sustainable exploitation of marine resources and different uses at sea.

- The Mediterranean Sea represents 1% of the global ocean surface but hosts 20% of global marine biodiversity. However, anthropogenic pressures, as well as some countries' socio-political contexts, make conservation measures difficult.
- There are only 1231 Marine Protected Areas in the Mediterranean basin. This means that most of the Mediterranean Sea is not under any limits or control.

For further information

Project contact:

Conference of Peripheral and Maritime Regions: Jordi Juarez jordi.juarez@crpm.org or Lise Guennal lise.guennal@crpm.org

ETC-UMA: Sonsoles San Roman sonsolessanroman@uma.es

Links of interest

- https://www.interreg-euro-med-academy.eu/course/view.php?id=7

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Engaged partner:
PANACeA / MBPC

Geospatial tool

MedBioLitter

To whom is it addressed?
Conservationists, funding programmes, Marine Protected Area (MPA) managers, public authorities, researchers

Theme
Marine litter

Type of tool
Geospatial tool

Key words
Biodiversity, ecosystem approach, environmental data, marine litter, Marine Protected Area, Mediterranean, policy

1. What problems would this tool solve?

Research efforts are increasing our knowledge on the amount, composition and impacts of marine litter on marine ecosystems, biodiversity and people. However, the number of studies is scattered and geographically unbalanced, making it difficult for policy makers, managers, the business sector and the general public to accurately understand the dimensions of such a modern challenge and the urgent need to react.

Aim of the tool

The aim of MedBioLitter is to support scientists, decision makers and managers in providing a structured and visual overview of the scientific knowledge necessary to tackle the issue of marine litter and its negative impacts on biodiversity in the Mediterranean.

Main objectives

The objective of MedBioLitter's open database and spatial geoportal, including an interactive viewer providing access to statistical information, is to provide a searchable one entry-point to peer reviewed research evidence published on the impacts of marine litter on marine biota in the Mediterranean region.

2. What is needed for its implementation?

Technological infrastructure

A PC, tablet or smartphone, an internet browser (Firefox and Google Chrome recommended) and an internet connection are required to access the MedBioLitter Platform.

Training

No particular training is necessary to access and use the Platform, only basic knowledge as an Internet user.

Investment

The access and use of the platform is free-of-charge.

3. How to use it?

Concept

The MedBioLitter database includes the geolocation of more than 900 interaction records across several areas studied and for more than 180 species, as well as providing direct access to more than 100 peer-reviewed articles. Parameters referring to the geographical location of the interactions, relevant policies and directives, ongoing protection frameworks (including reference to the IUCN Red List), species assessed, their habitats and conservation status, and the interaction with marine litter registered per marine compartment (beach, sea surface, water column, seafloor), are available in MedBioLitter. Each MedBioLitter spatial registry of an interaction directs the user to the reference source and the authors of the peer reviewed article published. Furthermore, the database includes a mechanism for any author interested to submit new information for analysis and inclusion in future updates.

Pilot areas

This tool has been built to cover the whole Mediterranean, and as such has not been piloted in any specific area.

Implementation Dates

September each year. Updates include the identification and selection of new entries for the Mediterranean Sea as included in LITTERBASE and additional searches and studies of peer reviewed publications.

4. What challenges may arise?

As for other similar geoportals, the quality and accuracy of the search results and of the records, depends on the quality and standardisation of the data input. Moreover, it may not be immediately usable to all users, especially those that are not experts or trained in using geoportals. To address this, a dedicated help page has been developed to teach the user how to navigate the interactive viewer and find the data of their interest.

5. What are the expected results?

Quantitative results

The result of using MedBioLitter is an increase in the knowledge of decision makers, scientists and managers of the interactions and impacts of marine litter on biodiversity in specific areas of the Mediterranean, in order to support the design and implementation of effective policies and management strategies to minimise such impacts. The Mediterranean data dashboard interactive viewer developed in 2021 provides statistical information as a digest and foundation for further analysis.

Key deliverables

Regular summary of the results in factsheets and policy reports, published on the MBKP.

Transfer potential

MedBioLitter is an open and continuously growing database. It is a useful tool addressed to all scientists, decision makers and managers throughout the Mediterranean that are interested in the themes of marine litter and interactions with biodiversity. It has already supported relevant studies on the impacts of marine litter on biodiversity. Further connections may be developed to ensure a wider spatial, temporal and thematic coverage of the data.

Key information

- Individuals and institutions interested in adding their peer-reviewed results can send their manuscripts or publications to the MedBiolitter team for consideration and integration in the database. A contact form is available online from the Mediterranean Biodiversity Protection Knowledge Platform (biodiversity.uma.es). Authors interested in providing their data and research outcomes can also do so following the required parameters and format by uploading their data through the “submit data” button on the Mediterranean Biodiversity Protection Knowledge Platform.
- Waters belonging to the countries of the European Union present more than 90% of the data. This highlights the need to strengthen data collection and the monitoring of marine litter and its interactions with biodiversity in the Southern part of the Mediterranean, where information is largely lacking.

For further information

Project name: Mediterranean Biodiversity Protection Community (MBPC)

Project Contact : Antonio Sánchez, ETC-UMA (a_sanchez@uma.es)

Links of interest:

- MedBioLitter
- MedBioLitter Help page
- Report on Marine mega fauna and litter in the Mediterranean. An overview of impacts in MedBioLitter – April 2022
- Report on Mapping the State of Knowledge on Marine Litter and Biodiversity Interactions in the Mediterranean Sea – December 2019

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

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MPA Engage

Management tool

Climate Change Participatory Action Plans

To whom is it addressed?
Citizens, Marine Protected Area (MPA) managers, public authorities, scientists, socio-economic actors

Theme
Climate change

Type of tool
Management tool

Key words
Climate change adaptation, decision-making process, joint plan, public participation

Pilot areas: Brijuni National Park (Croatia), Cap de Creus MPA (Spain), Litoral del Baix Empordà (Spain), Portofino MPA (Italy), Tavolara MPA (Italy), Zakynthos MPA (Greece) and Clanques National Park (France)

1. What problems would this tool solve?

Climate change is dramatically affecting the Mediterranean Sea, which is warming 3-times faster than the world's average. Mediterranean MPAs are already facing major biodiversity and functional alterations due to climate change, or are expected to do so within the next few decades. There is an urgency therefore, to mitigate these risks and to consider adaptation options in partnership with local communities, decision makers, civil society organisations, research bodies and other socio-economic actors at local, national and regional levels.

Aim of the tool

The aim of this tool is to support Mediterranean MPAs in successfully adapting to climate change by devising participatory adaptation plans.

Main objectives

The specific objectives of this tool are to (i) guide stakeholder engagement and public participation processes that are key for the elaboration of climate change mitigation and adaptation action plans, and (ii) present climate change

adaptation options endorsed or shortlisted by pilot MPAs, and to define common priority actions that should implemented by all Mediterranean MPAs in response to climate change effects.

2. What is needed for its implementation?

Technological infrastructure

No particular technological requirements are required to design and implement the participatory process to develop the Action Plan.

Training

Staff coordinating the participatory process should be well skilled in these types of processes and familiar with the specific context of the MPA.

Investment

Stable funding and commitment to public participation are fundamental to ensure the successful adoption and implementation of the climate change participatory action plan.

3. How to use it?

Concept

There is no one-size-fits-all approach for preparing a local climate change adaptation plan. Plans should be adapted to the local context in terms of the nature and magnitude of existing and future threats, the condition of the ecological resources, past and ongoing management efforts and prevailing political and socio-economic circumstances etc.

The seven pilot MPAs applied a five-phase participatory planning process and the quintuple helix participatory approach (engaging five groups of actors: MPA managers, socio-economic actors, scientists, public authorities, and citizens) for the identification, elaboration, shortlisting and adoption of climate change adaptation measures.
Based on this, a total of 10 measures have been identified that give shape and form to a joint plan for action to face climate change in Mediterranean MPAs. These are:

CAPACITY-BUILDING AND AWARENESS RAISING MEASURES

1. Implement awareness raising campaigns on the effects of climate change, targeting key local stakeholders, such as artisanal and recreational fishermen, divers, and boaters;
2. Develop awareness raising activities targeting MPA visitors on climate change effects and best practice approaches and responses at MPA level;
3. Carry out sector-specific capacity building to reduce and manage the impact of coastal and marine users' activities on MPAs, and enhance ocean literacy towards ocean-informed actions and the adoption of good practices.

RESEARCH AND MONITORING MEASURES MEASURES

1. Set up comprehensive monitoring schemes focused on climatic variables, species or habitats, extreme events, ecological and social processes;
2. Carry out research on the effects of climate change, vulnerability and capacity for adaptation;
3. Engage with wide-ranging volunteers in citizen science activities to monitor the effects of climate change on marine ecosystems.

REGULATION AND GOVERNANCE MEASURES

1. Apply and/or reinforce restrictions for professional and recreational users to avoid or decrease damages on marine ecosystems;
2. Develop or update emergency response plans to address potential greater frequency of extreme weather events;

ECONOMIC MEASURES

1. Promote the consumption and commercialization of warm-water species of either native or exotic origin.

PROTECTION & RESTORATION MEASURES

1. Promote the consumption and commercialization of warm-water species of either native or exotic origin.

Pilot areas

This tool has been piloted in seven Mediterranean MPAs: Brijuni National Park (Croatia), Zakynthos MPA (Greece), Litoral del Baix Empordà (Spain), Cap de Creus MPA (Spain), Portofino MPA (Italy), Tavolara MPA (Italy), and Clanques National Park (France).

Implementation Dates

Crafting a local climate change adaptation plan should follow five phases:

1. Establishment – to make known the intention for drafting the plan and identify the convening body responsible for the overall coordination of the planning.
2. Analysis and scenarios – to establish the foundation on which the preparation of the plan and its implementation will be based.
3. Setting the vision – to achieve engagement and consensus building with the stakeholders and the wider community on the action plan, based on the findings from the phases 1 and 2.
4. Designing the future – actual drafting and finalisation of the local climate change adaptation plan, which should indicatively include: the goals and objectives of the plan, a preamble explaining the scope and process followed for its production and approval, the context derived from the analysis, the governance structure, the institutional framework for implementation and the priority climate change adaptation measures agreed upon by the different stakeholders, along with a roadmap for their implementation.
5. Realising the vision – to operationalise the adopted climate change adaptation plan and provide for its constant improvement.

4. What challenges may arise?

Participatory approaches and public participation require to address the following challenges at multiple levels:

- Allocating funds and securing commitment for public participation;
- Finding individuals skilled in participatory approaches and familiar with the specific context;
- A full understanding of the political, cultural, and institutional context at local, national, regional and global levels, including overcoming language barriers or even illiteracy, and 'translating' technical text to layman's terms;
- Possible lack of clear goals and understanding of the

process, inadequate planning and lack of feedback on issues raised by stakeholders.

A participatory decision-making process takes patience and commitment on everyone's part. People have to maintain their commitment over time, remain civil while discussing issues about which they may have strong feelings and be willing to compromise.

5. What are the expected results?

Quantitative results

Through the implementation of the Guidelines, it is expected that Mediterranean MPAs adopt a participatory climate change adaptation plan that addresses the 10 common priority measures identified.

Key deliverables

Joint Plan for action to face climate change in Mediterranean MPAs.

