



UNITED
NATIONS

EP

UNEP/MED IG.27/11



**Mediterranean
Action Plan**
Barcelona
Convention

2 October 2025
Original: English

24th Meeting of the Contracting Parties to the
Convention for the Protection of the Marine Environment
and the Coastal Region of the Mediterranean and its Protocols

Cairo, Egypt, 2-5 December 2025

Agenda Item 3: Thematic Decisions

Decision 27/8: Specially Protected Areas of Mediterranean Importance (SPAMIs), Strategies and Action Plans under the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, including the Post-2020 SAPBIO

For environmental and cost-saving reasons, this document is printed in a limited number. Delegates are kindly requested to bring their copies to meetings and not to request additional copies.

Note by the Secretariat

Mid-term assessment of the implementation of the Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region (Post 2020 SAPBIO)

1. As provided for in the Post-2020 SAPBIO (Decision IG.25/11 of the 22nd Meeting of the Contracting Parties to the Barcelona Convention and its Protocols (COP22, Antalya, Türkiye, 7-10 December 2021)) and as requested by COP23 (Decision IG.26/5) (Portorož, Slovenia, 5-8 December 2023), SPA/RAC conducted the mid-term assessment of the collective implementation of the Post-2020 SAPBIO to ensure the achievement of the Post-2020 SAPBIO objectives by 2030.
2. To undertake the mid-term assessment focusing on start-up activities, as listed in the Annex III of the Post-2020 SAPBIO (Decision IG.25/11 of COP22), a simplified table, as provided for by Action 34 on Post-2020 SAPBIO Monitoring, was elaborated and disseminated to National correspondents and SPA/RAC partners including members of the advisory committee.
3. The findings of this mid-term assessment focusing on start-up activities with national scope, along with the findings on regional scope form the mid-term assessment of the collective implementation of the Post-2020 SAPBIO, focusing on start-up activities.
4. The main findings of the mid-term assessment provided in this document, based on a quantitative analysis and are aggregated by Post-2020 SAPBIO Goals, were presented to the 11th meeting of the Post-2020 SAPBIO National correspondents (Athens, Greece, 9-10 April 2025).
5. The main findings of the mid-term assessment along with the conclusions and recommendation of the Post-2020 SAPBIO National correspondents were reviewed by the Seventeenth Meeting of SPA/BD Focal Points (Istanbul, Türkiye, 20-22 May 2025), which agreed on their submission as appropriate to the meeting of MAP Focal Points and COP24 for adoption.

Development of the Monitoring Framework for the assessment of the collective implementation of the Post-2020 SAPBIO

6. As provided for in the Post-2020 SAPBIO (Decision IG.25/11 of COP22) and as requested by COP23 through Decision IG.26/5, SPA/RAC will conduct a mid-term assessment of the collective implementation of the Post-2020 SAPBIO to ensure the achievement of the Post2020 SAPBIO objectives by 2030.
7. To undertake the mid-term assessment focusing on start-up activities, SPA/RAC developed a simplified table as provided for by Action 34 on Post-2020 SAPBIO Monitoring and is proposing a Monitoring framework of the collective implementation of the Post-2020 SAPBIO for 2027 and 2030 (Action 35).
8. The Monitoring Framework of the assessment of the Post-2020 SAPBIO was discussed and reviewed by the 11th Meeting of the Post-2020 SAPBIO National Correspondents (Athens, Greece, 9-10 April 2025), which agreed on its submission to the 17th Meeting of SPA/BD Focal Points (Istanbul, Türkiye, 20- 22 May 2025).
9. Due to the recent finalization and adoption of the Monitoring Framework for the Kunming Montreal Global Biodiversity Framework, particularly its indicator components, at the resumed session of the 16th meeting of the Conference of the Parties to the Convention on Biological Diversity in Rome, Italy (27 February 2025), the development of indicators for the Monitoring Framework of the Post-2020 SAPBIO has been delayed. The Meeting requested the Secretariat, in close consultation with the Post-2020 SAPBIO National Correspondents and with their endorsement, to use the indicators of the Monitoring framework for the Kunming-Montreal Global Biodiversity Framework if

relevant and applicable or be developed as region-specific indicators for the Monitoring Framework for assessing the collective implementation of the Post-2020 SAPBIO in 2026.

10. This Decision was reviewed by the 17th Meeting of SPA/BD Focal Points, which agreed on its submission as appropriate to the meeting of MAP Focal Points and COP24 for adoption.

Outcomes of the Ordinary Periodic and Extraordinary Review of the areas included in the SPAMI List during the biennium 2024-2025

11. By their Decision IG.26/5 of COP23, the Contracting Parties requested SPA/RAC to work with the relevant designated national authorities in Albania, Cyprus, France, Italy, Lebanon, Monaco, Slovenia, Spain and Tunisia to carry out the ordinary periodic review and the Extraordinary Review for the Specially Protected Areas of Mediterranean Importance (SPAMIs) listed below, and bring the outcome of that review process to the attention of the Contracting Parties at their COP24:

- The ordinary review for the Karaburun Sazan National Marine Park (Albania), which should have taken place in 2022 but has been exceptionally postponed to 2024.
- The ordinary reviews for the following national SPAMIs:
 - o Lara-Toxeftra Turtle Reserve (Cyprus),
 - o Cerbère-Banyuls Marine Nature Reserve (France),
 - o La Côte Bleue Marine Park (France),
 - o Les Embiez Archipelago - Six Fours (France),
 - o Port-Cros National Park (France),
 - o Capo Carbonara Marine Protected Area (Italy),
 - o Egadi Islands Marine Protected Area (Italy),
 - o Penisola del Sinis - Isola di Mal di Ventre Marine Protected Area (Italy),
 - o Porto Cesareo Marine Protected Area (Italy).
 - o Landscape Park Strunjan (Slovenia),
 - o Alboran Island (Spain),
 - o Cabo de Gata-Níjar Natural Park (Spain),
 - o Cap de Creus Natural Park (Spain),
 - o Columbretes Islands (Spain),
 - o Mar Menor and Oriental Mediterranean zone of the Region of Murcia coast (Spain),
 - o Medes Islands (Spain),
 - o Sea Bottom of the Levante of Almeria (Spain), and
 - o Cetaceans Migration Corridor in the Mediterranean (Spain).
- The ordinary review for the Pelagos Sanctuary for the Conservation of Marine Mammals (France, Italy and Monaco).
- The extraordinary reviews for the following national SPAMIs:
 - o Palm Islands Nature Reserve (Lebanon),
 - o Tyre Coast Nature Reserve (Lebanon),
 - o La Galite Archipelago (Tunisia),
 - o Kneiss Islands (Tunisia), and
 - o Zembra and Zembretta National Park (Tunisia).

12. The 2024-2025 SPAMI ordinary periodic and extraordinary reviews were all conducted. The results and recommendations of the realised ordinary periodic reviews were approved by the 17th Meeting of SPA/BD Focal Points, which recommended that the five SPAMIs subject to extraordinary reviews leave the period of provisional nature and enter again the regular review process, in accordance with the Procedure for the revision of areas included in the SPAMI List.

Ordinary reviews of SPAMIs expected in 2026-2027

13. Ordinary reviews of four SPAMIs in 2026 and six SPAMIs in 2027, should take place.

Four ordinary reviews to be undertaken in 2026 for the following SPAMIs:

- Marine Protected Area of Tavolara-Punta Coda Cavallo (Italy),
- Marine Protected Area and Nature Reserve of Torre Guaceto (Italy),
- Miramare Marine Protected Area (Italy), and
- Plemmirio Marine Protected Area (Italy).

Six ordinary reviews to be undertaken in 2027 for the following SPAMIs:

- Bouches de Bonifacio Nature Reserve (France),
- Marine Protected Area of Capo Caccia Isola Piana (Italy),
- Punta Campanella Marine Protected Area (Italy),
- Al-Hoceima National Park (Morocco),
- Archipelago of Cabrera National Park (Spain), and
- Maro-Cerro Gordo Cliffs (Spain).

Updating of the Regional Action Plans and Strategies

14. The Contracting Parties to the Barcelona Convention and its Protocols, at their COP22, requested the Secretariat (SPA/RAC) to update (i) the Action Plan for the Conservation of the Coralligenous and Other Calcareous Bio-concretions in the Mediterranean Sea, (ii) the Action Plan for the Conservation of Mediterranean Marine Turtles, (iii) the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea, and (iv) the Regional Strategy for the Conservation of Monk Seal in the Mediterranean Sea.

15. An assessment of the progress of their previous implementation timetables has been done at national and regional levels. The assessment has considered the SPA/RAC progress activities achieved during the last biennia (since 2018) and the activities realized by Contracting Parties as requested by the adopted timetables. Multilateral Environment Agreements, regional organizations, and institutions as well as Partners to these Action Plans were also invited to report on their related achievements.

16. The assessment introduces updates to both the main text of the Action Plan and their implementation timetables. These changes follow the review of the implementation of the previous version and considering input from the SPA/BD Focal Points at their 17th Meeting (20 to 22 May 2025, Istanbul, Türkiye) and the national and regional experts. Key changes and updates made in the action plans are:

Updated Action Plan for the Conservation of Marine Turtles in the Mediterranean

- **Stronger emphasis on climate change impacts**, such as feminization of eggs and sea-level rise affecting nesting beaches and on reduction of incidental catches and elimination of intentional killings.
- **New priorities**, including protection of **emerging nesting areas**, genetic studies for sub-regional management, and improved rescue center protocols.
- **Updated objectives**, now aiming to maintain **Good Environmental Status (GES)** for turtle populations, with priority given to green turtles.
- **Refined implementation measures**, such as dynamic fishing regulations, socio-economic assessments of conservation measures, and inclusion of marine turtle conservation in school curricula.
- **Implementation**: A revised timetable (extending to 2030) with detailed actions.

Updated Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea

- **Policy Integration:** Explicit linkage to the Post-2020 SAPBIO, *CBD Global Biodiversity Framework*, and *SDGs*, alongside updated legal references (e.g., GFCM/44/2021/16 and GFCM/46/2023/4).
- **Species Prioritization:** An expanded list of protected and data-deficient species, now including deep-sea sharks and other vulnerable taxa.
- **Science & Technology:** Adoption of advanced tools like *eDNA*, *BRUVs*, and *citizen science* for monitoring, alongside genetic studies to map ecological corridors and habitat connectivity.
- **Stakeholder Engagement:** Broader inclusion of *youth, women, and Indigenous communities* in conservation efforts, coupled with socioeconomic assessments of fisheries impacts.
- **Education & Outreach:** Modernized campaigns leveraging *virtual reality* and digital platforms to raise public awareness.
- **Fisheries Mitigation:** Promotion of alternative gear to reduce bycatch and enforce GFCM anti-finning rules.
- **Implementation:** A revised timetable (extending to 2030) with detailed, actionable targets and cross-sectoral collaboration mechanisms.

Updated Regional Strategy for the conservation of monk seal in the Mediterranean

- **Revision of the trend in sightings occurring in the Mediterranean countries Groupings:** Year 2017 was selected as a criterion to separate the present from the country assessments described in the first and second Monk seal Regional Strategy. Inclusion of Croatia, with practically no monk seal sightings reported in recent years, with the exception of a couple of opportunistic reports in 2022, in Group C and move Syria to Group B.
- **Expanded Conservation Measures:** Emphasis on MPAs, stricter enforcement of fishing regulations, and community involvement, particularly in Group A countries (e.g., Greece, Türkiye, Cyprus).
- **Enhanced Monitoring and Awareness:** Updated protocols for monitoring, capacity building, and public awareness, including regional databases and contingency plans for disasters.

17. Furthermore, the Action Plan for the conservation of the Coralligenous and Other Calcareous Bio-concretions in the Mediterranean Sea, follows a new structure that includes a first part covering the species/habitats concerned, the current state of knowledge, the relevant policies, the key threats, the assessment methods. This section will undergo less frequent review. The second part is to be evaluated and updated more regularly than Part I. It consists of a short-term action plan, focusing on immediate conservation measures, with the vision, goals and long-term targets.

Evaluation of the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and recommendations for the way forward

18. For the biennium 2024-2025, the Contracting Parties to Barcelona Convention and its Protocols requested SPA/RAC during COP23 to evaluate the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and to identify recommendations for the way forward, in light of the new Global Biodiversity Framework, Post-2020 SPABIO and the EcAp/IMAP processes of UNEP-MAP/Barcelona Convention and submit them for consideration to COP24.

19. A draft Evaluation of the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and recommendations for the way forward was presented to the 17th Meeting of SPA/BD Focal Points. It included the common approach, the structural differences and specificities of the Regional Action Plans, the results from the questionnaire shared with the national

SPA/BD focal points and resource persons and the SWOT analysis. It also highlighted the conclusions and recommendations of the evaluation that were mainly related to the Regional Action Plans (RAP) evaluation and updating process, including a RAP working group and the proposed common format/template for the regional Action Plans.

20. The proposed structure is composed of a first part covering the species/habitats concerned, the current state of knowledge, the relevant policies, the key threats, the assessment methods, the vision, the goals, and the long-term targets. This section will undergo less frequent review. The second part is to be evaluated and updated more regularly than Part I. It consists of a short-term action plan, focusing on immediate conservation measures.

21. The Meeting agreed the submission of the conclusions and recommendations of the evaluation as appropriate to the meeting of MAP Focal Points and COP 24 for adoption.

22. The implementation of this decision is reflected in the proposed 2026-2027 PoW and Budget under Programme 2, especially under activities 2.2.1, 2.3.1 and 2.3.2.

23. This Decision and its Annexes were submitted to the 2025 MAP Focal Points Meeting (Athens, Greece, 16-19 September 2025) that decided to transmit it to the 24th Meeting of the Contracting Parties (COP24) (Cairo, Egypt, 2-5 December 2025).

[Decision IG.27/8]**Specially Protected Areas of Mediterranean Importance (SPAMIs), Strategies and Action Plans under the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, including the Post-2020 SAPBIO**

The Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) and its Protocols at their 24th Meeting,

Welcoming the outcome document of the 2025 United Nations Ocean Conference (UNOC-3) entitled “Our ocean, our future: united for urgent action”, reaffirming the strong global commitment to conserve and sustainably use the ocean, seas and marine resources and reconfirming the need to strengthen the role of regional seas conventions and action plans,

Being inspired by the high-level celebration of the anniversary of the 50 years of the UNEP/Mediterranean Action Plan and the 30 years of the Post-Rio Barcelona Convention, in UNOC-3, on 10 June 2025, as a strong sign of renewed commitment of the Contracting Parties, as reflected in their Ministerial Declaration,

Noting with appreciation Resolution 6/15 adopted by the United Nations Environment Assembly on 1 March 2024, on strengthening ocean efforts to tackle climate change, marine biodiversity loss and pollution,

Recalling also the United Nations General Assembly resolution 76/296 of July 2022, entitled “Our Ocean, Our future, Our responsibility”,

Recalling further the Kunming-Montreal Global Biodiversity Framework (GBF), its goals A and B and targets 1, 2, 3, 4, 5, 6, 8, 9 and 11 and other important decisions underpinning its implementation adopted by 15th Conference of the Parties (COP15) to the Convention on Biological Diversity (CBD, Montreal, Canada 7 - 19 December 2022),

Having regard to Article 10 of the Barcelona Convention and to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, and in particular Articles 4, 5, 6, 8, 9, 11 and 12, thereof, whereby Contracting Parties shall, individually or jointly, take all appropriate measures to protect and preserve biological diversity, rare or fragile ecosystems, as well as species of wild fauna and flora which are rare, depleted, threatened or endangered and their habitats, in the Mediterranean Sea Area,

Having also regard to Decision IG.25/11 on the Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region (Post-2020 SAPBIO) and its goals aiming to reduce the threats to biodiversity and ensure that biodiversity is preserved and maintained or enhanced in order to meet people’s needs, targets and actions, adopted by the Contracting Parties to the Barcelona Convention and its Protocols at their 22nd Meeting (COP 22, Antalya, Türkiye, 7-10 December 2021),

Noting Decision IG.17/12 on the Procedure for the Revision of the Areas included in the Specially Protected Areas of Mediterranean Importance (SPAMI) List, adopted by the Contracting Parties at their 15th Meeting (COP 15, Almeria, Spain, 15-18 January 2008),

Considering Decision IG.24/6 on the Identification and Conservation of Sites of Particular Ecological Interest in the Mediterranean, including Specially Protected Areas of Mediterranean Importance, adopted by the Contracting Parties at their 21st Meeting (COP 21, Naples, Italy, 2-5 December 2019),

Having also regard to Decision IG.25/12 on Protecting and conserving the Mediterranean through well connected and effective systems of marine and coastal protected areas and other effective area-based conservation measures, including Specially Protected Areas and Specially Protected Areas of Mediterranean Importance, adopted by the Contracting Parties at their 22nd Meeting (COP 22, Antalya, Türkiye, 7-10 December 2021),

Appreciating the support provided by the *Ad hoc* group of Experts for Marine Protected Areas in the Mediterranean to the Secretariat and the Contracting Parties during the current biennium,

Recalling Decision IG.22/7, on the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria, adopted by the Contracting Parties at their 19th Meeting (COP 19, Athens, Greece, 9-12 February 2016),

Recalling also Decision IG.25/13, on Action Plans for the conservation of species and habitats under the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, adopted by the Contracting Parties at their 22nd Meeting (COP 22, Antalya, Türkiye, 7-10 December 2021) and Decision IG.26/5, on Specially Protected Areas (SPAs), Specially Protected Areas of Mediterranean Importance (SPAMIs) and ecosystem restoration, adopted by the Contracting Parties at their 23rd Meeting (COP 23, Portoroz, Slovenia, 5-8 December 2023),

Noting with appreciation that for many populations of various threatened species GES is reached (Marine birds, Marine turtles) as indicated in the 2023 Mediterranean Quality Status Report (Decision IG26/3),

Taking into account the results of the assessments of the status of implementation of the Action Plan for the Conservation of Marine Turtles in the Mediterranean, of the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea, of the Regional Strategy for the conservation of monk seal in the Mediterranean, and of the Action Plan for the conservation of the Coralligenous and Other Calcareous Bio-concretions in the Mediterranean Sea, as well as the Evaluation of the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and recommendations for the way forward,

Taking into account also the results of the extraordinary evaluations of the five following Specially Protected Areas of Mediterranean Importance (SPAMIs) undertaken during the biennium 2024-2025: Palm Islands Nature Reserve (Lebanon), Tyre Coast Nature Reserve (Lebanon), La Galite Archipelago (Tunisia), Kneiss Islands (Tunisia), and Zembra and Zembretta National Park (Tunisia),

Guided by the UN-backed *30x30 Ocean Action Plan* (launched at the 2025 UN Ocean Conference) that outlines two critical pathways to achieve 30% marine protection by 2030: (1) enabling global conditions, notably ratifying the BBNJ Agreement; and (2) accelerating site-specific protection through political mobilization, embedding 30x30 in national frameworks, and fast-tracking MPA/OECM designations,

Committed to further streamlining the Mediterranean Action Plan Ecological Objectives and associated Good Environmental Status and Targets, as well as the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria into the Regional Action Plans for the conservation of endangered and threatened species and key habitats adopted within the framework of the SPA/BD Protocol,

Having considered the report of the 17th Meeting of Specially Protected Areas and Biological Diversity Focal Points (Istanbul, Türkiye, 20-22 May 2025),

1. *Take note* of the Main findings of the mid-term assessment focusing on the Post-2020 SAPBIO start-up activities (UNEP/MED IG.27/Inf.20);

2. *Urge* the Contracting Parties to prepare or revise their National Biodiversity Strategies and Action Plans (NBSAPs) under the Convention on Biological Diversity (CBD) by fully incorporating the relevant elements of the Post-2020 SAPBIO, and maximise their efforts for their timely implementation and identification of financial needs for marine and coastal biodiversity and to this aim every effort should be made to prepare and implement National Marine and Coastal Biodiversity Finance Plans or similar instruments as recommended in the Post-2020 SAPBIO mid-term assessment;

3. *Urge* the Secretariat (SPA/RAC) to provide support for the implementation of the Post-2020 SAPBIO, particularly by assisting in the preparation and updating of the NBSAPs, monitoring and assessment, undertaking targeted action as specified in the Programme of Work 2026-2027 and mobilizing resources through the development of project proposals;

4. *Invite* the relevant organisations, in particular the members of the Post-2020 SAPBIO Advisory Committee, to continue contributing to the efforts by the Contracting Parties in implementing the Post-2020 SAPBIO, as appropriate, in close collaboration with the Secretariat (SPA/RAC);

5. *Invite* the relevant International Organisations, Funding Agencies, International Donor Community and Contracting Parties as appropriate to give due consideration to the priority actions of the Post-2020 SAPBIO in their programming for supporting actions in the Mediterranean region;

6. *Take note of* the Monitoring Framework for the assessment of the collective implementation of the Post-2020 SAPBIO (UNEP/MED IG.27/Inf.21), which will guide the Secretariat (SPA/RAC) and the Contracting Parties in undertaking the assessments of the expected results, in 2027 and 2030 respectively in close interaction with the Monitoring framework for the Kunming-Montreal Global Biodiversity Framework to ensure alignment and coherence;

7. *Invite* the Secretariat to use the indicators of the Monitoring framework for the Kunming-Montreal Global Biodiversity Framework if relevant and applicable or to develop region-specific indicators for the Monitoring Framework of the assessment of the collective implementation of the Post-2020 SAPBIO in 2026, in close consultation with the Post-2020 SAPBIO National Correspondents and with their endorsement, to be used in the assessment of the Post-2020 SAPBIO collective implementation in 2027 and 2030;

8. *Deeply concerned* about the low rate of protection in the Mediterranean, *urge* the Contracting Parties to expand and strengthen the network of Marine Protected Areas (MPAs) as well as establishing Other Effective Area Based Conservation Measures (OECMs) in the Mediterranean Sea with the aim to protect 30% of the Mediterranean Sea by 2030, ensuring effective conservation and sustainable management of the protected areas, including OECMs, and their integration into national and regional policies, thus contributing to target 3 of the Kunming-Montreal Global Biodiversity Framework of the UN Convention on Biological Diversity (CBD), through the implementation of the Post-2020 SAP BIO and Post-2020 Regional Strategy for marine and coastal protected areas and other effective area-based conservation measures in the Mediterranean, adopted at COP 22 of the Barcelona Convention and its Protocols;

9. *Encourage* Contracting Parties that have not yet done so to take action to ratify, approve, accept or accede to the Agreement under the United Nations Convention on the Law of the Sea on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement), as a contribution from the Mediterranean countries to its early entry into force;

10. *Decide* that the five SPAMIs subject to extraordinary reviews in the biennium 2024-2025 listed below leave the period of provisional nature and enter again the regular review process, in accordance with the Procedure for the revision of areas included in the SPAMI List:

- Palm Islands Nature Reserve (Lebanon),
- Tyre Coast Nature Reserve (Lebanon),
- La Galite Archipelago (Tunisia),
- Kneiss Islands (Tunisia), and
- Zembra and Zembretta National Park (Tunisia);

11. *Request* the Secretariat (SPA/RAC) to work with the relevant designated national authorities in France, Italy, Morocco, and Spain to carry out ordinary reviews for the 10 Specially Protected Areas of Mediterranean Importance (SPAMIs) listed below, and bring the outcome of these reviews to the attention of the Contracting Parties at their 25th Meeting (COP 25):

- The following four SPAMIs are to be subject to an ordinary review in 2026:

- Marine Protected Area of Tavolara-Punta Coda Cavallo (Italy),
 - Marine Protected Area and Nature Reserve of Torre Guaceto (Italy),
 - Miramare Marine Protected Area (Italy), and
 - Plemmirio Marine Protected Area (Italy);
- The following six SPAMIs are to be subject to an ordinary review in 2027:
- Bouches de Bonifacio Nature Reserve (France),
 - Marine Protected Area of Capo Caccia Isola Piana (Italy),
 - Punta Campanella Marine Protected Area (Italy),
 - Al-Hoceima National Park (Morocco),
 - Archipelago of Cabrera National Park (Spain), and
 - Maro-Cerro Gordo Cliffs (Spain);

12. *Adopt* the updated Action Plan for the conservation of marine turtles in the Mediterranean, set out in Annex I to this Decision;

13. *Adopt* the updated Action Plan for the conservation of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea, set out in Annex II to this Decision;

14. *Adopt* the updated Regional Strategy for the conservation of monk seal in the Mediterranean, set out in Annex III to this Decision;

15. *Adopt* the updated Action Plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea, set out in Annex IV to this Decision;

16. *Urge* the Contracting Parties to take the necessary measures for the effective implementation of the Action Plans and Regional Strategy and to report on their implementation, using the online Barcelona Convention Reporting System;

17. *Request* the Secretariat (SPA/RAC), in coordination with the relevant regional action plans partners and international organizations, where appropriate, to continue to provide technical support to the Contracting Parties for the effective implementation of the Action Plans and Regional Strategy, through technical cooperation and capacity-building activities, including resource mobilization activities;

18. *Take note of* the conclusions and recommendations of the Evaluation of the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and the recommendations for the way forward, set out in Annex V to this Decision;

19. *Request* the Secretariat (SPA/RAC) to update the (i) Action Plan for the conservation of marine vegetation in the Mediterranean Sea, and the (ii) Action Plan for the conservation of cetaceans in the Mediterranean Sea, taking into account as appropriate the conclusions and recommendations of the Evaluation of the Regional Action Plans Approach and submit them for consideration to COP25.

]

Annex I

Action Plan for the conservation of marine turtles in the Mediterranean

Table of Contents

1.	<u>Introduction</u>	2
2.	<u>Objectives</u>	4
3.	<u>Priorities</u>	4
	3.1. <u>Protection and management of the species and their habitats</u>	4
	3.2. <u>Research and monitoring</u>	5
	3.3. <u>Public awareness and education</u>	5
	3.4. <u>Capacity building/Training</u>	5
	3.5. <u>Coordination</u>	5
4.	<u>Implementation</u>	6
	4.1. <u>Protection and management</u>	6
	(a) <u>Legislation</u>	6
	(b) <u>Protection and management of habitats</u>	6
	(c) <u>Reduction of incidental catches and elimination of intentional killings</u>	6
	(d) <u>Other Measures to Reduce Mortality</u>	7
	4.2. <u>Scientific Research and Monitoring</u>	7
	(a) <u>Scientific research</u>	7
	(b) <u>Monitoring</u>	8
	4.3. <u>Public awareness and education</u>	9
	4.4. <u>Capacity building/Training</u>	9
	4.5. <u>National Action Plan</u>	9
	4.6. <u>Regional coordination structure</u>	10
	4.7. <u>Participation</u>	10
	4.8. <u>Actions Plan Partners</u>	10
	4.9. <u>Implementation timetable</u>	12

1. Introduction

1. The Parties to the Barcelona Convention included among their priority targets for the period 1985-1995 the protection of Mediterranean marine turtles (Genoa Declaration, September 1985). To this purpose and as a response to growing international concern about the status of Mediterranean marine turtles, which encounter various threats, including mortality in fishing gear and loss of vital habitats on land (nesting beaches), they adopted in 1989 the Action Plan for the Conservation of Mediterranean Marine Turtles. In 1996, the Parties confirmed their commitment to the conservation of marine turtles by including the 5 species of marine turtle recorded for the Mediterranean in the List of **Endangered** and Threatened Species annexed to the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (Barcelona, 1995). The Protocol calls on the Parties to continue to cooperate in implementing the Action Plans already adopted.

2. Since 1989, the Action Plan has been revised four times. The first review was in 1999, when the updated version of the Action Plan was adopted by the 11th Conference of the Contracting Parties to the Barcelona Convention (COP11 Malta). The second review was in 2007 and concerned only the update of the timetable for the period 2008-2013. The third and fourth revisions occurred in 2013 and 2019 where the timetable was updated respectively for the periods 2014-2019 and 2019-2025. This fifth revision of the Action Plan, completed in 2025, updates the main text of the Action Plan and the associated implementation timetable following a review of the implementation of the previous version involving input from national Focal Points and national and regional experts.

3. Two species of marine turtles nest in the Mediterranean, the Loggerhead turtle (*Caretta caretta*¹) and the Green turtle (*Chelonia mydas*²). The Leatherback turtle (*Dermochelys coriacea*³) is observed regularly, while the remaining two species (Hawksbill turtle *Eretmochelys imbricata*⁴ and Kemp's Ridley turtle *Lepidochelys kempii*⁵) in the original listing are very rarely encountered vagrant species. A sixth species of marine turtle, the Olive Ridley (*Lepidochelys olivacea*⁶) has also recently been recorded in the region. Both Loggerhead and Green turtles also enter the Mediterranean from the Atlantic as juveniles in their oceanic stage and generally return to the Atlantic at larger sizes.

4. Marine turtles are reptiles, and they need to utilise terrestrial habitats (sandy beaches) to lay their eggs and produce young. The intensive exploitation of marine turtles during much of last century has led to a virtual collapse of the marine turtle populations in the Mediterranean. The remaining populations still face threats such as incidental catches and mortality in commercial fishing gear and degradation of nesting habitats, entanglement as well as plastic ingestion. The conservation of marine turtles requires that threats and issues both on land and in the sea are addressed. Marine turtles are long-lived reptiles, and the recovery of populations is therefore a protracted process. Their reproduction on land poses threats, but it also provides opportunities, in a practical way, to help the species recover, for example through reducing predation rates on eggs and hatchlings. Good knowledge of marine turtle population biology is essential if this opportunity is to be used properly. Marine turtles do not nest every year and significant fluctuations from year to year in nesting activity

¹ Loggerhead Turtle *Caretta caretta* Mediterranean subpopulation has most recently been assessed for *The IUCN Red List of Threatened Species* in 2015. *Caretta caretta* Mediterranean subpopulation is listed as Least Concern

² Green Turtle *Chelonia mydas* Mediterranean subpopulation has most recently been assessed for *The IUCN Red List of Threatened Species* in 2022. *Chelonia mydas* Mediterranean subpopulation is listed as Near Threatened under criteria B2b(ii,iii)

³ Leatherback Turtle *Dermochelys coriacea* has most recently been assessed for *The IUCN Red List of Threatened Species* in 2013. *Dermochelys coriacea* is listed as Vulnerable under criteria A2bd

⁴ Hawksbill Turtle *Eretmochelys imbricata* has most recently been assessed for *The IUCN Red List of Threatened Species* in 2008. *Eretmochelys imbricata* is listed as Critically Endangered under criteria A2bd

⁵ Kemp's Ridley *Lepidochelys kempii* has most recently been assessed for *The IUCN Red List of Threatened Species* in 2019. *Lepidochelys kempii* is listed as Critically Endangered under criteria A2bd

⁶ Olive Ridley Turtle *Lepidochelys olivacea* has most recently been assessed for *The IUCN Red List of Threatened Species* in 2008. *Lepidochelys olivacea* is listed as Vulnerable under criteria A2bd

are common, especially in green turtles. Consequently, long-term data are needed to study populations and draw conclusions on their status.