Transfer potential

Piloting climate change adaptation participatory action planS in the seven Mediterranean MPAs allowed the identification of 10 common no-regret priority measures that should be jointly adopted by Mediterranean MPAs .Further, MPAs may also use the methodology developed to design their own Action Plan.

Key information

- 300 stakeholders engaged in the quintuple helix
- 4 MPAs to successfully elaborate a climate change adaptation plan
- 1 Joint Plan for action to face climate change in Mediterranean MPAs.
- A total of 300 stakeholders were engaged in the quintuple helix participatory process to elaborate climate change adaptation plans in the pilot MPAs.
- Four out of the seven MPAs managed to successfully elaborate a full-blown climate change adaptation plan with priority measures agreed to be undertaken by the MPA. Each adopted measure features a description, the target group, expected results, the lead organisation(s) as well as those who should be involved in the implementation, a timeframe and performance indicators (used to measure achievement of outputs or outcomes).

For further information

Project contact: MPA Engage

MPA ENGAGE Lead partner

Marine Sciences Institute (ICM) CSIC, Barcelona
secredir@icm.csic.es

Leader Participatory Adaptation Plans
MIO-ECSDE info@mio-ecsde.org

Links of interest:

- MPA Engage Toolbox

Project

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FishMPABlue2

Management tool

MPAs Small-scale Fisheries Governance Toolkit

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	Fisheries	Management tool	Fisheries, governance, MPA

Pilot areas: Secche di Tor Paterno MPA (Italy); Secche della Meloria MPA (Italy); Regno di Nettuno MPA (Italy); Pequerolle marine reserve (France); Cap d'Ail marine reserve (France); Lastovo MPA (Croatia); Velebit Channel Marine Reserve (Croatia); Karaburun-Sazan MPA (Albania); Butrint National Park (Albania); Samaria MPA (Greece); Pelagos Sanctuary (Italy-Monaco-France)

1. What problems would this tool solve?

Meaningful engagement of local communities and resource users is key for the successful management of an MPA. The impacts of MPAs on different communities and users can provide scope for opposition and conflict, especially when tackling small-scale fisheries.

It is essential therefore, to adopt good governance principles and adaptive management strategies that engage local communities in a participatory way in all steps of the MPA process, so as to build trustful relationships that lead to shared decisions.

Aim of the tool

The overall aim of this Toolkit is to support the implementation of a co-management approach for small-scale fisheries. In this manner, decision-making is equitably and genuinely

shared between all relevant actors, with the long-term goal of improving the overall governance of natural resource management in the Mediterranean region.

Main objectives

This Toolkit presents management measures and governance principles, which are intended to help improve MPA management effectiveness of small-scale fisheries, with a particular focus on increased stakeholder engagement.

2. What is needed for its implementation?

Technological infrastructure

Technological requirements may be in place for specific tools, such as for the development of a database of infractions, the use of video and photo cameras to improve surveillance and patrolling, and the use of equipment and/or tools needed to carry out monitoring (e.g. logbooks, database creation).

Training

All stakeholder groups involved in co-management should be provided basic training on participatory processes to ensure more equitable participation and empowerment.

Moreover, specific training may be needed for implementing some tools, including surveillance capacities for rangers and fishers, data collection and/or experimental fishing and pescatourism.

Investment

For each tool, the costs and time required have been indicated as either low, medium, or high, based on the experience of pilot implementation.

3. How to use it?

Concept

This Toolkit is structured into four sections:

1. A synthesis of MPA challenges in relation to small-scale fisheries.
2. Based on this, MPA managers are invited to decide their preferred approach to address such challenges, including the example of co-management tested in the FishMPABlue2 project.
3. The 12 proposed management tools for small-scale fisheries are described and grouped into five categories:

    - Involvement in decision-making (1 tool)
    - Enforcement strengthening (3 tools)
    - Knowledge and ownership (2 tools)
    - Improvement of the environmental sustainability of small-scale fisheries (3 tools)
    - Improvement of the economic profitability of small-scale fisheries (3 tools).

For each tool, there is a description of the problem addressed and of the implementation process including lessons learnt. Case studies provide additional details on challenging or successful tools and recommendations are provided to guide their implementation. Finally, a basic assessment of the feasibility of each measure is described, based on the results of the testing of these tools in 11 pilot MPAs.

Pilot areas

These interventions and techniques were tested in 11 MPAs from six countries in the northern shores of the western-central Mediterranean.

Implementation Dates

The phases and timeline of implementation are described for each tool included in this Toolkit, including also a quantitative indication of the time required for successful implementation (low/medium/high).

4. What challenges may arise?

The establishment and effective implementation of co-management for small-scale fisheries requires a strong willingness of all parties involved. Parties should be involved in a long process to build trust, as well as a strong commitment in applying the shared decisions.
It is strongly recommended that the proposed management tools are not selected and applied blindly without first involving local stakeholders that may be affected by the identified measures. The process to identify both issues and potential tools should be done in a participatory way. This could be through pre-existing committees/working groups or through the creation of a dedicated "Local Governance Cluster", which would include the MPA managing body and representatives of various stakeholder groups, to identify areas in need of strengthening and potential tools to improve small-scale fisheries management.

5. What are the expected results?

Quantitative results

By adapting the proposed approach and selecting the tools that can be applied in the specific context, it is expected that MPAs will effectively shift towards the co-management of the small-scale fisheries sector.

Key deliverables

Improved management plans at MPA level.

Transfer potential

The small-scale fisheries Toolkit addresses the most recurrent problems of Mediterranean MPAs and proposes a governance model that can be applied to any Mediterranean MPA.

Key information

- In the Egadi Islands MPA (Italy), local fishermen publicly signed a voluntary "Code of Conduct" that included guidance for monitoring the MPA, and was aligned with the FAO "Code of Conduct for Responsible Fishing".
- To raise the awareness of fishers and the local community, pilot MPAs adopted different approaches which included promoting invasive species consumption, showcasing the importance of small-scale fisheries, launching an underwater photo competition, producing outreach videos and taking the general public on-board fishing vessels to show fishers' lives.

For further information

Project contact: FishMPABlue2

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FishMPABlue2 Project Manager
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Links of interest:

- FishMPABlue2 Project
- Awareness and outreach video of Strunjan Landscape Park, Slovenia

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

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PLASTICBUSTERSMPAs

Management tool

Marine Litter Prevention and Abatement Measures

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	Marine litter	Management tool	Adopt-a-beach, ALDFG, cigarette butts, marine litter, reusable cups, single-use plastics

Pilot areas: Greece (National Marine Park of Zakynthos, Thermaikos Gulf Protected Area), Italy (Miramare MPA, Pelagos Sanctuary, Tuscan Archipelago National Park), Slovenia (Strunjan Landscape Park), and Spain (Cabo de Gata-Nijar Natural Park-UNESCO Global Geopark, Cabrera Archipelago Maritime-Terrestrial National Park, Natural Park of Ebro Delta). They have been replicated in Albania (Karaburun-Sazan MPA), Croatia (Brijuni National Park), Montenegro (Platamuni MPA), and Slovenia (Debeli Rtic Landscape Park)

1. What problems would this tool solve?

The Mediterranean Sea is one of the areas most affected by marine litter worldwide. Impacts include entanglement and ingestion, bio-accumulation and bio-magnification of toxic substances released from litter items, facilitating the introduction of invasive species and causing damage to benthic habitats. MPA managers stand at the forefront of this issue, however, they often lack the tools, knowledge and resources to effectively tackle it. As a result, it can be difficult to achieve set conservation goals.

Aim of the tool

The aim of this action is to contribute to the prevention and mitigation of the impacts of marine litter in Mediterranean MPAs.

Main objectives

The objective of these measures is to propose concrete actions to reduce or mitigate marine litter presence in Mediterranean MPAs.

2. What is needed for its implementation?

Technological infrastructure

Technical equipment may be necessary to perform monitoring, including a GPS tracker to record marine litter locations and a camera to document the characteristics of sites.

Training

Some training is necessary to apply the appropriate protocols to monitor abandoned, lost and discarded derelict fishing gear (ALDFG).

Investment

Each measure entails organisational, implementation and equipment costs that are variable depending on the type of measure and scope of implementation. For example, equipment costs are related to monitoring activities, the provision of refillable and/or paper caps to the local enterprises, producing reusable cups, installing reverse-vending machines or collection bins in selected sites, or organising awareness-raising events and implementing communication activities.

3. How to use it?

Concept

A total of 9 demonstrations, categorised in 5 different types of measures, have been implemented, :

- Replacement of single-use plastics.
- Derelict fishing gear management schemes.
- Awareness raising campaigns (e.g., adopt-a-beach).
- Banning specific items and activities (e.g, cigarette butt-free beaches).
- Extended producer responsibility (e.g., developing a network of collection points for beverage containers made of PET, can and glass).
- For each demonstration, the location, brief description, lines of action, expected results, performance indicators, target groups and contacts of implementing and coordinating partners are specified.

The final short-listing of marine litter measures to be considered for the pilots was made using a participatory process among all Plastic Busters MPAs project partners. This ensured the full consideration of MPA-specific contexts and characteristics, such as the marine litter pressure, organisational capacity and human resources and the institutional setup and management priorities. Plastic Busters MPAs monitoring campaigns were instrumental in generating fit-for-purpose marine litter data that pinpointed the selection of targeted measures for the demonstrations.

Pilot areas

The proposed measures have been piloted in 9 Mediterranean MPAs in Greece (National Marine Park of Zakynthos, Thermaikos Gulf Protected Area), Italy (Miramare MPA, Pelagos Sanctuary, Tuscan Archipelago National Park), Slovenia (Strunjan Landscape Park), and Spain (Cabo de Gata-Nijar Natural Park-UNESCO Global Geopark, Cabrera Archipelago Maritime-Terrestrial National Park, Natural Park of Ebro Delta). They have been replicated in Albania (Karaburun-Sazan MPA), Croatia (Brijuni National Park), Montenegro (Platamuni MPA), and Slovenia (Debeli Rtic Landscape Park).

Implementation Dates

Implementation steps for each proposed measure are presented and illustrated in detail in the publication "Showcases on how to prevent and mitigate marine litter in Mediterranean MPAs".

4. What challenges may arise?

The publication "Showcases on how to prevent and mitigate marine litter in Mediterranean MPAs" illustrates the experiences of piloting marine litter prevention and mitigation measures in pilot MPAs, including the challenges that were faced during the various phases.

5. What are the expected results?

Quantitative results

By implementing the proposed measures, it is expected that the quantities of marine litter in Mediterranean MPAs are mitigated as a result of the widespread adoption of measures preventing their entry into the marine environment.

Transfer potential

These measures can and should be adopted by other Mediterranean MPAs, as well as local managers and public authorities wishing to effectively address the issue of marine litter in their area of jurisdiction.

Key information

- 1,500 Distributed reusable cups in Zakynthos Marine Park
- 20,000 Distributed paper straws in Zakynthos Marine Park
- 8400 Collected beverage containers in Cabo de Gata-Nijar Park
- In the Zakynthos Marine Park, a total of 1,500 reusable cups and 20,000 paper straws were distributed to encourage residents, tourists and businesses (beach bars, hotels, etc.) to reduce their use of single-use plastics.
- To date in the Cabo de Gata-Nijar Park, a total of 8,400 beverage containers have been collected through installed reverse-vending machines, two businesses have been involved and 184 vouchers have been offered, of which 96 have been redeemed.