5. The wider issues of biodiversity conservation need to be considered in conserving species, such as marine turtles. Threatened species are components of an ecosystem and the interdependence of the implementation of the various SPA/RAC Action Plans for endangered species and biodiversity conservation is stressed here.

6. There is clear evidence of important negative impacts on the populations of Mediterranean marine turtles by human activities. The most serious current threats to and impacts on marine turtles are:

- Deterioration of the critical habitats for their life cycle, such as nesting, feeding and wintering areas, and key migration routes.
- Direct impacts from incidental capture in fisheries, intentional killing, consumption, egg exploitation and boat strikes.
- Pollution, which can impact both habitats and the marine turtles at individual and population level.
- Climate change (feminization of eggs, sea level rise impacting the nesting beaches)

7. Knowledge of the genetic units, status, biology and behaviour of marine turtles is increasing rapidly in the Mediterranean and, though gaps still exist, sufficient information is available for conservation purposes. This information has been used in updating and improving the provisions of the present MAP Action Plan for the Conservation of the Mediterranean Marine Turtles. Sufficient information is also available in most cases to draw up National Action Plans for the conservation of marine turtles.

8. Elaborating and implementing action plans to confront the threats to biological diversity is an effective way of guiding, coordinating and stepping up the efforts made by the Mediterranean countries to safeguard the region's natural heritage. The adopted Ecosystem Approach (EcAp) to management of human activities with a view to conserving natural marine heritage and protecting vital ecosystem services recognizes that to achieve Good Environmental Status "Biological diversity is maintained or enhanced". In this context, under the Barcelona Convention, three common indicators related to marine turtles have been elaborated within the 27 common indicators of the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and related Assessment Criteria (IMAP):

- **COMMON INDICATOR 3:** Species distributional range (EO1 related to marine mammals, seabirds, marine reptiles)
- **COMMON INDICATOR 4:** Population abundance of selected species (EO1, related to marine mammals, seabirds, marine reptiles)
- **COMMON INDICATOR 5:** Population demographic characteristics (EO1, e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles)

9. The 2017 Mediterranean Quality Status Report (2017 MED QSR), within the analysis conducted on Common Indicators 3 (Species distributional range), 4 (Population abundance of selected species) and 5 (Population demographic characteristics) related to EO1 on marine mammals, seabirds and marine reptiles, focused on the major existing gaps related to the current knowledge about the presence, distribution, habitat use and preferences of these marine species. It stressed the need to increase efforts on filling these gaps to predict with any certainty the future viability of marine turtle populations in the Mediterranean. Moreover, the 2023 MED QSR recalls that IMAP reporting framework, is a requirement of all riparian Mediterranean states, does not exist in isolation but coincides with other international reporting requirements such as those for the EU Habitats Directive and the Marine Strategy Framework Directive (MSFD). There is much overlap and synergy between these programs, which means data collected if collected in adequately rigorous manner can be used multiple times and not only for the IMAP.

10. Information from various sources has been considered in this updated Action Plan. Effective protection and management of nesting areas, practical measures to reduce turtle bycatch, as well as the management of feeding grounds, based on scientific information, are some of the key elements that can help to ensure the survival and the recovery of populations of marine turtles. These elements have been paid due attention. Scientific information on population dynamics, biology and physiology and the topics of public awareness and education etc have also been given due consideration in this plan. Especially noted was the nesting range expansion and increased use of previously marginal areas for nesting by Loggerhead turtles in the central and western Mediterranean.

11. The effective and sustainable protection of the Mediterranean marine turtles implies the need for management of the Mediterranean as a whole, taking into account the ecosystem approach, it should take advantage of the actions of all the concerned stakeholders and be carried out in cooperation with organisations, programmes and plans, at the supranational and national level such as the Mediterranean Action Plan (MAP); Fisheries Management Plans (FAO/GFCM); the Marine Turtle Specialist Group (IUCN/SSC); International Commission for the Conservation of Atlantic Tunas (ICCAT); International Commission for the Scientific Exploration of the Mediterranean Sea (CIESM); relevant NGOs, research institutions and universities etc.

12. This Action Plan outlines objectives, priorities, and implementation measures in different fields as well as their coordination. The different components of the Action Plan are mutually reinforcing and may act synergistically.

13. Progress in implementing the Action Plan will be reviewed at each meeting of the National Focal Points for SPA/BD, based on national reports and on reports by SPA/RAC on the regional aspects of the Action Plan. The Action Plan will be assessed and revised and updated every five years, unless the SPA Focal Point Meetings deem otherwise.

2. Objectives

14. The objective of this Action Plan is to maintain the Good Environmental Status and to further recovery of the populations of Loggerhead turtles and Green turtles in the Mediterranean (with priority accorded to Green turtles, wherever appropriate, due to their more spatially and numerically smaller populations) through:

- Appropriate protection, conservation and management of marine turtles and their habitats, including nesting, feeding and wintering areas and key migration passages.
- Improved biological understanding of the status of marine turtle populations through scientific research and monitoring.

3. Priorities

15. Acknowledging the progress achieved over the past years and the proliferation of projects, activities and actions in many countries in the region, it is considered an overarching priority action to continue and enhance such ongoing projects and activities related to marine turtle conservation, research and monitoring. The following priorities have been identified for each component of this Action Plan:

3.1. Protection and management of the species and their habitats

16. Conservation should be fostered through the following actions:

- Development, implementation and enforcement of specific legislation on marine turtles.
- Reduction of incidental catches and elimination of intentional killings.
- Protection and effective management of nesting areas, including emerging nesting areas, and the adjacent mating and inter-nesting marine habitats.

- Protection and management of feeding, wintering and mating areas and key migration passages.
- Assessment, improvement, and restoration of degraded nesting beaches.
- Sharing and adopting standardised protocols for management and conservation.

3.2. Research and monitoring

17. Knowledge needs to be improved in the following topics:

- Location of mating, feeding and wintering areas and key migration routes.
- Location of potential and new nesting areas with thermal conditions conducive to successful breeding.
- Biology of the species, in particular aspects related to life cycles, population dynamics and population trends and genetics.
- Rates of fisheries interactions (e.g. bycatch) and associated direct and post-release mortalities.
- Efficacy of modification of fishing practices, mitigation measures and related socioeconomic effects of implementing these measures.
- Efficacy of nesting beach management techniques that increase hatchling recruitment, especially for emerging nesting areas.
- Causes of injury and death that may be collected from stranded marine turtles through adoption of standardised protocols used by stranding networks and rescue centres.
- Impact of climate change on populations including habitat alteration, altering sex ratios to levels that could reduce population fitness, hatching success, changes in reproductive frequency and changes in food availability and in feeding ecology that could affect reproduction and/or survival.
- Impact of pollution (including plastics) on the health of individuals and populations.
- Population status and trends through long-term monitoring programmes, both on nesting beaches and at sea, based on the IMAP developed within the framework of the EcAp process of the Barcelona Convention as well as the monitoring requirements set under the MSFD of the EU.

3.3. Public awareness and education

18. For the implementation of this action plan, public support is needed. Information and education campaigns on relevant marine turtle conservation issues should target groups such as:

- Fishers and other stakeholders.
- Decision makers at national, regional and local levels.
- Local residents and visitors to nesting areas.
- Schoolchildren and teachers.
- Tourists and tourism-related organizations.

3.4. Capacity building/Training

19. Training in standardised conservation and management techniques and protocols relating to conservation, research and monitoring of the priority issues covered by the Action Plan, and data required for the IMAP, should be delivered to managers, scientists, researchers and other relevant staff.

3.5. Coordination

20. Promote and enhance cooperation and coordination among the Contracting Parties, the UNEP/MAP partners, relevant organizations and projects carried out in the field of marine turtle conservation. Promote intra-governmental coordination and communication for the enhancement of marine turtle conservation. Priority should be given to the regular assessment of the progress in the implementation of this Action Plan.

4. Implementation

21. The implementation of the measures recommended in this Action Plan will only be possible with the appropriate support of the Parties and by competent national and international organisations, particularly with regards to the provision of adequate financial support, through national and regional funding programmes and through applications to donors for specific projects. Much progress has been achieved over recent years, with the proliferation of projects, programmes, activities and actions in many countries around the Mediterranean. The implementation, coordination and strategic alignment of such ongoing activities related to marine turtle conservation, research and monitoring is expected to benefit from the provisions of this Action Plan.

4.1. Protection and management

22. Regarding protection and management, the following measures are recommended:

(a) Legislation

23. The Contracting Parties that have not yet extended legal protection to marine turtles should do so as soon as possible. Protection should be extended to *all* species of sea turtle as any marine turtle present in the Mediterranean is worthy of protection; however, management legislation can be limited to loggerhead and green turtles as the only two species with established breeding populations.

24. Each Contracting Party should develop and implement as soon as possible the necessary legislation for the protection, conservation and/or management of areas important for marine turtles, such as nesting (including the adjacent sea), feeding, wintering and mating areas and key migration passages.

25. In pursuing the above the Contracting Parties should consider the provisions of the relevant international conventions and supranational legislation as well as the SPA/RAC “Guidelines to Design Legislation and Regulations Relative to the Conservation and Management of Marine Turtles Populations and their Habitats”.

26. Legislation on deliberate killing must be enforced and/or updated in some countries and developed in others that lack this fundamental measure.

(b) Protection and management of habitats

27. Integrated management plans should be elaborated and implemented for terrestrial and marine areas critical for nesting, feeding, wintering and mating, as well as key migration routes.

28. Measures and management rules aimed at protecting critical habitats, on land and at sea, should be developed and implemented. In the case of nesting areas, such measures should cover issues such as public access, use of vehicles, use of artificial lights, nautical activities, minimization of predation, inundation, disturbance during nesting, disturbance in adjacent waters, etc. In the case of marine areas such measures should address boat traffic and fishing. Contracting Parties are encouraged to use the SPA/RAC “Guidelines for setting up and management of Specially Protected Areas for marine turtles in the Mediterranean”

29. Training of the staff involved in protection and management activities is a prerequisite to good management.

(c) Reduction of incidental catches and elimination of intentional killings

30. A reduction of incidental catches and mortality can be achieved by:

- Applying appropriate regulations concerning fishing depth, season, gear, etc, especially in areas with a high concentration of marine turtles.
- The modification of fishing gear, methods and strategies proven to be effective, and as appropriate, their introduction in fisheries legislation and fishing practices.

- Education/training of fishers to correctly haul, handle, release and record incidentally caught marine turtles. Use of appropriate methods are described *inter alia* in the SPA/RAC publication “Sea turtle handling guidebook for fishermen”.

31. Deliberate killing and exploitation of marine turtles can be practically eliminated by:

- Applying and enforcing appropriate legislation.
- Carrying out campaigns among fishers, to urge them to release unharmed any marine turtles caught incidentally and to participate in the information networks on turtles (report sightings of marine turtles, of tags, participation in tagging programmes, etc.).
- Carrying out campaigns for fishers and local populations to facilitate the implementation of legislation to ban the exploitation/consumption and trade/use of all products derived from marine turtles.

The above will help reduce mutilation and killing of marine turtles due to ignorance and/or prejudice.

(d) Other Measures to Reduce Mortality

32. The setting up and proper operation of Rescue Centres and First Aid Stations is suggested as an additional means to minimize individual marine turtle mortality. Rescue centres may also play an important role for the conservation of the populations by contributing to activities such as awareness, education, and data collection. The use of the SPA/RAC “Guidelines to Improve the Involvement of Marine Rescue Centres for Marine Turtles” is recommended.

33. There is a need to develop a common methodology for the management of rescue centres both for methods of collection and transfer of conservation relevant data and the improved welfare to individual marine turtles.

34. Staff involved at rescue and rehabilitation centres should all receive training to provide them with a certain level of competency. In addition, a Mediterranean-wide rescue network should be set up, to assist the exchange of knowledge and experience among those who work with marine turtles in facing difficulties. The network should include existing rescue centres and promote the establishment of new rescue centres in countries that are currently lacking adequate structures.

35. Through all work, standard protocols should be followed, which include good data collection and sharing for the general advancement of marine turtle welfare and generation of conservation-related information. Guidelines should be reviewed and updated where necessary.

4.2. Scientific Research and Monitoring

36. The strategic development of research and monitoring programmes and the exchange of information should focus on the priority fields for the conservation of marine turtle populations. This can be achieved through adoption of various methods, such as beach surveys and (long-term) monitoring of nesting beaches, tagging (keeping in mind the provisions of the SPA/RAC tagging guidelines), data logging, satellite telemetry, Geographic Information Systems (GIS), genetics, fishery observers and modelling.

37. Priority should be afforded to robust scientific data collection that contributes to regional assessment programmes such as the EU MSFD and the Barcelona Convention IMAP, and to the fledgling identification of Important Marine Turtle Areas initiative of the IUCN Marine Turtle Specialist Group.

(a) Scientific research

38. Research should cover *inter alia* the following (not in order of priority):

- Identification of mating, feeding and wintering areas and key migration passages.
- Identification of potential or new nesting areas with thermal conditions conducive to successful breeding.
- Deeper understanding of the biology of the species, in particular aspects related to life cycles, population dynamics and population trends and genetics. Contracting Parties are encouraged to use the “Guidelines to standardize methodologies to estimate demographic parameters for marine turtles [sic] populations in the Mediterranean”.
- The assessment of marine turtle bycatch and direct and post-release mortality rates from different fishing gears, including those used in small scale and artisanal fisheries.
- Gather data on the effects of gear modifications (new hooks etc.), other mitigation measures and fishing strategies to evaluate the effects of these on marine turtle mortality and catch rates as well as the effects on other species.
- The assessment of socio-economic effects of the implementation of marine turtle conservation measures that can impact fisheries to determine best course of action.
- Evaluation of the impact of different climate change scenarios on marine turtles; for example altered sex ratios (to levels that could reduce population fitness), behaviours and habitat use or shifted seasonality of nesting.
- Identification and quantification of new and emerging threats, whose impacts may be increasingly important at national to regional level.