For further information

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Links of interest

- Plastic Busters MPAs Marine Litter Prevention and Mitigation Measures (splash page)
- Showcases on how to prevent and mitigate marine litter in Mediterranean MPAs

Project

Interreg Mediterranean
PLASTIC BUSTERS MPAs

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

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TUNE UP

Management tool

MPA Contracts

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers	MPA contracts	Management tool	Adaptive governance, co-management, environmental contract, MPA, stakeholders

Pilot Areas

1. What problems would this tool solve?

There is currently a strong need for a strategic and participatory approach to manage Mediterranean MPAs. Such an approach ensures transparency, the involvement of all relevant stakeholders and can help settle potential conflicts, hence leading to a greater chance in achieving biodiversity protection objectives.

Environmental Contracts have the potential to fulfil this need. In fact, they are a highly feasible and flexible tool to ensure effective coordination among institutions at all levels involved by integrating funding, planning tools and human resources, while at the same time limiting potential conflicts between preservation and economic issues.

Aim of the tool

The overall aim of the environmental (MPA) contract is to contribute to the achievement of the objectives of conservation of biodiversity in MPAs, by effectively addressing the important pressures and threats on coastal and marine ecosystems from human activities, and the rise in competing demands for the resources in these areas.

Main objectives

The objective of Environmental Contracts is to promote a comprehensive and integrated vision that openly considers all the possible objectives and finds solutions to make these objectives coexist, assuming environmental sustainability simultaneously as a priority objective and as an implementation strategy.

2. What is needed for its implementation?

Technological infrastructure

No particular technological requirements are required to design and implement the Environmental Contracts in MPAs.

Training

Through the analysis and mapping of stakeholders, it is possible to define the specific training needs and build a capacity-building plan focused on the interests and possible roles and positions that the various subjects can/want to occupy in the management and governance system of the MPA.

Investment

Although European Programmes can act as a starter for such governance processes, an administrative system capable of guaranteeing an ongoing and funded basis to those processes should be built. It is recommended that in the preparation phase of an Environmental Contract, the human and financial resource capabilities of the promoter and the other subjects involved

to both manage the governance process and implement the Action Plan are assessed, as well as the relationships with local and institutional stakeholders.
It is essential that stakeholders are involved in order to obtain a clear and complete picture of the available economic resources, the financing possibilities and the conditions within which these can be activated under the Contract.

3. How to use it?

Concept

An Environmental Contract should be based on a participative, inclusive governance process engaging all stakeholders with a legitimate interest in the protection and sustainable development of the target area. Moreover, it should be based on a structured and integrated analysis that can be shared and updatable, the state of the target area and the connected risks/opportunities. It should put in place a comprehensive and integrated strategy that deals with the resolution of problems in a balanced, ordered and positive manner, with the aim to achieve sustainable development. For this purpose, a clear set of quantifiable measures and actions should be put in place to measure the progress of the strategy towards the achievement of specific objectives, and to monitor the changing nature and influences of internal and external forces that act upon the target area.

The detailed stages of preparation and implementation of an environmental contract, including a report of the main issues emerged during the pilot implementation, and a summary of lessons learned and recommendations, are included in the document "Environmental Contracts in Marine Protected Areas: Methodology and pilot cases from TUNE UP".

Pilot areas

10 MPA contracts were implemented in Albania, France, Greece, Italy, Montenegro, Slovenia, Spain, corresponding to six ecoregions (Alboran Sea, Levantine Sea, Gulf of Lion, Adriatic Sea, Tyrrhenian Sea and Ionian Sea). Each pilot case was characterised by the exposure of marine biodiversity to a peculiar set of concurrent pressures, as well as by

different MPA institutional frameworks, comprising a variety of planning and regulatory tools, which at times interfere or or even conflict with each other.

Implementation Dates

The Environmental Contract is an input-output process articulated along 2 phases:

1. Preparatory stage: Definition of the area, determination of the governance structure, drafting of the context analysis and of the participatory strategy with a Memorandum of Understanding.
2. Development stage: Creation of three scenarios (Trend, Oriented, Preferred), upon which the formal agreement and the final Action Plan will be built.

It is recommended that the timeframe of the process should be planned according to the local context specificities.

4. What challenges may arise?

It may be difficult to embed the Environmental Contract into national regulations due to the novelty of the tool in almost all pilot countries (France and Italy excluded). However, public bodies responsible for the management of MPAs should be fully involved, so that the governance process is not weakened.

The presence of multiple actors and the overlap of plans and programs in MPAs requires an adaptive governance approach, one that is based on continuous supervision and reorientation carried out by the managing board.
Other challenges include the difficulty in transmitting the potential of the process and the expected results, the risk that local stakeholders are already heavily involved in other recent, or in progress, participatory initiatives and the costs of participation, in particular for private actors. These challenges may be overcome however by ensuring an accurate preliminary analysis of participatory experiences and local initiatives already developed in the target area in order to identify any pre-existing conflicts between stakeholders.

5. What are the expected results?

Quantitative results

It is expected that Environmental Contracts will streamline and improve the management efficiency and effectiveness of Mediterranean MPAs, thus contributing to achieving their biodiversity conservation objectives.

Key deliverables

Formal agreement, subscribed by key stakeholders, including an Action and Implementation Plan.

Transfer potential

Pilot sites provided an opportunity to test the applicability of the tool and the process in the European Mediterranean region and make the necessary adjustments to best fit the legal framework and specific contexts for each MPA.

It is important to keep in mind that every pilot is different and the way the process should be managed will differ in each case.

Key information

- The MPA Contract stems from previous experiences of river contracts which are voluntary commitments undertaken by various public and private entities in various capacities interested in environmental restoration and the socio-economic regeneration of water systems. It is a flexible, open and continuously updated tool, adaptable to transformations and changes in social and economic conditions and policies.
- The Environmental Contract is a process for creating synergies and integrating actors, it is not a new planning tool. The Contract allows horizontal and vertical subsidiarity, providing it is flexible, adaptable and based on an inclusive participatory and negotiated decision-making process. Although voluntary, it is binding in terms of liability, financing and timing, and takes place among both private and public actors (public-private partnership).

For further information

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Links of interest:

- Environmental Contracts in Marine Protected Areas: Methodology and pilot cases from TUNE UP (download)

Donor: Interreg Med programme

Project

Interreg Mediterranean TUNE UP

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

TUNE UP

Management tool

Environmental Contracts in Marine Protected Areas

To whom is it addressed?
Local communities, Marine Protected Area (MPA) managers, SMEs, tourism businesses

Theme
Mpa Contracts, MPA Management

Type of tool
Management

Key words
Biodiversity, participatory approach, environmental contract, governance, protected areas, marine and freshwater biodiversity, MPA, multistakeholder process, stakeholders

Pilot areas: Amvrakikos Gulf (Greece), Cabo de Gata –Níjar Natural Park (Spain), Kotor – Risan Bay (Montenegro), L'Albufera (Spain), Sazan – Karaburun (Albania), Sečovlje Salina Landscape Park (Slovenia), Sinis Peninsula – Mal di Ventre Island (Italy), The former saltworks of Camargue (France), Thermaikos Gulf – Axios delta (Greece), Ventotene and Santo Stefano Islands (Italy)

1. What problems would this tool solve?

The Mediterranean basin is one of the most important global hotspots of biodiversity. However, it is facing ecosystem degradation due to its high exposure to anthropogenic impacts such as seasonal tourism, illegal fishing or overfishing, unsustainable agriculture methods, maritime transport pollution or other kinds of pollution such as plastics. Environmental issues linked directly to climate change such as extreme climatic events, extensive fires or invasive alien species, also play a role in this degradation process.

The Interreg MED TUNE UP project is addressing a governance gap to deal with the risk of biodiversity loss and unsustainable socio-economic activities in the Mediterranean region. It focuses specifically on the ongoing lack of multilevel governance, weak cooperation between stakeholders, unsustainable management and low public awareness.

Aim of the tool

Marine Protected Area Contracts are voluntary governance tools built on Environmental Contracts that originated in France in the early eighties to control pollution and flooding, manage hydraulic structures and raise stakeholder awareness. This tool responds to the need for a strategic and collaborative approach to Mediterranean marine protected area (MPA) management and biodiversity protection, based on the active participation of local stakeholders. The overall aim of the tool is

and encourage the effectiveness of MPA management and planning in the Mediterranean.

The Environmental Contract has the proper features of a governance model. It must be adaptive and open to any possible update according to the external conditions that eventually determine or change the feasibility of decisions being implemented. This creates a synergy and a bottom-up dynamic between actors in order to share different perspectives and discover new ways of identifying and solving problems in MPAs.

Main objectives

The final objectives of the negotiated and voluntary management tool are to:

- Engage and strengthen the capacities of key stakeholders within novel territorial governance frameworks,
- Guide both the public and private sectors to accurately apply ecosystem-based approaches in their activities,
- Ensure multi-stakeholder coordination and prevent potential conflicts between different parties/sectors,
- Promote the achievement of long-term results to increase the size of protected areas in the Mediterranean, and
- Attract new sources of funding and exploit various financial tools, for concrete actions to be activated, in relation to MPAs' effective management.

2. What is needed for its implementation?

Technological infrastructure

No specific technological infrastructure is needed for the implementation of this tool. However, since this management tool is based on a participatory approach, technological materials for improving communication between participants, such as computers and the internet, can be necessary. They help to reinforce synchronisation and share knowledge between MPA managers and other stakeholders.

Training

It is important that the MPA managing authority launching the Contract has the capacity to lead the process and design a participation and communication strategy. Training to some employees or trained external advisors should be foreseen to ensure a proper management of both technical and scientific aspects of the process.

Investment

The final cost concerns the funding of the governance process and structure as previously described and will likely depend on factors such as the type and length of the process.

3. How to use it?

Concept

Environmental Contracts are not new plans. Rather they are designed to bring existing plans together in order to amplify their effectiveness in the target region. It is a complex procedure, because the tool has to take different socio-economic, political and sectoral dynamics into account. A long-term governance model also requires an adaptive governance approach, based on flexibility and a simplification of administrative procedures with a view to its application across different MPAs. This is also needed to reinforce stakeholder participation, communication and engagement, especially between those parties that possess sectoral expertise, local authorities and the catalysts of the Environmental Contract process.

Therefore, the Environmental Contract involves the preliminary definition of the territorial area to be considered, its legal and regulatory framework, a stakeholder map, questionnaires and a Memorandum of Understanding. The tool's participatory approach allows for drafting three scenarios for each pilot site:

1. Trend scenario: considering negative tendencies in the current situation
2. Oriented scenario: considering a set of positive interventions to improve the situation
3. Preferred scenario: highlighting the proposals to achieve short and mid-term improvement goals.

These scenarios comprise three strategic topics: governance, environment and socio-economic development, as well as the specific characteristics of each MPA. Thus, at the end of the process, the Contract is based on a shared vision, an action plan and an agreement between the stakeholders, based on the legal framework in place in the area. After signing, during the implementation stage, there is also a monitoring phase of contract compliance.

Pilot areas

Amvrakikos Gulf (Greece) , Cabo de Gata –Níjar Natural Park (Spain) , Kotor – Risan Bay (Montenegro) , L'Albufera (Spain), Sazan – Karaburun (Albania) , Sečovlje Salina Landscape Park (Slovenia) , Sinis Peninsula – Mal di Ventre Island (Italy) , The former saltworks of Camargue (France) , Thermaikos Gulf – Axios delta (Greece) , Ventotene and Santo Stefano Islands (Italy)

implementation Dates

The implementation timeline of the action plan that supports an Environmental Contract is 5 years.

4. What challenges may arise?

The challenges observed in the pilot areas reveal the following Contract implementation challenges:

- Fragmentation of administrative boundaries and complexity of the institutional framework
- Lack of coordination between different stakeholders and insufficient collaborative governance approaches
- Ignoring crucial aspects of local development such as human, cultural and socio-economic dynamics
- Lack of a centralised system for data collection and dissemination policies
- Lack of public and institutional awareness

Other main challenges revolve around the need to prioritise the activities and clearly identify dates, budgets and responsibilities, while involving stakeholders both within and outside of the MPAs and public authorities in the process from the very beginning.

5. What are the expected results?

Quantitative results

The main result of the Environmental Contract is improved MPA management effectiveness at the Mediterranean basin. Overall,

quantitative results include the number of stakeholders targeted and involved in the process, the people reached and impacted during the territorial labs, as well as the total area of the MPA involved and impacted.

Key deliverables

The tool encourages optimal engagement between stakeholders in the targeted area to achieve the best practices for biodiversity protection in the Mediterranean. It contains two key deliverables:

1. a Formal Agreement (signed legal act, binding for the undersigning parts), and
2. an Action Plan (including the sequence of alternative scenarios, responsible bodies, necessary economic and human resources, implementation terms).

Transfer potential

Environmental Contracts may be adopted by any MPA, and in numerous other contexts such as urban/rural/natural areas which have similar governance and management issues. Regardless of the complexity of the cultural, political, economic and social systems, it is an adaptable management tool that aims to solve governance challenges. It is a suitable tool to be used by different stakeholders (international, national, local authorities, private and public enterprises, civil society organisations, general public, etc.) as a formal agreement. This kind of transfer contributes to sharing different stakeholder experiences on community development, training methodologies, conflict resolution as well as communication and management skills.

Key information

- All Mediterranean stakeholders have a key role to play in the MPA governance process to ensure efficient and long-term MPA management.
- MPAs are impacted by numerous activities (fishing, tourism, agriculture, etc) and the active participation of local stakeholders have a key role in contributing to the improvement of MPA management.
- Strong and effective communication and engagement strategies for these stakeholders are also important to amplify the efficiency of MPA management.

In the Mediterranean, there is an urgent need to support the effectiveness of MPA management and this tool can contribute by fostering participatory approaches within and beyond territorial waters to improve local and regional governance.

For further information

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Links of interest:

- TUNE UP project website
- Environmental Contracts in Marine Protected Areas
- Mediterranean Biodiversity Knowledge Platform - TUNE UP Project Viewer

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean

BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

MPA Engage

Management tool

Coastal governance good practices database

To whom is it addressed?
Civil society, governmental representatives, local communities, Marine Protected Area (MPA) managers, policy-makers, public interested in governance, research centres, SMEs, tourism businesses

Theme
MPA management

Type of tool
Management tool

Key words
Database, good practices, governance, lesson learnt, Marine Protected Area, MPA, multistakeholder process, participatory approach, participatory approaches, protected areas

Pilot areas: Amvrakikos Gulf (Greece), Cabo de Gata –Níjar Natural Park (Spain), Kotor – Risan Bay (Montenegro), L'Albufera (Spain), Sazan – Karaburun (Albania), Secovlje Salina Landscape Park (Slovenia), Sinis Peninsula – Mal di Ventre Island (Italy), The former saltworks of Camargue (France), Thermaikos Gulf – Axios delta (Greece), Ventotene and Santo Stefano Islands (Italy)

1. What problems would this tool solve?

The Mediterranean Sea is acknowledged as one of the priority eco-regions. While it contains major biodiversity hotspots it also faces a wide array of pressures (e.g. population growth, urbanisation, tourism exploitation, overfishing, pollution, shipping traffic, non-native species) that are causing loss and fragmentation of Mediterranean marine and coastal habitats. Good governance is key to reverse these trends and minimise the pressures. The Interreg MED TUNE UP project is promoting multilevel governance for tuning up biodiversity protection in marine areas sharing good practices and lessons learnt through the COASTINGWIKI.

Aim of the tool

The COASTINGWIKI is an online database gathering good practices and experiences of governance in the Mediterranean. This tool is an interactive source of information on coastal governance aiming at sharing good practices and lessons learnt for policymakers, practitioners and researchers of coastal governance.

Main objectives

The final objectives of the COASTINGWIKI are to:

- Promote the good practices of governance in the Mediterranean to improve governance in the Mediterranean with a bottom-up approach.
- Foster the dissemination of the Environmental Contract in Marine protected areas, showing case studies.
- Engage key stakeholders in the formulation of a local MoU

2. What is needed for its implementation?

Technological infrastructure

No specific technological infrastructure is needed for the implementation of this tool. Only a PC and an internet connection are required to have access.

Training

No particular training is required.

Investment

No particular investment is needed to have access to the database.

3. How to use it?

Concept

The database builds on good practices and lessons learnt about governance from two different projects: COASTING and TUNE UP. The aim of the database is to share knowledge across the Mediterranean. All the pilot sites of the TUNE UP project have included their experiences to develop a voluntary Contract as a key tool of a bottom- up approach to improve governance. The pilot sites have developed a preliminary definition of the territorial area to be considered, including its legal and regulatory framework, a stakeholder map, questionnaires and finally a Memorandum of Understanding, which is presented as the final result in the good practices that are included in the database.

Pilot areas

Amvrakikos Gulf (Greece), Cabo de Gata –Níjar Natural Park (Spain), Kotor – Risan Bay (Montenegro), L'Albufera (Spain), Sazan – Karaburun (Albania), Secovlje Salina Landscape Park (Slovenia), Sinis Peninsula – Mal di Ventre Island (Italy), The former saltworks of Camargue (France), Thermaikos Gulf – Axios delta (Greece), Ventotene and Santo Stefano Islands (Italy).

Implementation Dates

The database is already available. It offers the possibility to submit other good practices or lessons learnt but a registration is needed before validation.

4. What challenges may arise?

Some difficulties may arise for external agents trying to add a good practice if they have not previously gathered all the information requested, especially due to the fact that some

parts of the questionnaire cannot be avoided. Also, information requested is mainly focused on good practices that could be or were beneficial for the COASTING project experience, and it can be difficult for external entities to accommodate information of new good practices to such a structure.

5. What are the expected results?

Quantitative results

The outcomes of the TUNE UP project include delivering political recommendations for MPA governance for the Mediterranean area and to capitalise on the results of the implementation of the Environmental Contract in 10 pilot sites. Ten examples of good practices from the pilot sites will be added to the database. The Environmental Contract includes as quantitative results, the number of stakeholders targeted and involved in the process, the people reached and impacted during the territorial labs, as well as the total area of the MPA involved and impacted.

Key deliverables

The key deliverable is the COASTINGWIKI database available here. The database invites submissions of good practices to be integrated in the database.

Transfer potential

The COASTINGWIKI can be used by anyone, from policy makers and governance managers for adoption in other coastal areas. It also offers the possibility to submit other good practices or lessons learnt to be added to the database.

Key information

- The COASTINGWIKI has been developed in the context of the COASTING project, and has been updated with the good practices from the TUNE UP project.
- All Mediterranean stakeholders have a key role to play in the MPA governance process to ensure efficient and long-term MPA management.
- MPAs are impacted by numerous activities (fishing, tourism, agriculture, etc) and the active participation of local stakeholders have a key role in contributing to the improvement of MPA management.

For further information

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Links of interest:

- TUNE UP project website
- COASTINGWIKI
- Environmental Contracts in Marine Protected Areas
- Mediterranean Biodiversity Knowledge Platform – TUNE UP Project Viewer

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Interreg Mediterranean
BIODIVERSITY PROTECTION

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MPA Engage

Management tool

Engaging Mediterranean key actors in Ecosystem Approach to manage Marine Protected Areas to face Climate Change

To whom is it addressed?
Marine Protected Area (MPA) managers, scientists

Theme
Climate change, Ecosystem approach, MPA management

Type of tool
Management tool

Key words
Adaptive capacity, climate change, exposure, MPA managemen, sensitivity, socio-ecological indicators, vulnerability assessment

Pilot areas: Brijuni National Park (Croatia), Portofino MPA (Italy), Calanques National Park (France), Zakynthos National Marine Park (Greece), Cap de Creus MPA (Spain), Litoral del Baix Empordà (Spain) and Tavolara Punta Coda Cavallo MPA (Italy)

1. What problems would this tool solve?

Climate change is already posing a big threat to the conservation objectives of marine protected areas. An urgent common effort is required to mitigate this threat and to establish adaptation strategies to prevent irreversible alterations of MPAs. To address this challenge, a socio-ecological vulnerability assessment tool has been developed among other tools within the MPA-Engage project, supported by the Interreg Med Programme (Grant number: 5216 /5MED18_3.2_M23_007). The ultimate goal of the project is to support and train managers to respond to and manage the impacts of climate change in their MPAs.

Aim of the tool

The vulnerability assessment tool aims to support local managers in the application of a standardised methodology to understand the MPA socio-ecological vulnerabilities to the impacts of climate change. Understanding these weaknesses, managers can put in place additional strategic actions to increase the local resilience of the area. Additionally, extensive data collection is required for the calculation of the vulnerability index, providing an opportunity to managers to understand in which area of their management there are data gaps.

Main objectives

The final objective of the tool is to assess the vulnerability of MPAs through a multidimensional socio-ecological vulnerability index that combines vulnerability scores of the MPA, habitats, species and stakeholder groups in order to provide relevant information for the design and implementation of targeted adaptation strategies to face the impacts of climate change.

2. What is needed for its implementation?

Technological infrastructure

No technological infrastructure is needed, only a laptop and Wi-Fi connection.

Training

Currently specific training is required to fill in the template necessary to use the tool and at least one person per MPA is recommended to receive this training. In the future, video tutorials and guidance documents can be provided.

Investment

There are no costs to access and use the tool.

3. How to use it?

Concept

A webpage with a virtual interface hosts the vulnerability assessment tool and the user can upload the template with all the data collected to calculate the final vulnerability indices. The outcome provided consists of a series of figures showing the final result for each index calculated. From the page, the user can then also download an excel file with all numerical results related to the indices, figures with qualitative results and a template to write a report for the MPA recently assessed.

Pilot areas

Brijuni National Park (Croatia), Portofino MPA (Italy), Calanques National Park (France), Zakynthos National Marine Park (Greece), Cap de Creus MPA (Spain), Litoral del Baix Empordà (Spain) and Tavolara Punta Coda Cavallo MPA (Italy).

Implementation Dates

We recommend performing a socio-ecological vulnerability assessment every 5 years. However, during the first assessments, if data poor templates are used for the calculation of the index, the assessment can be repeated as frequently as new data are collected and included in the template.

4. What challenges may arise?

The amount and diversity of data to collect can be challenging for managers. In addition, transforming data to properly fill in the tool's template may require additional effort. The quality of the final results is dependent on the quality of the data collected. However, a specific output of the tool is dedicated to calculating the quality of the final index.

5. What are the expected results?

Quantitative results

By using the tool, important data related to the physico-chemical characteristics, species and habitats are collected. These data are important to understand the sea water qualities and the status of species and habitats analysed.

Quantitative results are provided as an output for each index calculated by the tool. Furthermore, qualitative data have also been collected through questionnaires to compile information about stakeholders' perception on climate change impacts and MPA management. These data are important in order to have a holistic view of the MPA that combines the knowledge of managers and local stakeholders.