(b) Monitoring

39. For monitoring, programmes should follow the recommendation of the MAP ecological objectives, the IMAP and the relevant Protocol³. They should cover *inter alia* the following (not in order of priority):

- Long-term monitoring programmes for important nesting beaches and foraging areas. All Contracting Parties that have nesting beaches or foraging areas should encourage their uninterrupted and standardized monitoring considering any national monitoring programmes related to biodiversity. Where such programmes do not exist, the Parties should set up such programmes or encourage them.
- Surveys of nesting beaches of lower nest densities, and of scattered nesting at emerging sites need also to be undertaken regularly if possible, so that a more complete picture of populations can be formed. Contracting Parties are encouraged to use the SPA/RAC “Guidelines for the long-term Monitoring programmes for marine turtles nesting beaches and standardized monitoring methods for nesting beaches, feeding and wintering areas”.
- Cost-effective by-catch monitoring programmes, possibly using on-board observers (who could collect marine turtle tissue samples for genetic analyses) or cameras, to gather precise data on species biology and bycatch rates and outcomes should complement nesting beach and foraging area monitoring.
- Standard management techniques for nesting beaches within the scope of on-going monitoring programmes should be implemented
- Standard management techniques for foraging areas within the scope of on-going monitoring programmes, and for the establishment of new programmes should be developed and implemented.
- Data collection from stranded marine turtles through integrated stranding networks and rescue centres should be strengthened following standard protocols.
- Joint monitoring initiatives (possibly on a pilot basis) with the aim to share and exchange best practices, using harmonized methodologies, and ensuring cost efficiency. Contracting Parties, with the help of national, regional or international organisations, should undertake, when appropriate,
- Regional initiatives and projects led by competent partner organizations to strengthen strategic and operational regional synergies. Contracting Parties should support and take part in them to contribute to the implementation of the IMAP, and other international initiatives.

- Regular reporting of quality assured data, based on national and international reporting requirements. Contracting Parties should encourage this together with promoting publication of results as peer-reviewed articles in scientific journals.

40. For some Contracting Parties there is still little information on marine turtle nesting beaches and size of breeding populations. These Parties should undertake urgently more comprehensive surveys and encourage the setting up of long-term monitoring programmes considering their national monitoring programmes related to biodiversity.

4.3. Public awareness and education

41. Public-awareness programmes, including appropriate multiple information tools (special documentary information material, electronic media etc), should be developed for fishers, local residents, tourists and tourism-related organizations, to help reduce the mortality rates of marine turtles, to induce respect for nesting, feeding and wintering and mating areas, and to promote the reporting of any useful information concerning marine turtles. Appropriate training/education of stakeholders can be given (e.g. turtle handling to fishers and promotion of legitimate eco-touristic options to tourism businesses).

42. Information campaigns directed at local authorities, residents, teachers, visitors, fishers, decision makers at local, regional and national levels and other stakeholders, are urgently needed to enlist their participation in the efforts for the conservation of marine turtles and for their support for conservation measures.

43. Inclusion of marine turtle conservation in school education, potentially as part of the national curriculum, is strongly recommended.

4.4. Capacity building/Training

44. Existing training programmes should be continued, particularly for those Parties that need more expertise and/or experts with specialized knowledge of marine turtles, and for managers and other staff of protected areas, in the conservation and management techniques needed (these include *inter alia* beach management, tagging and monitoring).

45. Training programmes in the setting up and operation of Rescue Centres should be continued, with the aim of guaranteeing that these centres have skilled personnel, appropriate equipment and adopt best practice and common methodologies for necessary data collection. Training programmes to be elaborated for other fields, as needed, especially where fisheries managers are concerned. The dissemination of standardised protocols to all relevant parties is encouraged, to obtain comparable and scientifically robust data for conservation and management.

4.5. National Action Plan

46. Contracting Parties should establish National Action Plans for the conservation of marine turtles, in line with the requirements for the Post-2020 SAPBIO.

47. National Action Plans should address the current factors causing loss or decline of marine turtle population and their habitats, suggest appropriate subjects for legislation, give priority to the protection and management of coastal and marine areas, the regulation of fishing practices and ensure continued research and monitoring of populations and habitats as well as the training and refresher courses for specialists and the awareness-raising and education for the general public, actors and decision-makers.

48. Long established National Action Plans should be reviewed to confirm they still meet the national needs of the marine turtles and how well-established recommendations have been implemented.

49. The national plans must be brought to the attention of all concerned actors and, when possible, coordinated on a regional basis.

4.6. Regional coordination structure

50. It is necessary to further develop cooperation and exchange of information among the Contracting Parties for the implementation of the Action Plan and to improve the coordination of activities within the region.

51. SPA/RAC continues to be considered the most appropriate existing mechanism for this coordination. The implementation of the Action Plan may be carried out, in cooperation with other bodies concerned, through establishing Memoranda of Cooperation, as necessary. Sub-regional working groups of experts and NGOs, such as NAST-Net for the northern Africa region, are encouraged to be developed and become partners to the AP (see below). Such regions could include the Adriatic Sea and the northern Western Mediterranean.

52. The major function of the coordinating mechanism for the marine turtle AP would be to:

- Assess the progress achieved in implementing this Action Plan. SPA/RAC will request at regular intervals, not exceeding two years, update reports from the Parties and, based on these ongoing national reports and of its own assessment of the progress in the regional component of this Action Plan, prepare reports to be submitted to the SPA National Focal Point meetings, which will make follow-up suggestions to the Contracting Parties.
- Collect and evaluate the data at Mediterranean level.
- Prepare a timetable of activities and financing proposals for the Contracting Parties' meetings.
- Contribute to the dissemination and exchange of information and best practice standard protocols.
- Create more opportunities with relevant partner organizations, to strengthen technical support that countries might need to implement the IMAP in relation with marine turtles.
- Assist and/or organize expert meetings on specific topics regarding marine turtles.
- Continue to support the organisation of the Mediterranean Marine Turtle Conferences.
- Assisting and/or organising, training courses and support and catalyse the complementary work carried out by other international bodies, NGOs and UNEP/MAP partners aiming at the same objectives should be encouraged and capitalized to prevent possible overlapping and help disseminate their knowledge across the Mediterranean Community.
- Coordinate the activities needed for the revision/updating of this Action Plan every five years, or earlier, if this is deemed necessary by the SPA/DB National Focal Point meetings or based on important new information becoming available.
- Support data collection, compilation and analysis that will contribute towards the establishment of Important Marine Turtle Areas in the Mediterranean, which is a target of the IUCN-SSC Marine Turtle Specialist Group.

4.7. Participation

53. Any interested international and/or national organisation, qualified through sufficient expertise, is invited to participate in actions necessary for the implementation of this Action Plan.

54. Links with other bodies responsible for Action Plans dealing with one or more species of marine turtles, especially regarding fisheries related issues, should be made to strengthen co-operation and avoid duplication of effort.

55. The co-ordination structure shall set up a mechanism for regular dialogue between the participating organisations and is encouraged to organise regular meetings to this effect.

4.8. Actions Plan Partners

56. Implementing the present action plan is the province of the national authorities of the Contracting Parties. Relevant international organisations, NGOs, laboratories, and any other entities are invited to join in the efforts necessary for the successful implementation of the Action plan. During their ordinary meetings, the Contracting Parties may, upon the recommendation of the meeting of National

Focal Points for SPAs/BD, grant the status of «Action Plan Partner» to any organization or laboratory that requests it. This status will be awarded to those that carry out, or support (financially or otherwise), concrete actions (such as conservation, research, etc.) That contribute to the implementation of the present action plan, in line with its priorities. The conditions and criteria for the award of the regional action plan partner title are outlined in Annex VI to the decision IG.26/5.

4.9. Implementation timetable

ACTION	Deadline/ periodicity	By whom
A. PROTECTION AND MANAGEMENT		
A.1 Legislation		
a. Protection of marine turtles – general species protection	As soon as possible	Contracting Parties
b. Enforce legislation to eliminate deliberate killing	As soon as possible	Contracting Parties
c. Habitat protection and management (nesting, mating, feeding, wintering and key migration passages)	As soon as possible	Contracting Parties
A.2 Protection and management of habitats		
a. Setting up and implementing management plans of key areas	Immediate and continuous	Contracting Parties
b. Mitigation measures in place at damaged nesting habitats	Immediate and continuous	Contracting Parties
A.3 Minimisation of incidental catches		
a. Fishing regulations (depth, season, gear, duration, dynamic spatial extents) in key areas	Immediate and continuous	Contracting Parties
b. Modification of gear, methods and strategies	Immediate and continuous	SPA/RAC, Partners & Contracting Parties
A.4 Other measures to minimise individual mortality		
a. Setting up and/or improving operation of Rescue and Rehabilitation Centres	Continuous	Contracting Parties
b. Elaborate guidelines for the management of rescue centres, including methods for data collection, which align with existing protocols	1 year after adoption	SPA/RAC

ACTION	Deadline/ periodicity	By whom
B. SCIENTIFIC RESEARCH AND MONITORING		
B.1 Scientific research		
a. Identification of new mating, feeding and wintering areas and key migration passages in order to generate data for establishing MTSG Important Marine Turtle Areas	Continuous	Contracting Parties and Partners
b. Assess the interaction between marine turtles and fisheries through elaboration and execution of cooperative research projects of regional importance	Continuous	SPA/RAC, Partners & Parties
c. Identify sub-regional management units through re-identification and tracking of individual marine turtles and through genetic analysis	Continuous	SPA/RAC and Contracting Parties and Partners
d. Exchange information and experience between managed and monitored nesting sites through networking and other means	Continuous	SPA/RAC
B.2. Monitoring		
a. Set up and/or improve long-term monitoring programmes for nesting beaches, feeding and wintering areas in order to generate data for establishing MTSG Important Marine Turtle Areas and other regional initiatives such as IMAP and MSFD	Continuous	Contracting Parties and SPA/RAC
b. Elaboration of protocols for data collection from stranded marine turtles, ensuring minimum data standards are adhered to	2 years from adoption	SPA/RAC
c. Encourage establishment of national stranding networks and communication between established networks	As soon as possible	Contracting Parties

ACTION	Deadline/ periodicity	By whom
C. PUBLIC AWARENESS AND EDUCATION		
Awareness raising and information campaigns directed at fishers, coastal populations, authorities and other stakeholders	Continuous	SPA/RAC, Partners and Contracting Parties
D. CAPACITY BUILDING		
Establish training courses on topics such as nesting and foraging area management, nest management techniques and in-water research techniques. To be carried out by recognised regional expert individuals and organisations.	Continuous	SPA/RAC and Partners
E. NATIONAL ACTION PLANS		
Elaboration of National Action Plans	Continuous	Contracting Parties
F. COORDINATION		
a. Assessment of progress in the Implementation of the Action Plan	Every Five years	SPA/RAC and Parties
b. Cooperation in organising the Mediterranean Conferences on marine turtles	Every three year	SPA/RAC
c. Updating the Action Plan on Marine Turtles	Five years from adoption	SPA/RAC

Annex II

Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea

Table of Contents

FOREWORD

<u>INTRODUCTION</u>	4
<u>A. OBJECTIVES</u>	5
<u>B. PRIORITIES</u>	5
<u>C. IMPLEMENTATION MEASURES</u>	7
<u>C.1. PROTECTION</u>	7
<u>C.2. FISHERIES MANAGEMENT</u>	7
<u>C.3. CRITICAL HABITATS AND ENVIRONMENT</u>	8
<u>C.4. SCIENTIFIC RESEARCH AND MONITORING</u>	8
<u>C.5. CAPACITY BUILDING/TRAINING</u>	9
<u>C.6. EDUCATION AND PUBLIC AWARENESS</u>	10
<u>C.7. REGIONAL COORDINATING STRUCTURE</u>	10
<u>D. PARTICIPATION IN THE IMPLEMENTATION</u>	11
<u>E. TITLE OF ACTION PLAN PARTNER</u>	11
<u>F. ASSESSING THE IMPLEMENTATION AND REVISION OF THE ACTION PLAN</u>	11
<u>IMPLEMENTATION TIMETABLE FOR THE PERIOD 2025-2030</u>	12
<u>ANNEX I: Assessment report on the status of implementation of the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2019-2024)...</u>	Error! Bookmark not defined.
<u>ANNEX II: Questionnaire on the implementation of the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2019-2024) - Contracting Parties ...</u>	Error! Bookmark not defined.
<u>ANNEX III: Questionnaire on the implementation of the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea (2019-2024) - Action Plan partners / Experts</u>	53

FOREWORD

Chondrichthyan fishes constitute a class within the zoological classification, which includes cartilaginous fish commonly known as sharks, skates, rays, and chimaeras. The skates and rays, or batoids, are flattened, shark-like fish.

The Action Plan for the Conservation of Chondrichthyan Fishes in the Mediterranean Sea is in line with:

1. the Barcelona Convention which was adopted on 16 February 1976 in Barcelona by the Mediterranean countries and the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean.
2. the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) proposed by FAO and adopted by UN member states in 1999 [Note: in the FAO documents, the term 'sharks' is used to refer to all chondrichthyans].
3. the UN Fish Stocks Agreement (UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks) in effect since 11th December 2001.
4. paragraph 31 of the Implementation Plan of the Resolution of the World Summit for Sustainable Development adopted in Johannesburg in September 2002.

In the implementation of IPOA-Sharks, the Mediterranean Action Plan for the Conservation of Chondrichthyan Fishes constitutes a proposal for regional strategies, pointing out priorities and actions to be undertaken at national and regional levels, as regional coordination is needed to ensure the implementation of conservation measures. IPOA-Sharks suggests that FAO member states should develop national action plans when their fishing fleets conduct targeted fisheries for sharks or when sharks are taken as by-catch. Regarding this recommendation, the Contracting Parties to the Barcelona Convention are strongly urged to elaborate national action plans based on the priorities defined herein to ensure the conservation, management, and long-term sustainable use of chondrichthyan species in the Mediterranean Sea.

Twenty-four species are listed in Annex II (list of endangered or threatened species) of the SPA/BD Protocol are already protected, and more species have been proposed to be added through amendments to Annexes II and III. In addition, these species are protected based on following GFCM recommendations: Recommendation GFCM/36/2012/1 (now GFCM/42/2018/2), they cannot be retained on board, trans-shipped, landed, transferred, stored, sold, displayed, or offered for sale, and must be released unharmed and alive to the extent possible; Recommendation GFCM/44/2021/16 that address additional mitigation measures for the conservation of elasmobranchs in the Mediterranean Sea; and Resolution GFCM/46/2023/4 that address the regional plan of action to monitor and mitigate interactions between fisheries and vulnerable species in the Mediterranean and the Black Sea. Additionally, some Mediterranean countries have taken specific protection measures for these species to reinforce their conservation status. Many species on this list appear on the IUCN Red List, in the appendices of the Bern and Bonn Conventions, and some have been included in the CITES appendices. In addition, some Contracting Parties have also joined the Memorandum of Understanding on the Conservation of Migratory Sharks, which is an international instrument for the conservation of migratory species of sharks, under the auspices of the Convention on the Conservation of Migratory Species of Wild Animals (CMS; also known as the Bonn Convention), which aims to achieve and maintain a favorable conservation status for migratory sharks, rays and chimaeras. Some of the species listed in Annex 1 of the Sharks- MOU occur in the Mediterranean Sea. Although conservation measures focusing on particular species have proven useful at species level, they are not sufficient at the ecosystem level.

Therefore, habitat and environmental parameters related to the species' conservation should be included in the Action Plan. As a result, the guidelines for elaborating the Action Plan are as follows:

- species conservation
- biodiversity maintenance
- habitat protection
- management for sustainable use
- scientific research
- monitoring
- funding for research, implementation, and monitoring
- public awareness
- international cooperation for controls in the open sea.