Key deliverables

As a key output we can expect a consistent database with all the data collected by the MPA. In addition, a report where the user can include and describe the final results is produced by the tool.

Transfer potential

Following the example set by the 7 pilot MPAs, the vulnerability assessment tool could be adopted by all Mediterranean MPAs. In this way, coordinated actions to build resilience in MPAs to tackle the impacts of climate change, can be established on a Mediterranean scale.

Key information

- The vulnerability assessment tool is an innovative instrument developed with the participation of MPA managers that tested it throughout its implementation.
- The vulnerability tool output is a multidimensional index at the MPA, species, habitat and user group scale. The user groups involved are: professional and recreational fishers, divers, and the nautical and tourism sectors.

For further information

Project contact: MPA-Engage

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POSBEMED2

Monitoring tool

Transnational monitoring and management toolbox

To whom is it addressed?
Beach managers, environmental actors, local administrations, Marine Protected Area (MPA) managers, regional administrations, tourism actors, tourism businesses

Theme
Beach management, MPA management

Type of tool
Monitoring tool

Key words
Banquettes, Beach, coastal erosion, Marine Protected Area, nature-based solutions, Posidonia oceanica

Pilot areas: Capo Carbonara & Sinis Mal di Ventre Marine Protected Areas (Sardinia, Italy), Es Trenc-Salobrar de Campos Maritime-Terrestrial Natural Park (Balearic Islands, Spain), Schinias – Marathon National Park (Greece), Spyros beach (Cyprus), Sakarun beach (Croatia), Potamos beach (Greece)

1. What problems would this tool solve?

POSBEMED2 Interreg Med project capitalises on the results of the POSBEMED project (2016-2019) and develops planning strategies that enhance the value of the Posidonia beach-dune environment and integrates them into the overall coastal strategy, while also addressing concerns and educating stakeholders. Results from previous POSBEMED surveys revealed that:

- 83% of the surveyed local authorities remove seagrass deposits and banquettes every year on some or all of the beaches, including in protected areas.
- A large percentage of beachgoers are unaware of the role of Posidonia banquettes in the formation and maintenance of beaches.
- The concept of a Posidonia-free beach is linked more to stakeholders' and decision makers' perceptions of what beach users would expect, rather than to beach users' attitudes.

All in all, POSBEMED2 aims to address key knowledge gaps, providing information that will enhance management decisions on adaptation, policies, planning and promotion in protected areas.

Aim of the tool

This toolbox was developed as the result of a process. It included testing and monitoring of management measures taken from the POSBEMED Strategy and Action Plan for the Mediterranean region, activities to raise awareness and educate stakeholders and a framework action plan for Posidonia coastal zones with an integrated and transferable methodology.

Main objectives

- Testing and monitoring management measures (restoration activities, erosion control, displacement options, stakeholder acceptance etc.) taken from the POSBEMED Strategy and Action Plan for the Mediterranean region in other seven pre-identified sites.
- Educating stakeholders by increasing awareness for more nature-oriented management strategies.
- Organising capacity building workshops to increase knowledge about Posidonia banquettes and its essential role to maintain healthy ecosystems.
- Promoting informational videos to inform about the functions of the Posidonia beach-dune system, the pressures it receives, as well as the consequences of unsustainable management practices.
- Developing a framework action plan for the Posidonia coastal zone at 7 protected areas.
- Setting up an integrated and transferable methodology for Posidonia beach management.

2. What is needed for its implementation?

Technological infrastructure

No specific technological infrastructure is needed. The toolbox provides mainly information and processes to enhance monitoring and management at a transnational level.

Training

Local workshops can be organised with stakeholders to raise awareness and start active dialogues within local communities to foster an ecosystem-based approach in beach management and promote Posidonia Banquettes conservation and protection.

Investment

The tool was a result of the POSBEMED / POSBEMED2 projects co-funded by the Interreg-Med project and is free to users.

3. How to use it?

Concept

The strategic objective of the toolbox is to achieve the sustainable management of Posidonia beaches.

First steps include building a diagnostic of each site and holding a seminar to build a community of actors. Depending on beach typologies, ecological function, environmental values and social expectations, specific management interventions will take place.

It is important to organise capacity-building workshops and participatory seminars that allow stakeholders to understand the importance of developing specific management practices which take into account the specific characteristics of each

area, but also to recognise the value of the Posidonia beach-dune environment.
All the interventions need to be monitored and subsequently evaluated, presenting results to the local community of actors. Discussions and feedback from local stakeholders on the results achieved will help to provide applicable and realistic advice for implementing a local strategy programme.

Pilot areas

Capo Carbonara & Sinis Mal di Ventre Marine Protected Areas, Es Trenc-Salobrar de Campos Maritime-Terrestrial Natural Park, Schinias – Marathon National Park, Spyros beach, Sakarun beach, Potamos beach

Implementation Dates

2019-2022

4. What challenges may arise?

Difficulties can occur in the identification and engagement of local concerned actors and to create "ownership" of the issue in the local community. Access to funding for local and regional actions can also be challenging to source.

5. What are the expected results?

Quantitative results

The effective implementation of these practices will considerably improve the management of Posidonia banquettes in Mediterranean beaches and dunes.

Key deliverables

A number of local and regional public administrations, tourism and environmental key actors, MPA managers, beach managers and tourism-related businesses, involved in the process.

Transfer potential

The actions and approach will provide a practical guide to support potentially transferable practices that might be used by other MPAs and by local municipalities in other regions.

Key information

- 85% of beach users that have been sensitised after public awareness actions, declare they are ready to accept Posidonia banquettes on the beach (ecoattitude camain, 2021). Despite this, municipalities in charge of beach management still claim that users are not ready for change. The platform aims to prove this to the contrary.

For further information

Project contact: POSBEMED2

REGION SUD: Stéphanie OUDIN: soudin@maregionsud.fr, Lorena BERNE lberne@maregionsud.fr, posbemed2@maregionsud.fr

Links of interest:

- https://posbemed2.interreg-med.eu/

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

MPA Adapt / MPA Engage

Monitoring tool

Monitoring Climate Change Impacts in Mediterranean MPAs

To whom is it addressed?
Hydrographic offices, Marine Protected Area (MPA) managers, marine scientists, national oceanographic agencies, policy-makers, the interested general public

Theme
Climate change

Type of tool
Monitoring tool

Key words
Alien species, citizen science, climate change, mass mortality, MPA, Photogrammetry, Pinna nobilis, Posidonia oceanica, protocol, sea urchins, seawater temperature

Pilot areas: This tool has been implemented in more than 70 sites

1. What problems would this tool solve?

The effects of climate change are particularly alarming for the Mediterranean Sea, which is warming faster than the global oceans. Documenting these changes is a key task to support Integrated Coastal Zone Management (ICZM) and to inform maritime spatial planning (MSP). Nevertheless, the complexity of ecological transformation, along with inadequate human and financial resources, typically hamper our observation capabilities. Mediterranean MPAs can play a primary role in providing a systematic and harmonised observation system, translating principles already consolidated in the political framework, to the real world.

Aim of the tool

The aim of these standard monitoring protocols, developed by the projects MPA-Adapt and MPA-Engage, is to help track climate-related impacts in Mediterranean MPAs and beyond, following the requirements of the Ecosystem Approach and within the framework of the UNEP/MAP Barcelona Convention.

Main objectives

The objective of these standard protocols is to capture greater dimensions of environmental change through a restricted set of simple measurements related to temperature,

mass mortality, species abundances and distribution, and historical changes, including climate-sensitive species of both native and alien origin.

2. What is needed for its implementation?

Technological infrastructure

Specific technological requirements are in place for the following protocols:

1. Monitoring temperature conditions: Temperature data loggers HOBOTidbit v2 or HOBO-U22 and related software;
2. Mass mortality events: Diving computer to set the depth of the survey;
3. LEK-1, LEK-2, and LEK-3: An excel file for data collection;
4. Fish visual census: Diving computer to set the survey depth, measure transects time (5 minutes) and water temperature;
5. Posidonia oceanica (POFA): A deep gauge or diving computer to record the depth of the survey; a GPS (on board);
6. Pinna nobilis (FAP): Underwater compass; GPS; Underwater camera with housing and electronic strobes or focus providing continuous lighting;
7. Benthic alien species (BARD): A portable GPS (on board); underwater camera with housing and external light system (e.g., electronic strobes); photoQUAD software for image analysis; and
8. SFM photogrammetry: Underwater camera and housing; ground control points (GCPs) for geo-reference processing

Training

Video tutorials are available in the T-MEDNet Platform on how to monitor temperature, deploy temperature data loggers for monitoring seawater temperature and monitor and conduct surveys on mortality. A video tutorial for fish visual census is also available in the ISPRA and MPA-Adapt YouTube channel. In addition, video tutorials have been developed for LEK-1, LEK-2, and LEK-3 and for monitoring rocky habitats (including fish, sea urchins, and alien species).

Temperature monitoring and benthic assessments of alien species (Benthic Species Rapid Detection-BARD) should be conducted by certified scuba divers, working in pairs. The mass mortality assessment, the fish census and the assessment of Posidonia oceanica (POFA) can also be performed by recreational divers once adequate training is received. MPA staff training is needed to monitor Pinna nobilis (FAP) and to implement fieldwork for the SFM photogrammetry protocol. For LEK-1, LEK-2, and LEK-3, interviewers should be practitioners skilled in species identification with good knowledge of local fisheries and/or underwater environments.

Investment

The estimated cost to implement the temperature monitoring protocol is 1,800 € per MPA.

3. How to use it?

Concept

These protocols are inspired by the concept of Essential Climate Variables, and focus on a restricted set of simple measurements to capture greater dimensions of environmental change. The indicators have been chosen on the basis of their scientific relevance, feasibility and cost effectiveness. The first five protocols have been developed by the project MPA-Adapt; these were later complemented by six other protocols, developed by the project MPA-Engage. They cover:

- Temperature conditions – to build robust baselines and track hydrological changes to better understand the impacts climate warming has on marine coastal biodiversity.
- Impact of mass mortality on macro-benthic species dwelling in coastal waters.
- Local Ecological Knowledge to reconstruct historical changes – to interview experienced fishermen or other sea users, to gather information on historical changes in species abundances and distribution (LEK-1), regularly monitor climate-sensitive species of both native and exotic origin (LEK-2), and to assess mass mortalities in marine organisms (LEK-3).
- Fish visual census – to assess the abundance and distribution of specific fish species as reliable indicators of climate change.
- POFA – to measure the density of leaf shoots of Posidonia oceanica and additional characteristics linked to warming.
- FAP – Pinna nobilis populations within MPAs.
- URCH – Sea-urchin populations in shallow rocky habitats within MPAs.
- BARD – Benthic invasive species in rocky benthic habitats within MPAs.
- SFM Photogrammetry – to characterise habitat complexity and distribution patterns of populations of key species and track their changes over time through 3D habitat mapping.

Pilot areas

These protocols have been piloted in more than 70 sites across Spain, France, Italy, Croatia, Greece, Turkey and Tunisia.

Implementation Dates

- Temperature conditions: It is recommended to set up and retrieve data loggers every 6 months, generally before and after the warm season. A yearly periodicity can be adopted for remote sites.
- Mass mortality: It is recommended to monitor mass mortality every 12 months after summer, i.e. from mid-September to mid-October, or in cases of observed mass mortality events.
- LEK-1 and LEK-3: Interviews can be performed at any time of the year.
- LEK-2: Interviews should be performed every 12 months; the respondents should ideally remain the same across time.
- Fish visual census: It is recommended to perform the fish census every 12 months, between August and October; for recreational divers, the census can be performed at any time of the year.
- POFA: The period for monitoring should be during summer and autumn on an annual basis. However, from the end of September-October, flowering events might be more likely, this period is recommended for surveys. Also, the presence of fruits on the plant is an indicator and allows monitoring during spring (April-May).
- FAP: The period of monitoring should be late summer/autumn.
- URCH: Sampling should be performed once per year in the late summer, when seasonal algae have disappeared.

- BARD: Sampling should be carried out twice a year in summer and winter. If this is not possible due to logistical or financial constraints, monitoring should be run at least once a year, preferably in summer, and at the same time each year.
- PFM: The monitoring period must be adapted to each MPA depending on which period it has better water transparency conditions, which is usually during summer or early fall.

4. What challenges may arise?

To ensure the continuity of temperature data series, temperature data loggers should be launched with the correct parameters prior to being placed again in the field, and should be solidly attached to the substrate to avoid losing them due to rough sea conditions.

Looking for small gorgonians' colonies or specimens (less than 15 cm in height) may not be straightforward during the sampling. It is recommended therefore, to exclude them from sampling.

Fishermen may distrust researchers and practitioners. As such, special attention should be given to the approach used during the interviews, e.g. by showing genuine interest towards the answers and by behaving like a facilitator and not an expert.

5. What are the expected results?

Quantitative results

The implementation of the proposed protocols allows the collection of important physical and biological data that is necessary to understand climate change and seawater warming in the Mediterranean. Such data also supports the drafting and implementation of adequate mitigation strategies and effective adaptation plans in Mediterranean MPAs.

Key deliverables

Comprehensive sets of monitoring data describing specific biological and physical features of the marine environment that will help assess the impact of climate change in Mediterranean MPAs.

Transfer potential

The protocols can be shared, downloaded and printed by Mediterranean MPAs and can be used in non-commercial products or services, provided that appropriate acknowledgment of the MPA-Adapt and MPA-ENGAGE projects as the source and copyright holder is given.

Key information

- 80/100% Pinna nobilis clams lost
- 167 Monitoring sites
- 868 Trials The Mediterranean Sea is warming three times faster than the global average, with the past seven years set to be the warmest on record. This results, inter alia, in increasing frequency of "Medicanes", native fish species' northward migrations, alien species invasion and mass mortality events (80-100% Pinna nobilis lost in the last years).
- The first five protocols have been developed by the project MPA-Adapt. The project MPA-Engage capitalised on the experience gained through this project, and developed six other protocols, which further expanded the range of action to tackle climate change in Mediterranean MPAs.
- Climate Change protocols have been implemented 55 times overall across the seven MPAs, for a total of 167 monitoring sites and 868 trials. In all MPAs, data were gathered at three different depths (shallow, intermediate and deep) and involved citizen scientists 533 times.

For further information

Project contact: Institut de Ciències del Mar (ICM) of the Spanish National Research Council (CSIC) http://www.icm.csic.es/en

Lead researcher: Joaquim Garrabou

Links of interest

- T-MEDNet Platform
- Monitoring Climate-related responses in Mediterranean Marine Protected Areas and beyond: FIVE STANDARD Protocols
- MPA ENGAGE 11 Standard Protocols
- T-MEDNet Video Tutorials
- MPA ENGAGE Toolbox

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION
Project co-financed by the European Regional Development Fund
PlasticBustersMPAs

Management tool

Toolkit for monitoring marine litter and its impacts on biodiversity in Mediterranean MPAs

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers, scientists, technicians	Marine litter	Management tool	Biodiversity, marine litter, monitoring, protocol

Pilot areas: The SPAMI Pelagos Sanctuary, between Italy and France, Tuscan Archipelago in Italy, Cabrera National Park in Spain, National Marine Park of Zakynthos in Greece.

1. What problems would this tool solve?

Marine litter is a major issue especially in the Mediterranean, as it endangers not only wildlife and ecosystems, but also has serious socio-economic impacts. The assessment of marine litter presence in coastal and marine areas, as well as their impacts on biota, especially on endangered species through ingestion and entanglement, is fundamental to support the achievement of conservation goals especially for Mediterranean MPAs.

Aim of the tool

The aim of this operational toolkit is to contribute to the fight against marine litter in Mediterranean MPAs by providing a harmonised, consistent and comprehensive approach to marine litter assessments.

Main objectives

The objective of this toolkit is to provide a compilation of all the protocols needed to implement the Plastic Busters MPAs harmonised marine litter monitoring strategy, which covers the presence and impact of marine litter in pelagic and coastal Mediterranean MPAs, with a special emphasis on marine species, including those that are endangered (e.g. cetaceans, sea turtles, birds, endangered sharks, etc.).

2. What is needed for its implementation?

Technological infrastructure

For each monitoring protocol, a detailed and comprehensive list of the necessary technological requirements is presented.

For example, the use of (underwater) digital cameras and hand-held GPS units with extra batteries (ideally rechargeable batteries) for the majority of protocols are identified, as well as an oceanographic flowmeter and a stereomicroscope for sample separation for monitoring micro-litter on the sea surface using manta net tows. Digital scales (ideally with a 1 g precision) may also be necessary for weighing. Where remotely operated vehicles (ROVs) are employed, an underwater acoustic tracking position system (USBL) is recommended to provide a detailed geographical and depth position of ROVs along transects, in addition to an automatic depth system (auto depth) and at least two laser beams at known distance, to use as a metric scale. Stereomicroscope with image analysis software and FTIR or Raman spectroscopy with associated analysis software are also necessary to analyse ingestion.

Training

The implementation of this toolkit requires adequate knowledge and expertise, depending on the specific protocol and techniques used. Expertise is particularly needed in relation to sample analysis, ROV use and the organisation, implementation and data collection by scuba-divers and snorkelers.

Regional online training sessions on harmonised marine litter monitoring protocols have been organised in the context of the project Plastic Busters MPAs. Training aimed to transfer knowledge gained on harmonised ML monitoring approaches and methodologies, to MPA managers and staff members

Investment

The human resources, equipment and material necessary varies depending on the applied protocol. These resources are described in more detail in the Toolkit for monitoring marine litter.

3. How to use it?

Concept

This toolkit is a compilation of a series of harmonised protocols to monitor marine litter in Mediterranean MPAs, covering methodologies for monitoring:

- Macro-litter on beaches
- Micro-litter in beach sediments
- Macro-litter on the sea-surface with visual observation by small- and medium-sized vessels
- Micro-litter on the sea-surface using manta net tows
- Macro-litter on the seafloor with bottom trawl surveys
- Macro-litter on the seafloor with visual surveys with scuba/snorkelling in shallow coastal waters (0-30 m)
- Macro-litter on the seafloor with ROV in the deep sea
- Macro-litter and micro-litter ingestion in invertebrates, fish, sea turtles, seabirds and marine mammals
- Identifying marine litter hotspots on beaches

For each monitoring protocol, details are presented in the toolkit on how to select sites, the recommended frequency and timing of surveys, the sampling unit, litter size limits to be surveyed, how to perform litter analyses and classifications, how to establish reporting units and the list of equipment and material along with the sampling and recording sheets.

Pilot areas

The monitoring methods described within this toolkit have been adapted to address the specificities of the three main types of protected areas to be investigated:

1. Large pelagic and coastal protected areas (i.e., the SPAMI Pelagos Sanctuary, between Italy and France)
2. Medium-scale MPAs (i.e., the Tuscan Archipelago, in Italy)
3. Small-scale MPAs (i.e., the Cabrera National Park in Spain, and the National Marine Park of Zakynthos in Greece).

Implementation Dates

For each protocol, the specific timeline is detailed in terms of frequency and timing of surveys. In general, most

protocols require monitoring to be performed at least twice per year. Monitoring ingestion in invertebrates and fish should be performed once per year.

4. What challenges may arise?

A thorough description of each protocol is presented in the toolkit, including the methodology to implement it in an effective way as well as possible difficulties and challenges. A general consideration, valid for all protocols, is that the survey should not pose any threat to endangered or protected species (e.g., sea turtles, seabirds or shore birds, marine mammals) and their habitats (e.g., sensitive beach vegetation). In many cases, this would exclude protected areas but it largely depends on local management arrangements.

The comprehensive implementation of these protocols may require human and financial resources to ensure the adequate level of expertise and the necessary technical equipment. Moreover, weather conditions may pose challenges to performing data collection activities.

Lastly, the accurate estimation of litter items/km2 while monitoring macro-litter in the seafloor with bottom trawl surveys can be difficult, as it requires the estimation of the "swept area" during the haul, which in turn, requires specialised equipment that may not be available like acoustic devices mounted on the trawl net. Knowing, based on experience, the geometry of the gear, the skipper can advise the surveying team on effective net mouth width and height during each fishing operation.

5. What are the expected results?

Quantitative results

By applying the standardised protocols presented in this document, it is possible to collect harmonised, consistent and comprehensive data upon which appropriate measures can be established to achieve the set conservation goals.

Key deliverables

Standardised data on marine litter in coastal and marine areas.

Transfer potential

The protocols proposed in this document are based on the work done in the context of implementation of related EU legislation and of the Barcelona Convention. As such, they can be applied by local and national authorities, as well as by MPA managers, across the whole Mediterranean.

Key information

- This toolkit takes stock of all recent advances made by the EU MSFD Technical Group on Marine Litter and the Barcelona Convention CORMON Group. Furthermore, it capitalises on the outcomes of relevant projects such as the IPA-Adriatic DeFishGear project, the EU-funded INDICIT project and Interreg Mediterranean marine litter related projects, namely the MEDSEALITTER, AMARE and ACT4LITTER.

For further information

Project contact: Plastic Busters MPAs Interreg MED

ISPRA: Teresa Romeo (teresa.romeo@isprambiente.it)
University of Siena : Prof. Maria Crisitina Fossi (fossi@unisi.it)

Links of interest:

- Toolkit for monitoring ML and its impacts on biodiversity in Med MPAs

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

AMAre

Monitoring tool

Guidelines for early warning indicators of regime shifts

To whom is it addressed?	Theme	Type of tool	Key words
Marine Protected Area (MPA) managers, researchers, scientists	Climate change, MPA management	Monitoring tool	Climate change, early warning, environmental quality, regime shift, resilience, stability

Pilot areas: Secche Della Meloria MPA (SIC/ZSC), Tuscany, Italy

1. What problems would this tool solve?

The tool consists of implementing a simple protocol to obtain early warning indicators of a regime shift or collapse of marine forests, including macroalgal canopies and seagrass meadows. This requires monitoring the spread of algal turfs, low-lying (usually filamentous) algae at the edge of marine forests. A healthy forest provides a barrier against the invasion of algal turfs, which provide a less productive and usually species-depauperate alternative state. The more algal turfs spread into the forest, the greater the risk of collapse.

Aim of the tool

This tool aims to provide guidelines for monitoring early warning indicators of regime shifts or collapsing marine forests.

Main objectives

The objective of the tool is to provide a protocol to obtain early warning indicators of a regime shift or collapse of marine forests, including macroalgal canopies and seagrass meadows.

2. What is needed for its implementation?

Technological infrastructure

Spreadsheet software.