Thus, implementing the Action Plan will involve a broad range of stakeholders, and its success requires increasing cooperation between different jurisdictions, professional fishers, conservation and environmental bodies, recreational and game fishing associations, scientific and research organizations, academic institutions, as well as administrative bodies at national, regional, and international levels.

INTRODUCTION

1. The chondrichthyan fish fauna of the Mediterranean is relatively diverse, with approximately 90 species; at least 48 species of sharks, 40 batoids and two chimaeras. All species are fished as bycatch, and many of them are sold at fish markets, among them some species which are very rare, endangered or protected and may never have been common. There is evidence of significant negative impacts of unmanaged and irresponsible fisheries on the populations of many chondrichthyan species.
2. Chondrichthyan fishes have specific biological characteristics, such as low reproduction productivity due to late sexual maturity and low fecundity, which make them vulnerable to fishing pressures and ecological disturbances, and populations are slow to recover once depleted.
3. For chondrichthyan fishes, there also exists a close relationship between the number of young produced and the size of the breeding biomass (stock-recruitment relationship) and complex spatial structures (size/sex segregation and seasonal migration) that contribute to their vulnerability to habitat deterioration, environmental pollution, and over-exploitation.
4. Most sharks and some skates and rays are apex predators that have an important trophic function in the marine ecosystem. Therefore, the ecosystem approach is particularly important to understand the role of these fishes in the structuring and functioning of this system. The integrated effects of irresponsible fishing, pollution, and habitat destruction can result in changes in abundance, size structure and biological features, and can lead to extinction. The indirect impacts include changes in species prey/predator composition, with species replacement, since fishing tends to remove larger species and larger individuals from ecosystems. Exploitation of chondrichthyans should respect the principles of sustainability and the precautionary principle as defined in the FAO Code of Conduct for Responsible Fisheries.
5. Elasmobranchs are by far the most endangered group of marine fish in the Mediterranean Sea and worldwide. The IUCN Red List shows clearly the vulnerability of elasmobranchs and the lack of data; 39 species in 2016 (53% of 73 assessed species), and 47 species in 2020 (53% of 88 assessed species), are critically endangered, endangered, or vulnerable. Around 13 % are data deficient (DD).
6. The Contracting Parties to the Barcelona Convention, within the framework of the Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Area of the Mediterranean (MAP Phase II), give priority to ensuring the protection of sensitive species, habitats and ecosystems in the Mediterranean Sea.
7. In line with the Post-2020 SAPBIO and its alignment with the CBD Global Biodiversity Framework and the UN Sustainable Development Goals, efforts to conserve cartilaginous fishes in the Mediterranean should emphasize harmonized regional actions, integrating habitat and species protection measures to achieve good conservation environmental status and ensure sustainable management of marine biodiversity.
8. The decline of some chondrichthyan populations has become a matter for international concern, and a growing number of organisations have expressed the need for urgent measures to be introduced for the conservation of these fish. To this end, SPA/RAC was entrusted (Monaco, November 2001) by the Contracting Parties to the Barcelona Convention with the task of elaborating an action plan for the conservation of the chondrichthyan populations of the Mediterranean. This action plan was adopted within the frame work of the Barcelona Convention for the protection of the marine environment and the coastal region of the Mediterranean in 2003.
9. Parties to Barcelona Convention requested SPA/RAC during the COP 23 (Portoroz, Slovenia, 5-8 December 2023) to update this Action Plan.

10. Today, the serious threats to the populations of chondrichthyan fishes are widely acknowledged: mainly unmanaged and irresponsible fishing, pollution and the negative aspects of some littoral development. These threats affect both chondrichthyan biodiversity and abundance. The Mediterranean Sea being a semi-enclosed sea with strongly populated coastal countries, critical habitats have been damaged by some littoral development and pollution. Pollution may harm the marine ecosystem because contaminants, concentrating along the food webs, can alter the physiology and good functioning of individuals and populations.

11. Although the Mediterranean chondrichthyan fish fauna have been studied for a long time, scientific research still needs to be undertaken to study the biology, ecology, population dynamics and status of stocks of most of the species. These studies are necessary to better understand their ecological role. The taxonomic status of several species is still uncertain. A few species are endemic to the Mediterranean. Some Red Sea species enter the eastern Mediterranean through the Suez Canal (Lessepsian migrants); the progression of the populations of these species, and the effect of these invaders on the Mediterranean ecology, should be carefully studied.

12. Since many chondrichthyans are wide-ranging and/or migratory, regional coordination is required for research, monitoring and enforcement. Also, information should be widely disseminated amongst the public to make it aware of the threats to chondrichthyans and the urgent need for their conservation and the management of their exploitation.

A. OBJECTIVES

13. The present Action Plan is aimed at promoting:

13.1. The general conservation of the endangered chondrichthyan populations of the Mediterranean Sea, including supporting and promoting national and regional programmes on reducing bycatch and all other kind of disturbance.

13.2. The protection of chondrichthyan species, mainly those which are vulnerable and endangered;

13.3. The identification, the protection and the restoration of critical habitats, such as mating, spawning and nursery grounds;

13.4. The improvement of scientific knowledge by research and scientific monitoring, including the creating of regional standardised databases;

13.5. The recovery of depleted chondrichthyan stocks;

13.6. Public awareness and capacity-building about conservation of chondrichthyans.

13.7. Compliance with provisions of Annex II listings and GFCM Recommendations through improved national legislation and effective national enforcement.

B. PRIORITIES

14. The following general priorities are recommended:

14.1. Urgent provision of legal protection status for the species enlisted in the Annex II (list of endangered or threatened species) of the SPA/BD Protocol, which based on Recommendation GFCM/36/2012/1 (now GFCM/42/2018/2) cannot be retained on board, trans-shipped, landed, transferred, stored, sold or displayed or offered for sale, and must be released unharmed and alive to the extent possible.

14.2. Urgent action is required to monitor and mitigate interactions between fisheries and vulnerable elasmobranch species in the Mediterranean Sea, in alignment with Resolution GFCM/46/2023/4 on a regional plan of action to monitor and mitigate interactions between fisheries and vulnerable species in the Mediterranean Sea.

14.3. Strengthened measures are needed to improve the conservation status of elasmobranch species listed in Annex II and III of the SPA/BD Protocol, and to mitigate or eliminate, where possible, the risk of incidental catch in fishing operations and associated mortality in the GFCM area of application, in line with Recommendation GFCM/44/2021/16 on additional mitigation measures for the conservation of elasmobranchs in the Mediterranean Sea.

14.4. Other species are currently data-deficient with inadequate information to assess extinction risk. Thus, there is an urgent need to assess the status in the Mediterranean Sea of the 12 species identified by IUCN as Data Deficient: Marbled stingray (*Dasyatis marmorata*), Lusitanian Cownose (*Rhinoptera marginata*), Round fantail stingray (*Taeniurops grabata*), Bignose shark (*Carcharhinus altimus*), Copper shark (*Carcharhinus brachyurus*), Blacktip shark (*Carcharhinus limbatus*), Dusky shark (*Carcharhinus obscurus*), Sharpnose sevengill shark (*Heptranchias perlo*), Longnose spurdog (*Squalus blainville*), Shortnose spurdog (*Squalus megalops*), Bigeyed sixgill shark (*Hexanchus nakamurai*) and Longfin mako (*Isurus paucus*). In addition, prioritize research and protection of deep-sea sharks, such as the Little Gulper Shark (*Centrophorus uyato*).

14.5. Identify further legislative, management and technical measures to protect species including minimizing bycatch and mortality of sharks, and develop management programmes for species currently marketed, which might include listing in Annex II of the SPA/BD Protocol.

14.5.1. Primarily for the endangered species: the dogfish (*Squalus acanthias*), the thresher sharks (*Alopias spp.*), the blue shark (*Prionace glauca*), sandbar shark (*Carcharhinus plumbeus*), gulper sharks (*Centrophorus spp.*), and Porbeagle (*Lamna nasus*).

14.5.2. Secondly, for the other commercially important species: the catsharks (*Scyliorhinus spp. and Galeus melastomus*), the hound sharks (*Mustelus spp.*), the requiem sharks (*Carcharhinus falciformis, C. limbatus, C. obscurus and*), the Mackerel sharks (Lamnidae), the skates (*Leucoraja spp., Raja spp.*), and the stingrays (*Dasyatis spp.*).

14.6. Ensure good practice for handling rays and sharks caught accidentally and encourage fishing practices that reduce chondrichthyan by-catch and/or facilitate live release.

14.7. Identify, protect, and restore critical habitats, especially mating areas, and spawning and nursery grounds, ensuring their sustained ecological function through regular monitoring and conservation efforts.

14.8. Develop research programmes on general biology (feeding, reproduction and growth parameters), taxonomy, ecology and population dynamics, with particular regard to genetic and migration studies. Additionally, establish programs for the development and transfer of technology and innovative measures in fishing activities.

14.9. Develop both systems for the monitoring of fisheries and fishery-independent monitoring programmes at both, national and regional level.

14.10. Develop research programmes to identify best practices for the reduction of the Chondrichthyes-fishery interactions

14.11. Develop training to ensure capacity-building at both the national and regional levels in a participatory approach, mainly in the following fields: taxonomy, biology, ecology, monitoring methods, stock assessment, and digital data collection tools.

14.12. Develop information, education and training programmes for professionals and public awareness.

C. IMPLEMENTATION MEASURES

In order to implement the above-mentioned general priorities, specific measures should be taken at national and regional level:

C.1. PROTECTION

15. Strict legal protection of elasmobranchs species under Annex II (list of endangered or threatened species) of the SPA/BD Protocol to the Barcelona Convention, which concerned by Recommendation GFCM/42/2018/2 on fisheries management measures for the conservation of sharks and rays in the GFCM area of application, amending Recommendation GFCM/36/2012/3 (cf. paragraphs 10.2 and 11.1), Recommendation GFCM/44/2021/16 on additional mitigation measures for the conservation of elasmobranchs in the Mediterranean Sea and Resolution GFCM/46/2023/4 on a regional plan of action to monitor and mitigate interactions between fisheries and vulnerable species in the Mediterranean and the Black Sea in accordance with national and international laws and conventions. The status of Mediterranean chondrichthyans should be regularly reviewed in order to recommend, when necessary, legal protection for threatened species.

16. Strengthen the legal framework for the conservation of elasmobranch species with consideration of amendments to Annexes II and III of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean. Mediterranean chondrichthyan species should be regularly reviewed to recommend updates and enhance legal protections for those listed in Annexes II and III.

C.2. FISHERIES MANAGEMENT

17. According to the principles of the IPOA-Sharks and of the UN Straddling Fish Stocks Agreement, states that contribute to fishing mortality for a species or stocks should participate in their management.

18. Existing assessment reports and fisheries management programmes should be adjusted to chondrichthyan fishes or specific plans should be developed within the framework of the IPOA-Sharks and the GFCM recommendations GFCM/42/2018/2, GFCM/44/2021/16 and Resolution GFCM/46/2023/4.

19. It is urgent to collect and report precise fisheries statistics, mainly on catches and landings by species. For this purpose, field identification sheets should be published in appropriate languages with vernacular names, dispatched to fishery communities, digitized, and integrated into mobile platforms to enhance functionality and user-friendliness, designed to aid species identification, incorporated into regional policies to make it mandatory for fishers and conservation stakeholders. Additionally, data on fishing efforts should be collected and reported to GFCM, when possible.

20.bis. capacity building training of statistics collectors should be ensured and statistics categories defined.

21. Management programmes for chondrichthyan fishes should be based on studies of the assessment of stocks and populations. Management should be also based on by-catch and measures, including proven and efficiently tested innovative approaches to reduce incidental catches studies specifically threatened or endangered chondrichthyan species

22. Publish and disseminate guidelines on bycatch reduction and proper handling practices for protected species in relevant languages to ensure broad accessibility. Ensure the immediate and safe release of protected species, prioritizing their unharmed survival, whenever conditions allow.

23. Implementing a permanent monitoring, specifically scientific monitoring, of fisheries where chondrichthyans are impacted is a fundamental management measure, useful for the conservation of these species. This action would permit the timely detection of any decline in their biomasses that could be an unequivocal sign of over-fishing. This monitoring could be done through surveys, scientific observation mainly on board, landing-site observation and the examining of logbooks. This action should also address sightings (strandings and observations at sea).

24. For most species, cooperative management is necessary at national, regional and international levels. The mechanisms for achieving a cooperative approach may consist of the following elements:

- information on existing exploited resources and management systems;
- the defining and provision of legal instruments;
- the use of a participatory planning approach;
- the defining of clear management agreements;
- the building and development of national groups.

25. Implement measures, including proven and efficiently tested innovative approaches, based on the assessment of fishing gear impacts and promote the adoption of alternative gear to minimize bycatch and enhance sustainable practices.

26. Mediterranean countries shall ban finning following GFCM recommendation GFCM/42/2018/2; it shall be prohibited to remove shark fins on board vessels and to retain, tranship or land shark fins.

C.3. CRITICAL HABITATS AND ENVIRONMENT

27. Field studies are needed to inventory and map critical habitats around the Mediterranean that are important for chondichthyans at all their life stage.

28. Legal protection should be given to these habitats, in conformity with the national and international laws and conventions on the subject, to prevent their deterioration due to the negative effects of human activity. When these habitats have deteriorated, restoration programmes should be undertaken. One example of legal protection is the creation, where possible, of marine protected areas in which human activity is regulated.

29. Such protection measures could be part of fishery management programmes as well as of integrated coastal zone management.

30. Habitat connectivity should be identified and preserved by mapping and protecting ecological corridors between critical habitats to ensure the movement, migration, and genetic exchange of sensitive species.

C.4. SCIENTIFIC RESEARCH AND MONITORING

31. Parallel to protection and conservation measures, properly funded and staffed scientific research programmes should be undertaken or developed, mainly on species biology and ecology, emphasising growth, reproduction, diet, geographical and bathymetric distribution, migration, ecological connectivity, population structure using molecular tools and dynamics, non-indigenous species interactions (including their role as hosts of pathogens) and risk assessment, specifically focusing on risks related to overfishing, habitat destruction, climate change, pollution, and invasive species. Regional tagging (conventional, acoustic, pop-up and satellite tag) programmes should be developed for migratory species. Also, fishing efforts exploratory cruises and the status of species within the

precautionary principle, should be assessed. In the same way, discard should be evaluated in terms of quantity and composition. Research on tools to avoid or reduce by-catch should be fostered. Evaluation of the outcomes of management measures should be considered, through the utilisation of the scientific monitoring programme and should be inclusive of all stages, in order to support and guide the development of effective management measures.

32. For the scientific monitoring of fisheries, the standardised collection of data at landing places and fish markets should be supplemented and completed by on-board observation programmes to gather precise data on fisheries and on species biology. Also, logbooks adapted to chondrichthyan fisheries should be distributed to fishermen. The following set of data would be required:

- species composition of the catch with length frequency distribution by sex and maturity stage;
- retained catch by species in number and weight;
- discarded catch in number and weight (+ reasons for discard);
- released species in number (sex, length when possible);
- gear and vessel specifications and cruise characteristics;
- provide data on location and depth of fishing

Furthermore, samples (vertebrae, dorsal spines) should be taken and adequately preserved for age determination, and tissue samples for genetic analysis (DNA). Furthermore, data collection and monitoring should be improved by utilizing new technologies for more effective and accurate tracking.

33. Mediterranean countries should establish or expand monitoring programmes, specifically scientific monitoring, at both national and regional level, to cover the whole Mediterranean Sea, and to collect standardised quantitative data to estimate fish density (relative abundance). Also these programmes should leverage innovative tools such as environmental DNA (eDNA), baited remote underwater videos (BRUVs), citizen science, and local ecological knowledge (LEK), fostering a participatory approach that actively involves all stakeholders. This would help evaluate the risk status of the various species.

34. Assess the socioeconomic impacts of interactions between elasmobranch species and fisheries, including incidental catch-related damages, testing mitigation technologies, and identifying barriers to adoption while developing alternative solutions and compensation measures.

C.5. CAPACITY BUILDING/TRAINING

35. The Contracting Parties should promote the training of specialists, fisheries officers and managers in the study and conservation of chondrichthyan fishes. To this end, it is important to identify already existing initiatives and to give priority to taxonomy, conservation biology and techniques for monitoring research programmes (cf. above paragraph on scientific research).

36. Training programmes should also focus on methods of fisheries data collection and stock assessment, by-catch mitigation especially data analysis.

37. Promote capacity-building initiatives that foster inclusivity by engaging experts, academia, indigenous peoples and local communities, women and youth representatives, and other relevant stakeholders. These efforts should aim to ensure diverse perspectives, equitable participation, and the effective dissemination of knowledge across all sectors

38. Provide adequate institutional support and promote capacity building activities to Contracting parties according to their needs, specifically training programs and workshops, technical assistance, and technical expertise and consultancy.

C.6. EDUCATION AND PUBLIC AWARENESS

39. For protection and conservation measures to be effective, public support should be obtained: In this respect, (1) information campaigns should be directed at national authorities, residents, teachers, visitors, recreational and professional fishermen, wholesale/market sector, sport anglers, divers and any other stakeholder; (2) Publication materials should be produced to present the life history, and vulnerability, of chondrichthyans; and (3) educational programme on the issue should be taught to school children (including new teaching approaches and technologies, such as virtual reality (3D-VR)).

40. Also, guidelines for chondrichthyan watching should be published and widely distributed to potential observers such as anglers, yachtsmen, divers, shark-fans, etc, in order to make them actively involved in the conservation of chondrichthyan fishes.

41. In this process of education and public awareness, the help of associations and other bodies involved in nature conservation should be solicited.

C.7. REGIONAL COORDINATING STRUCTURE

42. All the above-mentioned recommended actions related to the protection and the conservation of species and their habitats, and the research and educational programmes, should be monitored and implemented, with as much regional cooperation between all the countries operating in the Mediterranean basin.

43. These actions should be undertaken in cooperation with, and with the support of, other regional fisheries organisations (e.g. GFCM, ICCAT), through establishing MoUs where necessary. Non-governmental organisations, associations and national environmental bodies should also be involved, as well as other relevant MEA's such as CITES, CMS, Sharks-MOU, and the Bern Convention.

44. Implementation of the present Action Plan will be regionally coordinated by the Mediterranean Action Plan's (MAP) Secretariat through the Regional Activity Centre for Specially Protected Areas (SPA/RAC). The main functions of the coordinating structure shall consist in:

- favouring and supporting the collection of data and publishing and circulating results at Mediterranean level;
- promoting the drawing up of inventories of species and areas of importance for the Mediterranean marine environment;
- promoting transboundary cooperation;
- preparing reports on progress in the implementation of the Action Plan, to be submitted to the Meeting of National Focal Points for SPAs/BD and to meetings of the Contracting Parties;
- organising meetings of experts on specific subjects relating to Mediterranean chondrichthyans, and training courses;
- promoting the review of status of species and fisheries by relevant organisations;
- One year after the adoption of the Action Plan, coordinating the organisation of a Mediterranean symposium aiming at defining the state of knowledge on chondrichthyan fishes and taking stock of the progress made in implementing the Action Plan; five years after the present updating of the Action Plan, organising a meeting to review the progress of the Action Plan and to propose a revision of the Action Plan if needed. Complementary work done by other international organisations with the similar objectives shall be encouraged by SPA/RAC, promoting collaborative efforts and avoiding possible duplication.

45. Initiatives aiming at ensuring enforcement of the current Action Plan, particularly in international waters, should be promoted and aligned with the implementation of the Kunming-Montreal Global Biodiversity Framework, CBD modalities on ecologically or biologically significant marine areas (EBSA's), the United Nations Convention on the Law of the Sea (UNCLOS), and the Agreement

under UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (BBNJ).

46. Establish or improve a network and continuously update the directory of national, regional, and international experts on chondrichthyan fishes.

47. Enhancing coordination and collaboration at national and regional levels, among Contracting Parties, regional institutions, Convention Secretariats, Convention's Secretariats, Associates and Partners of the Action Plans, indigenous peoples and local communities, women and youth representatives, and other relevant stakeholders, initiatives, networks, and partnerships, while addressing gaps in geographical and thematic coverage.

48. Enhance contribution to efforts in identifying and facilitating partnerships with potential funding bodies, including international financial institutions, donors, and other relevant organizations, by promoting existing and new research proposals developed in the framework of this Action Plan.

D. PARTICIPATION IN THE IMPLEMENTATION

49. Implementing the present Action Plan is the responsibility of the national authorities of the Contracting Parties. Parties should facilitate coordination between their national, environmental and fisheries departments to ensure implementation of activities directed at protected and non-protected chondrichthyan species. Organisations or bodies concerned are invited to associate themselves with the work of implementing the present Action Plan. At their ordinary meetings, the Contracting Parties may, at the suggestion of the Meeting of National Focal Points for SPAs/BD, grant the status of 'Action Plan Associate' to any organisation or laboratory which so requests and which carries out, or supports (financially or otherwise) the carrying out of, concrete actions (conservation, research, etc.) likely to facilitate the implementation of the present Action Plan, taking into account the priorities contained therein. NGOs can submit their applications directly to SPA/RAC.

50. The coordinating structure shall set up a mechanism for regular dialogue between the Action Plan Associates and, where necessary, organise meetings to this effect. Dialogue should be conducted mainly electronically, including virtual meetings and e-mail.

E. TITLE OF ACTION PLAN PARTNER

51. To encourage and reward outside contributions to the Action Plan, the Contracting Parties may at their ordinary meetings grant the title of 'Action Plan Partner' to any organisation (governmental, NGO, economic, academic etc.) that has to its credit concrete actions likely to help protect chondrichthyan fishes in the Mediterranean. During their ordinary meetings, the Contracting Parties may, upon the recommendation of the meeting of National Focal Points for SPAs/BD, grant the status of «Action Plan Partner» to any organization or laboratory that requests it. This status will be awarded to those that carry out, or support (financially or otherwise), concrete actions (such as conservation, research, etc.), that contribute to the implementation of the present action plan, in line with its priorities. The conditions and criteria for the award of the regional action plan partner title are outlined in Annex VI to the decision IG.26/5.

F. ASSESSING THE IMPLEMENTATION AND REVISION OF THE ACTION PLAN

52. At each of their Meetings, the National Focal Points for SPAs/BD will assess the progress made in implementing the Action Plan, on the basis of national reports and of a report made by the SPA/RAC on implementation at regional level. In the light of this assessment, the Meeting of the National Focal Points for SPAs/BD will suggest recommendations to be submitted to the Contracting Parties, and, if necessary, suggest adjustments to the timetable given in the Annex to the Action Plan.

IMPLEMENTATION TIMETABLE FOR THE PERIOD 2025-2030

ACTIONS	CALENDER	BY WHOM
Tools		
1. Establish or improve a network and continuously update the directory of national, regional, and international experts on chondrichthyan fishes. (cf. § 47 of C.7 "Regional coordinating structure")	(2025-2030)	SPA/RAC, CMS Shark MOU Secretariat, IUCN SSG, RFMO Shark Working Groups
2. Improve and promote the use of the existing Field identification sheets. (cf. § 19 of C.2. "Fisheries management")	(2025-2030)	Contracting Parties and RFMOs
3. Promote the use of the GFCM manual (2019) "Monitoring the incidental catch of vulnerable species in the Mediterranean and the Black Sea: methodology for data collection" (cf. § C.2. "Fisheries management")	(2025-2030)	Contracting Parties
4. Formalize/reinforce synchronous submission of catch, bycatch and discard data annually to the GFCM according to DCRF (Data Collection Reference Framework). (cf. § 32 of C.4. "Scientific research and monitoring")	Every year	Contracting Parties
5. Information campaigns and publishing materials for public awareness (cf. § 13.11. of B "Priorities" and cf. § 39 of "Education and public awareness")	(2025-2030)	SPA/RAC
6. Publish and disseminate guidelines for reducing the presence of sensitive species in by-catch and releasing them if caught and promote them in relevant languages to ensure broad accessibility. (cf. § 22 of C.2 «Fisheries management")	(2025-2030)	SPA/RAC and RFMO
7.Update and promote protocols and programmes for improved compilation and analysis of data, for contribution to regional stock assessment initiatives. (cf. § C2 "Fisheries management" and 29 of C.4. "Scientific research and monitoring")	Continuous action (2025-2029)	National and regional agencies and advisory bodies, CMS, GFCM and FAO.
8. Training manual on cartilaginous fish eco-biology (Taxonomy, biological parameters determination, identification and monitoring of fisheries and critical habitats, conservation...) (cf. § 29 of C.6 "Education and public awareness")	ASAP	SPA/RAC
9. Capacity building and training programmes on cartilaginous fish biology (cf. § 14.11., and 14.12 of B "Priorities", cf. § 35, 36, 37, 38 of C.6 "Capacity building/training" and cf. § 39, 41 of C.6 "Education and public awareness")	ASAP	SPA/RAC, Contracting Parties, RFMOs, GFCM, FAO.

ACTIONS	CALENDER	BY WHOM
10. Symposium on Mediterranean chondrichthyan fishes (cf. § C.7 "Regional coordinating structure")	One year after adoption	SPA/RAC
11. Meeting to review progress made on the Action Plan (cf. § 52 of C.7 and § F "Assessing the implementation and revision of the Action Plan")	5 years after adoption	SPA/RAC
Legal processes		
12a. Legal protection established for endangered species, recommended in this Action Plan, identified by country (species enlisted in Annex II of the SPA/BD Protocol) 12b. Urgent assessment of the status of data deficient species, recommended in this Action Plan (assessed by IUCN) (cf. § 14.1. of B "Priorities"; C.1 "Protection")	ASAP	Contracting Parties
13. Legal protection for prohibiting "finning" according to the GFCM recommendation (GFCM/42/2018/2) (cf. § 14.1 of B "Priorities" and cf. § 26 of C.2 "Fisheries management")	ASAP	Contracting Parties
14. Legal protection that addresses additional mitigation measures for the conservation of elasmobranchs in the Mediterranean Sea, according to the GFCM recommendation (GFCM/44/2021/16) (cf. § 14.2 of B "Priorities")	ASAP	Contracting Parties
15. Legal protection that addresses the plan of action to monitor and mitigate interactions between fisheries and vulnerable species in the Mediterranean and the Black Sea according to the GFCM resolution (GFCM/46/2023/4) (cf. § 14.3 of B "Priorities")	ASAP	Contracting Parties
16. Critical habitats identified, legally protected, restored and monitored, as soon as they are identified. (cf. § 14.7. B "Priorities" and cf. § 27 and 28 C.3 "Critical habitats and environment")	ASAP	Contracting Parties
17. Implement measures based on the assessment of fishing gear impacts and promote the adoption of alternative gear to minimize bycatch and enhance sustainable practices. (cf. § 25 of C.2 "Fisheries management")	ASAP	Contracting Parties
18. Establish and promote national, sub-regional and regional plans or strategies for cartilaginous fish species (mainly listed in Annexes II and III). (cf. § C.2 "Fisheries management")	Continuous action (2025-2030)	Contracting Parties, SPA/RAC, GFCM, CMS

ACTIONS	CALENDER	BY WHOM
19. Facilitating the enforcement of legal measures aiming to set up a system for enforcement of monitoring fisheries in international waters such as extending MEDITS programme to all Mediterranean countries (Mediterranean International Trawl Survey). (cf. § 48 C. 7 "Regional coordinating structure")	(2025-2030)	Contracting Parties, SPA/RAC, GFCM, CMS and EU
20. Monitor and mitigate interactions between fisheries and vulnerable elasmobranch species in the Mediterranean Sea. (cf. § 14.2 of B "Priorities")	(2025-2030)	Contracting Parties, International organization, GFCM, FAO
Monitoring and data collection		
21. Establishing research programmes, specifically scientific programmes, mainly on the biology, ecology and population dynamics of the main species identified by the countries (cf. § C. 4 "Scientific research and monitoring")	(2025-2030)	Contracting Parties
22. Support the establishing of, or feed the existing, centralised databases (DCRF, MEDLEM...) (cf. § C.7 "Regional coordinating structure")	(2025-2030)	Contracting Parties and SPA/RAC
23. Inventory of critical habitats (mating, spawning and nursery grounds) (cf. § 14.7. B "Priorities" and cf. § 27 and 28 C.3 "Critical habitats and environment")	ASAP	Contracting Parties
24. Promote habitat connectivity and identify and protect ecological corridors between critical habitats. (cf. § 30 of C. 3 "Critical habitats and environment")	(2025-2030)	Contracting Parties and RFMOs
25. Promote existing and new research proposals developed under the SPA/RAC Action Plan to funding agencies (cf. § C. 4 "Scientific research and monitoring" and cf. § C.7 "Regional coordinating structure")	(2025-2030)	SPA/RAC, CPs, AP partners
26. Promote programme on citizen science and local ecological knowledge (LEK) in data collection and monitoring. (cf. § 33 of C. 4 "Scientific research and monitoring")	(2025-2030)	Contracting parties, RFMOs
27. Assess the socioeconomic impacts of interactions between elasmobranch species and fisheries. (cf. § 34 of C. 4 "Scientific research and monitoring")	(2025-2030)	Contracting parties, international organizations
28. Promote programs, specifically scientific programmes, on the status of bycatch to propose measures for attenuation of the phenomenon. Such programs should be developed with onboard observers and multispecies approach. (cf. § 32 of C. 4 "Scientific research and monitoring")	(2025-2030)	SPA/RAC, CPs, AP partners
29. Increase compliance with obligations to collect and submit species- specific commercial catch and bycatch data to FAO and GFCM, including through increased use of observers. (cf. § C. 7 "Regional coordinating structure")	(2025-2030)	Contracting Parties
30. Support expert participation in RFMO and other relevant meetings and workshops, to share expertise and build capacity for data collection, stock assessment and bycatch mitigation.	ASAP	Contracting Parties, RFMO, SPA/RAC

ACTIONS	CALENDER	BY WHOM
(cf. § C.5 "Capacity building / Training")		
Management and assessment procedures		
31. Continuously review data and undertake new studies to clarify the status of Mediterranean chondrichthyan species focusing on endemics and species assessed as Data Deficient or Near Threatened (cf. § 14.4 of B "Priorities"; 15 of C.1 'Protection'; 31 of C.4 "Scientific research and monitoring")	(2025-2030)	International organisations
32. Develop and adopt National Shark Plans where they do not yet exist. (cf. § C.1 'Protection', C.2. "Fisheries management", & C.3 "Critical habitats and environment").	(2025-2030)	Contracting Parties
33. Identify further management and technical measures to minimize bycatch and mortality of sharks in fisheries impacting cartilaginous fishes. (cf. § 14.5 of B "Priorities")	(2025-2030)	Contracting Parties & RFMOs
34. Identify and address mitigation measures for the conservation of cartilaginous fishes in the Mediterranean Sea (cf. § 15 of C.1. "Protection")	(2025-2030)	Contracting Parties
35. Assess the fishing gear impacts and promote the adoption of alternative gear to minimize bycatch and enhance sustainable practices. (cf. § 25 of C.2. "Fisheries management")	(2025-2030)	International organizations, RFMOs, GFCM, FAO

Annex III

Regional Strategy for the conservation of monk seal in the Mediterranean

Table of contents

1. Introduction and rationale.....	1
2. The Strategy.....	8
2.1. Vision	8
2.2. Goals	8
2.3. Goal Targets, Objectives and Objective Targets.....	8
3. Revision of the Strategy	18
4. References	19

List of Acronyms

AP: Action Plan

ISPRA: Italian National Institute for Environmental Protection and Research (Italy).