Training

A minimum of training is required for MPA staff in charge of establishing the permanent transects and for those involved in

experimental validation. Personnel need to be trained in field measurements and sample algal turfs with visual methods (e.g., photographic) and data entering into spreadsheets.

Investment

Costs will vary according to the site. Investments are needed for: a training workshop directed to MPA staff, which could be planned within AMARE plus; a field-based demonstration to ensure the efficient and correct implementation of the methodology; and personnel and field equipment costs.

3. How to use it?

Concept

The early warning system consists of establishing permanent transects at the edge between a forested patch and an area colonised by algal turfs. The abundance (percent cover) of algal turfs will be monitored just outside the canopy and 1-1.5 m within the forested patch. The indicator, called the recovery length, is quantified as the distance at which the cover of algal turfs will be reduced to 50% of that observed in a plot just outside the canopy. Large values of the indicator correspond to a larger penetration of algal turf inside the macroalgal forest or the seagrass meadow. When implementing the recovery length in a new area, it is recommended to perform a preliminary small-scale thinning experiment to ensure that the system behaves as expected and that algal turfs expand upon canopy removal. Probing the recovery length allows establishing the early warning system on the basis of observations alone, without any additional manipulation. Several transects can be established in an area and sampling can be done yearly or more frequently if necessary.

Pilot areas

Secche Della Meloria MPA (SIC/ZSC), Tuscany, Italy.

Implementation Dates

Establish at least five replicate 1.5 m transects at the border of each focal macroalgal forest or seagrass meadow and sample the transect once a year at the peak of vegetative cover of algal turfs, usually in summer.

4. What challenges may arise?

Implementing the tool is simple after a minimum of training. Data analysis to quantify the recovery length is more complicated, but personnel involved in AMARE Plus will help.

5. What are the expected results?

Quantitative results

The ability to quantify and clearly communicate the health status of key marine coastal ecosystems, such as macroalgal forests and seagrass meadows.

Key deliverables

Demonstration activity, reports, web-based communication tools.

Transfer potential

The proposed tool can be immediately implemented in MPAs, but we recommend having additional experimental tests assess the generality of its assumptions in a sample of locations.

Key information

The proposed tool originates from a robust theory on the dynamical behaviour of complex systems. There are a number of key papers defining the proposed indicator and its implementation under controlled laboratory conditions and in more complex real-world systems:

- Dai, L., Korolev, K. S. & Gore, J. Slower recovery in space before collapse of connected populations. Nature 496, 355-358, doi:10.1038/nature12071 (2013).
- Rindi, L., Dal Bello, M., Dai, L., Gore, F., Benedetti-Cecchi, L. 2017. Direct observation of increasing recovery length before collapse of a marine benthic ecosystem. Nature Ecology and Evolution. doi:10.1038/s41559-017-0153.
- Rindi, L., M. Dal Bello, and L. Benedetti-Cecchi. 2018. Experimental evidence of spatial signatures of approaching regime shifts in macroalgal canopies. Ecology 99:1709-1715.

The recovery length in the figure above, quantifies the propagation of a perturbation in space. In the figure, algal turfs propagate from a low-quality patch into a macroalgal forest. The larger the propagation, the closer the proximity of the forest to a point of collapse. The indicator is the distance at which the algal turfs decline to 50% of their abundance in the low-quality patch. This is called the half-point recovery length. An experimental test of the indicator is recommended before establishing the monitoring tool in a new area.

For further information

Project contact: AMARe

Lisandro Benedetti-Cecchi, Department of Biology, University of Pisa lbenedetti@biologia.unipi.it

Links of interest:

- https://www.quantamagazine.org/critical-slowing-warns-of-looming-disasters-20151118

Project

Interreg Mediterranean
AMAre
AMAre PLUS

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION
Project co-financed by the European Regional Development Fund
POSBEMED2

Monitoring tool

Joint Charter of Commitment for Mediterranean coastal communities

To whom is it addressed?
Beach managers, beach stakeholders, citizens, decision-makers, educational actors, SMEs

Theme
Beach management, MPA management

Type of tool
Monitoring tool

Key words
Banquettes, Beach, coastal erosion, Marine Protected Area, nature-based solutions, Posidonia oceanica, public awareness raising, social acceptability of change

1. What problems would this tool solve?

A Charter of Commitment has become a mobilisation phenomenon for all sorts of causes. However, many of these commitments are very general and don't materialise with concrete actions and usually end with the project. Moreover, most of the Charter of Commitments are addressed to decision makers since they are the ones in a position to decide to make changes. In the case of Posidonia banquettes, although many decision makers and beach managers say they agree on the need to keep them on the beaches, they don't necessarily act on it, because beach users don't accept banquettes. In our case, one of the key actions to make changes, is to create a community of actors declaring their acceptance of Posidonia banquettes on the beaches, and that they are ready to act for it.

Aim of the tool

The Charter of Commitment is a mobilisation platform dedicated to all beach stakeholders. Citizens, NGO's, scientific, education and economic actors are invited to sign the charter and act according to their own level to show change is possible and that decision makers can implement new management methods and lead this change. The Charter of Commitment aims to create a Posidonia friendly beach community of actors and to highlight actions undertaken to preserve the banquettes on Mediterranean beaches. The implementation of the tool will continue beyond the project's lifetime.

Main objectives

- To reach different target stakeholders (beach managers and decision makers, local residents, beach users and citizens, businesses, scientific actors, foundations and associations, education actors, tourism and hotel actors, professional athletes, artists and cultural actors, information actors).
- To propose to each signatory feasible, concrete and adapted options to engage him/herself/themselves and act. Proof, such as a picture or an invoice, will be requested to verify the commitment.

2. What is needed for its implementation?

Technological infrastructure

A website is used as a mobilisation platform to host the Joint Charter.

Training

No training is needed, a user-friendly platform ensures that all targeted audiences are able to use it

Investment

Access to the Charter website is free.

3. How to use it?

Concept

The strategic objective of the Joint charter is to engage people at different levels to protect and raise awareness of Posidonia

banquettes and their essential role for our beaches and planet. Each actor will have concrete commitments they make and specific actions, easy to carry out but that can make a difference. Once the actor commits, they must provide evidence that they have carried out the action or activity. They do this by going back onto the platform and uploading their action sheet (for municipalities especially) and posting a photo and text as a testimony.

Having different target stakeholders increases the likelihood of a greater number of actions being carried out, from decision makers to beach users.

Pilot areas

Spain, Cyprus, Crete, Greece, France, Italy, Croatia, Montenegro (however it's an open platform). The idea is to reach the whole Mediterranean region. Translation of the tool will be mandatory to reach further stakeholders.

Implementation Dates

2022

4. What challenges may arise?

The mobilisation platform is available in French and English. It will be translated into other Mediterranean languages such as Italian, Spanish, Croatian, and Greek to reach the different countries' local communities and to monitor the signatories in other languages. The long-term involvement and post project monitoring of results, animation and hosting of the website post project, remains a challenge with this tool.

5. What are the expected results?

Quantitative results

The commitment of different target actors will enhance collaboration, raise awareness, and give visibility to Posidonia banquettes issues in the Mediterranean.

Key deliverables

Number of actors involved and delivered commitments.

Transfer potential

The core of the Charter will be the same for all the countries and for all target audiences. However, some commitments might have to be adapted according to the country since laws and local characteristics are different.

Key information

- 85% of beach users that have been sensitised after public awareness actions, declare they are ready to accept Posidonia banquettes on the beach (ecoattitude camain, 2021). Despite this, municipalities in charge of beach management still claim that users are not ready for change. The platform aims to prove this to the contrary.

For further information

Project contact: POSBEMED2

REGION SUD: Stéphanie OUDIN: soudin@maregionsud.fr, Lorena BERNE lberne@maregionsud.fr, or posbemed2@maregionsud.fr

Links of interest:

- http://www.act4posidonia.eu/

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

PANACeA / MBPC

Geospatial tool

Mediterranean Biodiversity Protection Knowledge Platform

To whom is it addressed?
Conservationists, funding programmes, Marine Protected Area (MPA) managers, public authorities, researchers

Theme
Ecosystem approach

Type of tool
Geospatial tool

Key words
Biodiversity, ecosystem approach, environmental data, Mediterranean, policy, protected areas

MBPC implementing and associated partnership

1. What problems would this tool solve?

The objective of the Mediterranean Biodiversity Protection Knowledge Platform is to give visibility to effective methodologies, key project results, and actions towards biodiversity protection performed in the context of the Interreg MED funded Biodiversity Protection Community of projects, as well as to Interreg MED projects and partners. This platform provides a gateway to the spatial data generated by the Interreg MED Biodiversity Protection Community, and a knowledge library of documentary resources produced by MBPC partners and projects and relevant references (enriched with relevant external sources) on protected areas, ecoregions, and pressures to support regional environmental policy on biodiversity protection, natural resource management, and sustainable growth in Mediterranean protected areas and beyond.

Aim of the tool

The Charter of Commitment is a mobilisation platform dedicated to all beach stakeholders. Citizens, NGO's, scientific, education and economic actors are invited to sign the charter and act according to their own level to show change is possible and that decision makers can implement new management methods and lead this change. The Charter of Commitment aims to create a Posidonia friendly beach community of actors and to highlight actions undertaken to preserve the banquettes on Mediterranean beaches. The implementation of the tool will continue beyond the project's lifetime.

2. What is needed for its implementation?

Technological infrastructure

A PC/tablet, an Internet browser (Firefox and Google Chrome recommended) and an internet connection are required to access the Mediterranean Biodiversity Protection Knowledge Platform.

Training

No particular training is necessary to access and use the Platform, only basic knowledge as an Internet user. Video tutorials and a guidance document for users are included in the platform. Advanced GIS users can also extract tabular data and metadata linked to spatial viewer information.

Investment

No costs are associated with accessing and using the Platform.

3. How to use it?

Concept

The Mediterranean Biodiversity Protection Knowledge Platform has a visual interface giving access to project information, data per topic, guidance to users and a data policy. The knowledge contained can be accessed via two main components:

- Library, providing access to relevant project results, products, and available documentation; and
- The geoportal (or map viewer), which can be used to display biodiversity spatial data, and which consists of two main elements:
  1. A map viewer, where geospatial data can be displayed and individual queries can be performed; and
  2. A Catalogue viewer, allowing the user to navigate and discover available geospatial data, through a search engine and filtering tools.

The geoportal allows users to select and combine various data layers, to display and export ad hoc maps, and generate additional knowledge and policy-support. The infrastructure supports the principles of INSPIRE, SEIS, and GEOSS. The Platform uses Metadata standards (such as ISO 19119/115), existing thesauri to choose descriptive keywords (GEMET / INSPIRE / KEEP), and a clear and sound data policy to ensure data ownership and observe OGC web standards (WMS, WFS, WMTS, etc.).

Pilot areas

Interreg MED Biodiversity Protection Horizonal projects partner institutions 2016-2022

Recommended implementation frequency

The Mediterranean Biodiversity Protection Knowledge Platform is already online at biodiversity.uma.es and can be consulted at any time. Periodic updates are implemented to integrate relevant external spatial data on biodiversity, update the MedBioLitter database on interactions between biodiversity and litter, and add new materials to the library of resources on project results.

4. What challenges may arise?

The complexity and diversity of data inputs may require additional effort to find a dedicated solution to better represent specific results. The quality and accuracy of the results and messages output, extracted through the viewer interface, are strictly related to the quality and standardisation of the data input. New technologies are being integrated gradually through interactive dashboards and story maps to reach a wider audience.

5. What are the expected results?

Quantitative results

The Platform's map viewer is developed to spatially represent data and information generated by the projects of the Community. The Platform will work in synergy with MED's website, with a strong focus on spatial data and on ensuring service interoperability and integration. Relevant, external data sources include T-MEDNET, Med-IAMER, AWI, and VLIZ, among others.

Transfer potential

The Mediterranean Biodiversity Protection Knowledge Platform can be easily accessed by anyone interested in the themes of biodiversity protection and the implementation of an ecosystem approach to the Mediterranean. Further connections may be developed to ensure a wider spatial, temporal, and thematic coverage of the data.

Key information

- 300 and more Mediterranean partners.
- 19 Showcases of Interreg MED projects
- 1 Geoportal

For further information

Project contact: Emanuele Mancosu, ETC-UMA

Links of interest:

- Mediterranean Biodiversity Protection Knowledge Platform
- Factsheet – Biodiversity Protection Knowledge Platform
- PANACeA and Mediterranean Biodiversity Protection Community (MBPC) partnership
- Video tutorials

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

PHAROS4MPAS

Management tool

Recommendations for blue growth and marine conservation

To whom is it addressed?
Business sector, Marine Protected Area (MPA) managers, public authorities, public authorities (MSP)

Theme
Blue Economy

Type of tool
Management tool

Key words
Blue economy, Maritime Spatial Planning, MPA, recommendations

Pilot areas

1. What problems would this tool solve?

With the development of the Blue Economy, several maritime sectors are increasingly likely to operate more frequently both inside and in the vicinity of Mediterranean MPAs, resulting in increased environmental impacts. MPA managers tend to address interactions between maritime sectors and protected areas in an isolated manner, and management effectiveness and MPA networking are in their infancy regarding this issue. As part of the PHAROS4MPAs project, a set of recommendations is developed to improve the coordination between MPAs (and their conservation goals) and maritime economic sectors.

2. What is needed for its implementation?

Technological infrastructure

No particular technological infrastructure is needed.

Training

No particular training is needed.

Investment

No particular investment is needed to implement these recommendations.

3. How to use it?

Concept

The recommendations focus on the necessary practical collaboration between MPAs and several maritime sectors: offshore wind energy, maritime traffic and ports, cruise, leisure boating, recreational fisheries, aquaculture and small-scale fisheries. The aim is to achieve enhanced management effectiveness for marine protected areas by raising awareness, building capacity, and networking. This will be supported by the inclusion of MPA networks issues in the national maritime spatial plans that EU Mediterranean States are developing by 2021 and in the strategies developed for maritime sectors.

Recommended implementation frequency

These recommendations should be implemented whenever there are potential interactions between MPA management goals and maritime economic sectors, and in relation to the development of national MSP plans.

4. What challenges may arise?

For public authorities: the low level of influence of Maritime Spatial Planning (MSP) authorities in some countries may Recommendations for blue growth and marine conservation Management tool Photo by: Matt Hardy from Pixabay PHAROS4MPAS This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES: require reaching out to higher authorities (e.g., Ministries). Moreover, the influence of industrial lobbies may be an obstacle. Finally, political will is necessary to strike a balance between the various uses of the sea.

For the business sector: the lack of interest from sectors that use the sea as an infrastructure (e.g., for commercial maritime transport), and the varying interest from sectors that rely on ecosystem services (e.g., fisheries). If the recommendations are too negative for a sector, there is a risk that they will reject them.

5. What are the expected results?

Quantitative results

The outcomes of the PHAROS4MPAs project include delivering common capitalisation baselines, recommendations, and policy tools adapted for the MedPAN network, MSP authorities, the European Commission, the Barcelona Convention, and the various maritime sectors. The success of the recommendations will partly depend on the capitalisation phase, meeting with relevant stakeholders and attending regional and national meetings to make sure all key target groups have been reached and understand the value of the recommendations and their benefits. Persuasion and efforts will be needed to have the project recommendations included in MPA management plans, country planning processes, or business strategies.

Transfer potential

The recommendations may be applied by any Mediterranean MPA.

Key information

- 10 countries
- 15 partners
- 8 maritime sectors
- The recommendations have been developed in the context of the PHAROS4MPAs project, which involved more than 15 partners from 10 countries: Tunisia, Malta, Spain, France, Belgium, Italy, Slovenia, Croatia, Albania and Greece.
- The recommendations involve 8 maritime sectors: offshore wind farms (energy); maritime traffic and ports, and cruises and super yachts (transport); scuba diving, leisure boating, and recreational fisheries (tourism); aquaculture, and small-scale fisheries (fisheries).

For further information

Project contact: PHAROS4MPAs
Lead partner: WWF-FRANCE (Catherine Piante)

Links of interest:

- Pharos4MPAs website
- Biodiversity Protection Knowledge Platform – Pharos4MPAs project viewer
- Recommendations and policy briefs
- Decision Support Tool for Blue Economy in Marine Protected Areas (DST-MPA)

Project

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

Interreg Mediterranean
BIODIVERSITY PROTECTION

Project co-financed by the European Regional Development Fund

MPA Adapt / MPA Engage

Geospatial tool

T-MEDNET Platform

To whom is it addressed?
Hydrographic offices, Marine Protected Area (MPA) managers, marine scientists, national oceanographic agencies, policy-makers, the interested general public

Theme
Climate change

Type of tool
Geospatial and monitoring tool

Key words
Climate change, marine ecosystems, mass mortality, MPA, seawater temperature

Pilot areas

1. What problems would this tool solve?

The effects of climate change in the Mediterranean, such as shifts in species distribution and mass mortality events, have been related to seawater warming. At present, there is no comprehensive view on these effects, which hinders an in-depth analysis of climate change impacts on marine coastal biodiversity in the Mediterranean. The T-MEDNet platform is intended to develop a network to observe the effects of climate change on marine coastal ecosystems by promoting large-scale and long-term data acquisition, using standard monitoring protocols on seawater temperature and biological indicators.

2. What is needed for its implementation?

Technological infrastructure

The T-MEDNET Platform can be easily accessed online; only a PC and an internet connection are required.

Training

Training to use the T-MEDNET platform is not necessary.

The platform website provides access to video tutorials on how to deploy temperature data loggers to monitor seawater temperature, and on how to conduct mortality surveys (see also the MPA-ADAPT Protocols Tool). The integration of other standardised protocols is possible.

Investment

The T-MEDNET Platform can be accessed free of charge.

3. How to use it?

Concept

A display tool allows users to explore the trend in seawater temperature, temperature anomalies, and warming trends at the Mediterranean scale, both locally and in the different ecoregions. Moreover, T-MEDNet developed standard monitoring protocols to track long-term and large-scale mass mortality impacts that provide insights into the changes in distribution of fish indicators species (native warm- and cold affinity fish species and non indigenous tropical fishes). The database includes the network of

monitoring sites and the data on the status of populations of macroinvertebrates, collected mainly by MPA managers and scientific teams through a collaborative effort.

Pilot areas

80+ sites in Spain, France, Italy, Croatia, Greece, Turkey, Tunisia and Israel.

Recommended implementation frequency

The T-MEDNet Platform is continuously updated with new data coming from several users.

4. What challenges may arise?

Sustained monitoring efforts are being conducted in a growing number of sites. The lack of recurrent funding for long-term observation initiatives and network coordination is a serious emerging challenge.

5. What are the expected results?

Quantitative results

For the first time in the Mediterranean, the T-MEDNET Platform can be used to share, access, and display:

- Seawater temperature data, providing insights on coastal thermal regimes and seasonal stratification dynamics over extensive spatial and temporal scales. Moreover, it supports the analysis of warming trends and marine heatwaves in nearshore surface waters (0-40 m), and contributes to building more realistic coastal warming scenarios for the 21st century.
- Biological impacts, providing insights on mass mortality events affecting the coastal benthic biota over extensive spatial and temporal scales. Moreover, it supports the analysis of the relationships between T-conditions and biological responses, including episodic events, in particular the onset of mass mortality events, but also changes in distribution, behaviour, and phenology. Finally, through the T-MEDNET Platform, it is possible to test and complement climate change approaches for coastal and Marine Protected Areas, from local to regional scales.

Transfer potential

The development of a collaborative platform and the provision of data ingestion, quality check, and data management services has resulted in unified databases on essential physical and biological variables for Mediterranean coastal waters. The data and information has been transferred in several ways: networking, at the national, European, and international level; data reporting (through the Digital CSIC); data sharing with EMODnet Physics (work in progress); and contributions to the Marine Copernicus Ocean State Report issue #3 (in press, summary available online); and through various scientific publications. The yearly data and information update is an objective of the network coordinators, as they seek recurrent funding schemes.The T-MEDNet initiative is a successful end-to-end, bottom-up collaborative story between marine scientists and marine protected area managers. The approach and the tools have been set with the aim of building a representative coastal network on a Mediterranean scale, which is why they can be easily implemented in other European and Regional Seas.

Key information

- 200 temperature time series
- 70 sites logged in
- +30 million temperature samples in 70+ sites
- Continuous T-series are now logged in more than 70 sites, mostly in the Western Mediterranean, but also in the Alboran, Adriatic, Ionian, Aegean, and Tunisian sub-basins, resulting in a unified quality-checked database.
- The T-MEDNet database has been crucial for analysing the inter-annual variability of the stratification dynamics of coastal waters (5-40 m) under climate forcing, including the regional heatwaves of the summers of 2003 and 2006 (the warmest August and July in France since 1950 respectively) and recent marine heatwaves (2015-2019).
- As of today, there are about 80+ temperature time series in the database, with almost 30+ million temperature samples in 80+ sites, for depths ranging from the surface to a depth of 67 m.
- The implementation of Mass Mortality Events module has fueled the collaboration among research teams across the Mediterranean.
- As a main result, T-MEDNet is now providing the most comprehensive view on these events (+1200 events) covering all Mediterranean ecoregions (http://tmednet.org/mass-mortality/mass-mortality-events).
- The set-up of the new module on Climate Fish in 2022 is an important step forward for gathering information on the onoging changes in fish indicator species related to the warming.

For further information

Project contact: MPA-ADAPT
Joaquim Garrabou, ICM-CSIC

Links of interest:

- T-MEDNet Platform
- Biodiversity Protection Knowledge Platform – MPA-Adapt Project Viewer
- MPA-ADAPT work on climate change and marine protected areas

This tool is part of a Mediterranean Toolkit for Biodiversity Protection developed by the PANACeA partnership, the MBPC project and updated by ENSERES:

The Biodiversity Protection Tools Catalogue

In the framework of the Project PANACeA, the Mediterranean Biodiversity Protection Community built the present Catalogue of tools for biodiversity protection in Mediterranean MPAs, covering different needs and requirements for ecosystembased management.

This Catalogue is an update and extension of the Tools Catalogue published in 2019, which includes a preliminary version of some of the tools for ecosystem based management in the Mediterranean developed by the Biodiversity Protection Community projects up to 2019 and new information raising from relevant Interreg Mediterranean Biodiversity Protection Projects ending in 2022.

Furthermore, collaboration with the ENI CBC Med funded project ENSERES has madepossible the addition of other relevant biodiversity protection and management tools in the 2022 edition, both in pdf and online format.

This Catalogue is accessible online from biodiversity.uma.es

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