IMAP: Integrated Monitoring and Assessment Programme

IUCN/SSC: International Union for Conservation of Nature /Species Survival Commission

MSA: The Monk Seal Alliance.

MSAC: Monk Seal Advisory Committee.

MedCEM: Mediterranean Centre for Environmental Monitoring

MOm: Hellenic Society for the Study and Protection of the Monk Seal (Greece).

NECCA: Natural Environment and Climate Change Agency (Greece)

UNEP/MED: United Nations Environment Programme Mediterranean Action Plan

RS: Regional Strategy for the Conservation of Monk Seals in the Mediterranean

SPA/RAC: Specially Protected Areas Regional Activity Centre (Tunisia).

1. Introduction and rationale

1. In 1988, the Contracting Parties to the Barcelona Convention adopted an Action Plan for the management of the Monk Seal (AP). This was followed in 2013 by the adoption of the “Regional strategy for the conservation of Mediterranean monk seal (2014-2019)” (RS). A new updated RS (2020-2025) was adopted by the Barcelona Convention COP 19, 2019 Decision IG.24/7.

2. This new draft RS, like those preceding it, produced by the Specially Protected Areas Regional Activity Centre (SPA/RAC) in 2013⁷ and 2019⁸, respectively, differs from the Barcelona Convention’s “Action plan for the management of the Mediterranean monk seal (*Monachus monachus*)” (UNEP-MAP-RAC/SPA 2003a) chiefly in terms of its method, considering that the old AP continues to be valid as far as its contents and general principles are concerned⁹.

3. As, it was the case for the two earlier versions, this updated RS follows the guidelines detailed in the manual for the construction of Species Conservation Strategies (IUCN/SSC 2008). Accordingly, it is structured with the following elements:

- a. a **Vision**, with associated **Goals** and **Goal Targets** that are SMART¹⁰;
- b. the **Objectives** needed to achieve the Goal Targets within the stated time span, with associated **SMART Objective Targets**.

4. The main problem encountered in envisaging a region-wide Strategy derives from the quite diverse conservation status of monk seals in the different portion of the Mediterranean and by consequence the quite different priorities and responsibilities saddled onto the various monk seal Range States.

5. To handle this challenge, Mediterranean countries were assigned to the following three groups (Figure 1 and Table 1):

- A. Countries where monk seal breeding has been reported after year 2017¹¹;
- B. Countries where no monk seal breeding is reported, but where repeated sightings of monk seals (>3) were reported since 2017;
- C. Countries where no monk seal breeding is reported, and where very rare or no sightings of monk seals (≤3) were reported since 2017.

6. With respect to the precedent version, two countries have changed groups:

- Croatia, with practically no monk seal sightings reported in recent years, with the exception of a couple of opportunistic reports in 2022, has been moved to Group C from Group B.
- Syria, where between 2001-2023, Mediterranean monk seals were reported 34 times (17 of them between 2017-2023) in 7 different locations along the northern Syrian coast (Ibrahim et al., 2024). Of those 34 observations, with the exception of two dead individuals (one killed by a gunshot), all individuals were reportedly alive and routinely swimming around. These observations were concentrated in the area extending from Ras Al Bassit to Oum Al Tiur (9 caves) and that extending from Burj Islam to Slaib Al Turkman (7 caves). This data should however be interpreted with some caution since only three of those reports were supported with photographic evidence. Hence, Syria has been moved to Group B from Group C.

⁷ https://www.rac-spa.org/sites/default/files/doc_monackus/monk_seal_strategy.pdf

⁸ https://www.rac-spa.org/sites/default/files/action_plans/strategie_phoque_en.pdf

⁹ With few exceptions; e.g., concerning knowledge of the species, which is no longer as poor as it was in 1988 (Art. 3), and the fact that scientific opinion is no longer divided concerning conservation strategies (Art. 4).

¹⁰ Specific, Measurable, Achievable, Relevant, Time-bound.

¹¹ Year 2017 was selected as a criterion to separate the present from the country assessments described in the first and second RSs, respectively.

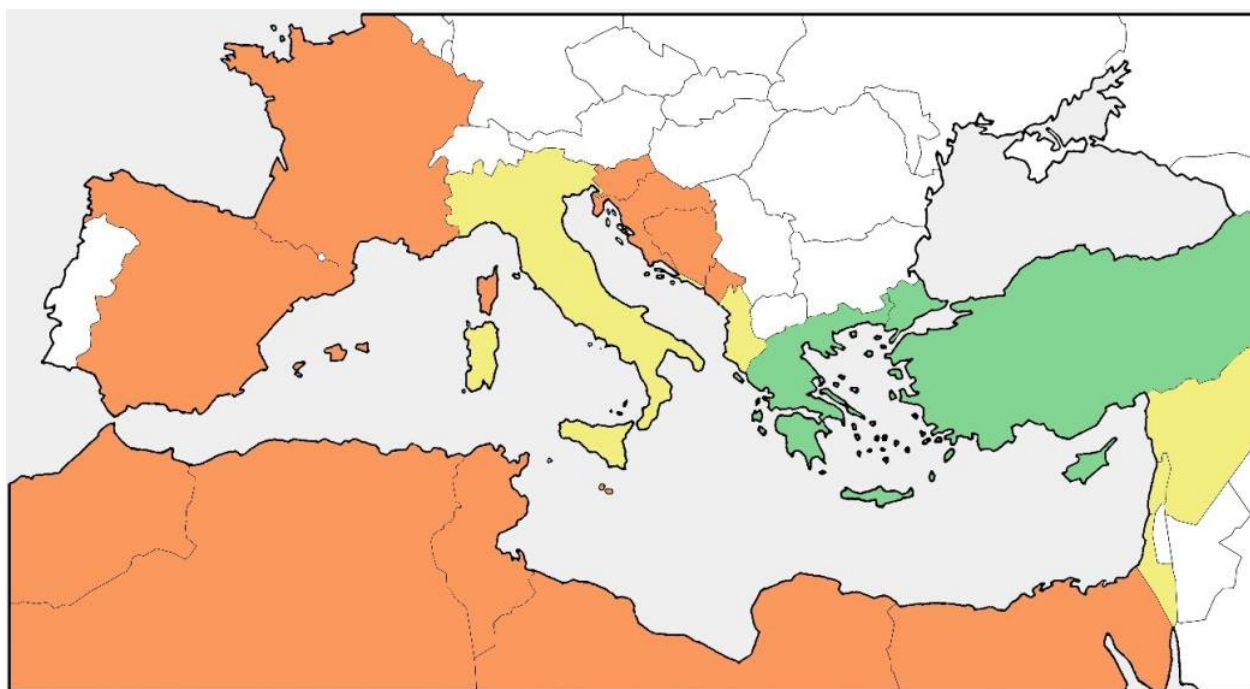


Figure 1. Monk seal conservation status by country (revised for this updated RS). Green: “Group A” countries (where monk seal breeding has been reported after year 2017). Yellow: “Group B” countries (where no monk seal breeding is reported, but where repeated sightings of monk seals (>3) were reported since 2017). Tan: “Group C” countries (where no monk seal breeding is reported, and where very rare or no sightings of monk seals (≤ 3) were reported since 2017).

7. We realise that the above are rough indicators (e.g., monk seals can be present in a location even if they are not seen, as sightings depend on the presence of observers and the animals can have very inconspicuous behaviours; breeding may not occur in some countries because of lack of breeding habitat, but there may be a healthy presence of animals in that country; etc.). However, the above indicators are conceived to separate countries into major categories according to their current importance for monk seals, thereby involving different types of actions.

8. Group A countries is where action is most urgent, because at the moment these countries are our best hope for the survival of the species. These countries host monk seal resident breeding populations and the majority of the species population.

9. Group B countries are important, because current monk seal sighting records suggest the potential for the species’ survival and expansion in areas beyond Group A country borders. Group B countries may contain monk seal critical coastal habitat which is likely to be re-colonised, and may lead to resident breeding nuclei, if conditions are favourable (as demonstrated by the frequent appearances of monk seals in many locations).

10. Group C countries are also important because, although they are characterised by rare monk seal occurrence, they contain historical monk seal critical habitat. The reestablishment of monk seal presence will become more likely if actions in nearby Group B countries are successful and if environmental conditions in historical critical habitat become favourable. In the absence of data collection mechanisms for monk seal sightings, some countries, known to host seals and suitable environmental conditions in the recent past, may currently qualify as Group C.

11. To fulfil the Vision, this updated Strategy identifies four Goals. The first Goal relates to the creation of a conservation support structure at the international level, whereas the other three Goals relate to each of the three Groups the various countries have been assigned to.

Table 1: Summary of monk seal presence in the different Mediterranean countries. Countries were subdivided as follows: Green: “Group A” countries (where monk seal breeding has been reported after year

2017). Yellow: “Group B” countries (where no monk seal breeding is reported, but where repeated sightings of monk seals (>3) were reported since 2017). Tan: “Group C” countries (where no monk seal breeding is reported, and where very rare or no sightings of monk seals (≤ 3) were reported since 2017). “Group C” includes countries where little or no data was collected at least since 2017, implying that monk seals could be occurring there more frequently, but no information is available

Country	Group A	Group B	Group C	References / Data sources	Notes
Albania				UNEP-MAP-RAC/SPA 2003b, UNEP-MAP-RAC/SPA 2005, Anon. 2012; Bundone <i>et al.</i> 2019, 2021, 2022; Bakiu and Cakalli 2018; Karamanlidis 2024	Sightings of single and 2 individuals reported in the last 15 years and evidence of cave use recorded recently. Birth of a pup in 2019 that survived the first 2 months of its life. The species should now be considered to be effectively re-established, at least from the border of Albania to Greece north to the bay of Vlorë.
Algeria				UNEP-MAP-RAC/SPA 2006	The seal pup reported in 2006 was not <i>M. monachus</i> (Bouderbala <i>et al.</i> 2007). No recent confirmed reports
Bosnia Herzego.					No recent reports.
Croatia				Antolovic <i>et al.</i> 2007; Gomercic <i>et al.</i> 2011; Bundone <i>et al.</i> 2019	2000-2014: 300 individual sightings reported. Only ONE single adult female has been inhabiting area of Kvarner. It appeared in the area in June 2005 and died in August 2014. (data to be taken with caution since these sightings were ascribed to a limited number of animals). Almost monk seal sightings reported in recent years, with the exception of two opportunistic sightings in 2022 confirmed by photograph/video in Croatia (both in July and October 2022).: at Mljet National Park ¹² , by a Park Ranger, and in Danče by a recreational fisher ¹³ .
Cyprus				Gucu <i>et al.</i> 2009a; UNEP/MAP/RAC/SPA 2011; Karamanlidis 2024; Marcou 2015; Nicolau <i>et al.</i> , 2021 ; Marcou and Nicolaou 2023	Evidence of breeding activities in the northern coast (2006-2007) and in the southern coast (since 2009). During 2009-2024, increasing number of seal sightings and the birth of several pups.
Egypt				Notarbartolo di Sciara and Fouad 2011	Single individual observed in 2011. No recent sightings.
France				UNEP-MAP-RAC/SPA 1994	No recent reports.
France-Corsica				Data stored in Office de l'Environnement de Corse	Single individual sightings reported in 2007 and 2011
Greece				Karamanlidis 2024; Notarbartolo di Sciara <i>et al.</i> 2009; Panou 2009; National Action Plan for the Mediterranean Monk Seal	Mediterranean monk seals in Greece are expanding their range and increasing in numbers. Their marine habitat includes almost the entire coastline of the country up to a depth of 200 m. Greece is home to > 50% of the world population for the species.

¹² Mediterranean monk seal after 40 years spotted in the waters of NP Mljet <https://np-mljet.hr/mediterranean-monk-seal-after-40-years-spotted-in-the-waters-of-np-mljet/?lang=en>

¹³ <https://youtu.be/jehVIh6JWjE?si=nJO-yZj5TRppZDGj>

Country	Group A	Group B	Group C	References / Data sources	Notes
				(Joint Ministerial Decision ΥΠΠΕΝ/ΔΤΦΠΒ/95178/2431/5-9-2024 ¹⁴)	
Israel				Scheinin <i>et al.</i> 2011; Bundone <i>et al.</i> 2016; Bundone <i>et al.</i> 2019; Roditi-Elasar <i>et al.</i> 2021, pers. comm.; Rabou <i>et al.</i> 2023	80+ individual sighting records (2010-2020), 2 different individuals observed in 2010. Monk seal “Yulia”, first spotted as a young adult in Türkiye, also known as Tuğra/Gülgez in Türkiye, back in 2007, seen in an open beach in Israel and even the Gaza Strip in May 2023, then spotted again in Israel in May 2024 and north of Beirut, Lebanon, in July 2024.
Italy				ISPRA records of in situ monitoring programs and national sighting database.	Individual validated sightings reported for the years :2010-2012, 2014-2015, 2017-2023. In situ cave use observed through monitoring: 2011-2013, 2016-2017,2020, 2022-2023. One stranded live seal pup but no direct observation of birth, lactation and coastal/cave use of mother-pup pairs observed. The species’ current national Red Listing status is Data Deficient due to the difficulty in establishing an overall national population estimate.
Lebanon				Anon. 2010; Karamanlidis 2024; Khatib 2016; SPA/RAC-UNEP/MAP, 2020 Data stored in Society for Nature Protection Lebanon	Single animal sightings reported: 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017; Dead pregnant seal observed in 2015; 47 monk seal sightings recorded 2003-2020 from Beirut to Tripoli in the north of Lebanon. Recent reports on monk seal presence at Amchit Seal Cave ¹⁵ ; SPA/RAC 2024 by Fatfat; No evidence of successful pupping.
Libya				Hamza <i>et al.</i> 2003, UNEP-MAP RAC/SPA 2003b, UNEP-MAP RAC/SPA 2012; Alfaghi <i>et al.</i> 2013	25 sightings reported by fishermen between 1998-2002 A 60-kg female juvenile Mediterranean monk seal, approximately 6 months old was found in March 2012 entangled in a fishing net near El Elba Island. Another 2 dead individuals reported in 2023.
Malta				UNEP-MAP-RAC/SPA 2003b	One recent report, where <i>Dive Systems Malta</i> captured some footage off the southwest coast of Malta in early July 2024 ¹⁶
Monaco					No recent reports. Monk seal habitat no longer present.

¹⁴ The National Action Plan for the Mediterranean Monk Seal (*Monachus monachus*) was published in September 2024 in the Official Gazette and prepared by the Hellenic Society for the Study and Protection of the Monk seal (MOM). <https://search.et.gr/el/fek/?fekId=770812>

¹⁵ https://www.instagram.com/reel/DBQkDqvMRSk/?utm_source=ig_web_copy_link&igsh=MzRIODBiNWFIZA==

¹⁶ <https://www.youtube.com/watch?v=OuurmtREzw0>

Country	Group A	Group B	Group C	References / Data sources	Notes
Montenegro				Panou <i>et al.</i> 2017, 2023	A total of 14 single individual sightings Between 1985-2010 throughout the country's coastline may indicate movements of animals from neighbouring countries. >25 suitable caves. A young individual, recorded by MedCEM in August 2023 ¹⁷ . Sightings also reported at Ulcinj and again in September 2024 in Bar (different locations).
Morocco				UNEP-MAPRAC/SPA 2003b, Mo <i>et al.</i> 2011; Bundone <i>et al.</i> 2019	More than 90 sightings reported by fishermen 2000-2005, 1 sighting 2006 (Chafarinas isl.)
Slovenia				UNEP-MAP-RAC/SPA 2003b	No reports.
Spain				Anon. 2008, Font and Mayol 2009; Karamanlidis 2024.	Individual sighted in 2008. More sightings in 2009. Possibly extinct, detection through eDNA, no recent sightings
Syria				Gucu 2004, Jony and Ibrahim 2006, Mo <i>et al.</i> 2003; Ibrahim <i>et al.</i> 2024	Between 2001-2023, Mediterranean monk seals reported 34 times (only three with photographic evidence) in 9 different locations along the northern Syrian coast. They were concentrated in the area extending from Ras Al Bassit to Oum Al Tiur (9 caves) and that extending from Burj Islam to Slaib Al Turkman (7 caves).
Tunisia				S. Guelloz ,pers. comm.	Single individual sightings reported: 2007, 2011 (La Galite archipelago)
Türkiye				Güçlüsoy <i>et al.</i> 2004; Gucu <i>et al.</i> 2009b; Karamanlidis <i>et al.</i> 2023; Karamanlidis 2024; Ok, M., & Kırac, C. O. (2023). <i>Updated population size and status of the Mediterranean monk seal in Türkiye</i> [Unpublished working document]. METU Institute of Marine Science, Mersin, Türkiye and Underwater Research Society – Mediterranean Seal Research Group, Ankara, Türkiye. (Contributed to Karamanlidis, A. A., Dendrinis, P., Fernandez de Larrinoa, P., Kırac, C. O., Nicolaou, H., & Pires, R. (2023). <i>Monachus monachus</i> . The IUCN Red List of	The number of Mediterranean monk seals in Türkiye has been estimated at 76–140 individuals, including 42–120 mature individuals. As it is the case in neighbouring Greece, their marine habitat is considered to include most of the coastline of the country up to a depth of 200 m. Recently some individuals also reported in the Sea of Marmara. Besides in Northern Aegean Sea was under surveyed last year.

¹⁷ <https://medpan.org/en/news/exceptional-filmed-observation-monk-seal-montenegro>

Country	Group A	Group B	Group C	References / Data sources	Notes
				Threatened Species 2023, e.T13653A238637039. https://dx.doi.org/10.2305/IUCN.UK.2023-1.RLTS.T13653A238637039.en); Dede, A., Tonay, A. M., Gönülal, O., Güreşen, S. O., & Öztürk, B. (2025). Camera trap monitoring of the haul-out behavior of Mediterranean monk seals on Gökçeada Island in the North Aegean Sea. <i>Regional Studies in Marine Science</i>, 87, 104224. https://doi.org/10.1016/j.rsma.2025.104224	

2. The Strategy

2.1. Vision

(As it was stated in the first version of the RS in 2013 and still valid)

12. *Over the next two decades, the ecological recovery of monk seals in the Mediterranean will deem to have occurred, when multiple colonies have become established within all major habitats in their historic range, interacting in ecologically significant ways with the fullest possible set of other species, and inspiring and connecting human cultures.*

2.2. Goals

13. **Goal 1.** Mediterranean Range States implement this Strategy in pursuance of the Vision, through the expeditious development and adoption of appropriate national policies and administrative frameworks, and with effective, coordinated support from relevant international organisations and civil society.

14. **Goal 2.** Monk seal breeding nuclei in sites located in “Group A” countries are effectively protected from deliberate and accidental killings, habitat degradation and human disturbance, so that seal numbers in such sites increase and seals are able to disperse to and re-colonise the surrounding areas.

15. **Goal 3.** Monk seal presence in sites where they are repeatedly seen today in “Group B” countries is permanently established, and breeding resumes. “Group B” countries are upgraded to “Group A”.

16. **Goal 4.** Monk seal presence is reported repeatedly in the species’ historical habitat in “Group C” countries, and these “Group C” countries are upgraded to “Group B”. Once all “Group C” countries are upgraded, Group C is deleted.

2.3. Goal Targets, Objectives and Objective Targets

Goal 1. Strategy implementation.

17. Mediterranean Range States implement this Strategy in pursuance of the Vision, through the development and adoption of appropriate national policies and administrative frameworks, and with effective, coordinated support from relevant international organisations and civil society.

Goal Target 1.1. A framework for the implementation of the Mediterranean Monk Seal Conservation Strategy is established by the Mediterranean Range States. The framework will include the establishment of a Monk Seal Advisory Committee (MSAC).

18. **Objective 1.1.1.** SPA/RAC establishes a **Monk Seal Advisory Committee (MSAC)**¹⁸. The main objective of the Committee is to support SPA/RAC in the development and implementation of specific conservation actions related to monk seal research and conservation in the framework of the RS and other initiatives/programmes in the region. Tasks of the MSAC will include :

- provide support to SPA/RAC in the implementation of the Strategy and its review and updating (e.g., by defining the Actions needed to attain the different Objective Targets);
- provide recommendations and advice on issues related to monk seal conservation;
- support SPA/RAC in the creation and maintenance of a forum for monk seal conservation practitioners, where relevant information and experience is shared, exchanges are facilitated, challenges are discussed, cooperative initiatives are enhanced, transparency and openness of procedures are safeguarded.

19. The MSAC is composed by a small number of experts, which should include, not only monk seal experts, but also professional profiles such as: marine conservation ecologists, marine veterinaries, fisheries experts,

¹⁸ Detail on Terms of Reference for the MSAC can be found at UNEP/MED WG.548/8 Rev.2 Annex I https://www.rac-spa.org/meetings/nfp16/docs/working/rev/WG548-8_ENG_REV_2_.pdf

fisheries practitioners, socio-economists, MPA practitioners, and representatives from relevant intergovernmental regional organisations.

20. The MSAC function is supported by SPA/RAC, and may benefit from relevant bodies within IUCN, the GFCM, and other international organisations.

21. **Objective Target 1.1.1.1.** MSAC established by 2026. The Advisory Committee meets at least once a year to review the status of monk seals in the Mediterranean, and to support the implementation of the Actions foreseen in the Strategy.
22. **Objective Target 1.1.1.2.** First meeting of MSAC in November 2026. The MSAC experts shall elect among them a chairperson that can be re-elected annually. SPA/RAC will act as secretariat and appoint a representative and Coordinator that will follow up on the organisation and work of the committee.
23. **Objective Target 1.1.1.3.** MSAC activities are harmonised, wherever appropriate, with prescriptions of the EU Habitats Directive, and with efforts by UNEP-MAP within the Ecosystem Approach process for the attainment of Good Environmental Status in the Mediterranean, i.e., to attain Ecological Objective EO1 “Biodiversity” and Operational Objectives 1.1 (“Species distribution is maintained”), 1.2 (“Population size of selected species is maintained”), 1.3 (“Population condition of selected species is maintained”), 1.4 (“Key coastal and marine habitats are not being lost”), as far as monk seals are concerned.
24. **Objective Target 1.1.1.4.** Member States establish a national multiannual program that draws from, their National Action Plan (if any), the Action Plan and the Strategy objectives, that incorporates monitoring, capacity building and conservation measures into relevant existing national programs involving monitoring of marine biodiversity and spatial protection measures that have been formulated for national and international policy implementation (i.e. monitoring as per EcAP/IMAP region-wide programs and Habitats Directive and MSFD for EC Member States, MPA network development and marine Natura 2000 establishment for Mediterranean EC countries). The MSAC reviews the multiannual programs and reports to SPA/RAC, recommending content improvement so as to harmonise conservation efforts at a regional level with common objectives and comparable efforts. The MSAC will provide support to SPA/RAC so national multiannual programs are defined by early 2027.
25. **Objective 1.1.2.** The Parties to the Barcelona Convention ensure that the activities that the MSAC recommends are addressed.
26. **Objective Target 1.1.2.1.** The Parties to the Barcelona Convention adopt resolutions in support of specific MSAC recommendations concerning the implementation of this Strategy.

Goal Target 1.2. Based on this Strategy, the MSAC provides support to SPA/RAC in the development and implementation of specific conservation actions having a regional scope.

27. **Objective 1.2.1.** The first task of the MSAC is to support SPA/RAC on supervising the attainment of Goals 2, 3 and 4.
28. **Objective 1.2.2.** Capacity building and awareness activities are planned by the MSAC, and promoted in monk seal Ranges States by SPA/RAC so that monk seal protection and recovery is effectively embraced at the national level. This will include the preparation of a dedicated website (including links to the relevant existing web pages) and the regular issuing and widely distributed monk seal information newsletter in an adequate number of different languages.
29. **Objective Target 1.2.2.1.** Capacity building: the main groups of stakeholders in monk seal conservation are identified by the MSAC, taking stock of national frameworks pertaining to the relevant sectors, tailored to each different monk seal Range State (with first priority given to

“Group A Countries” and second priority given to “Group B Countries”), and training courses are prepared and planned (see Goal Target 2.2.). Preferably, training events will be developed *in situ* at selected locations having special relevance to monk seal conservation, in collaboration with the local groups, and will be followed by a constant “advice service” or accompanying process to ensure that full and long-lasting advantage derives from the effort.

30. **Objective Target 1.2.2.2.** In order to facilitate collaboration and communication amongst monk seal conservation experts throughout the region, the MSAC provides support to SPA/RAC for organizing periodical workshops on best practices of monk seal monitoring and conservation techniques, preferably taking advantage of other meetings being periodically organised (e.g., CIESM Congresses, ECS Annual meetings). Proceedings are edited and widely diffused (e.g., by pdf through the Internet) in formats that will serve as “best practice guidelines”.
31. **Objective Target 1.2.2.3.** In consultation with MSAC awareness actions are promoted by SPA/RAC, with first priority given to “Group A Countries” and second priority given to “Group B Countries”, in cooperation with **local** groups, targeting special-interest stakeholders such as fishermen and local coastal communities.
32. **Objective Target 1.2.2.4.** Ideally, an electronic monk seal newsletter should be issued yearly by SPA/RAC based on the recommendations from the MSAC and made freely available on-line (e.g., by resuming the *Monachus Guardian*), starting in 2026.
33. **Objective 1.2.3.** Monitoring of monk seal distribution and abundance, as well as advances in knowledge important for monk seal conservation, are promoted and supported by SPA/RAC through training, workshops and the facilitation of research and monitoring programmes. The monitoring process is made to coincide with the similar monitoring requirements within the framework of the Ecosystem Approach-IMAP process by UNEP-MAP, and (where appropriate) with the Marine Framework Strategy Directive and Habitats Directive of the EC.
34. **Objective Target 1.2.3.1.** MSAC supports SPA/RAC in the completion of monk seal breeding site inventories in “Group A Countries” by 2030.
35. **Objective Target 1.2.3.2.** MSAC supports SPA/RAC in the yearly monitoring of monk seal population parameters (e.g., population abundance, trends, pup production) in breeding sites in “Group A Countries”, starting in 2026.
36. **Objective Target 1.2.3.3.** MSAC supports SPA/RAC in the monitoring of monk seal parameters (e.g., species distribution, population abundance, mortality levels and causes) in areas of “Group B countries” with recurrent sightings, habitat availability, and spatial protection measures for the species.
37. **Objective Target 1.2.3.4.** MSAC supports SPA/RAC in the set-up of common databases (e.g., photo-id catalogues). An initiative, in line with this, is being considered at the moment of producing this document by the Monk Seal Alliance (MSA)¹⁹. Strengthening cross-border cooperation and data-sharing mechanisms among Mediterranean countries would help to enhance the tracking of monk seal movements and improve habitat protection measures.
38. **Objective 1.2.4.** The MSAC will provide support to SPA/RAC in facilitating the definition of a region-wide protocol for rescue and rehabilitation centres and programmes, and will provide support and advice, as required, to such centres and programmes supported by the different Range States.

¹⁹ <https://www.monksealalliance.org/> The MSA was created in 2019 by five founding members experienced in funding Mediterranean monk seal conservation projects: the Prince Albert II of Monaco Foundation, the MAVA Foundation, the Segre Foundation, the Sancta Devota Foundation and the Thalassa Foundation.

39. **Objective Target 1.2.4.1.** Region-wide protocol for rescue and rehabilitation centres and programmes defined by the MSAC by 2026, taking stock of the successful initiatives developed during the last 30 years²⁰.

40. **Objective 1.2.5.** MSAC supports SPA/RAC in the development of contingency plans for disastrous events (e.g., lethal epizootic outbreaks, massive oil spills within monk seal habitat), and for emergency conditions which may derive from catastrophic environmental change. Ideally, this should be done in cooperation with equivalent bodies dealing with the conservation of Mediterranean monk seals in the Atlantic, with the conservation of cetaceans in the Mediterranean (i.e., within the ACCOBAMS framework), and with the appropriate bodies within the “Barcelona System” (e.g., REMPEC). The contingency plan will include the collection and safe storage of Mediterranean monk seal germplasm which may support in the future the recovery of the species, should it become necessary.

41. **Objective Target 1.2.5.1.** Contingency plan coordinated by SPA/RAC with support of MSAC in 2027 and adopted by the subsequent Barcelona Convention CoP.

(Note on MSAC: Once the MSAC is established, a first meeting of MSAC takes place and a chairperson is elected a two-year trial period could be envisaged for the MSAC so as to evaluate its real effectiveness.).

Goal 2. “Group A” countries.

42. Monk seal breeding nuclei in sites located in “Group A” countries are effectively protected from deliberate and accidental killings, habitat degradation and human disturbance, so that seal numbers in such sites increase and seals are able to disperse to and re-colonise the surrounding areas.

Goal Target 2.1. Maintain and secure monk seal presence in Group A countries with special attention to the following locations: a) Zakynthos, Kefalonia, Ithaca and the Inner Ionian Sea Archipelago (Meganisi, Arkoudi, Atokos, Kalamos, Kastos, Vromonas and surrounding islets and seas); b) Northwest Evia; c) Northern Sporades; d) Northern Cyclades (including the Natura 2000 site of the Island of Gyaros and its surrounding 3-mile marine area); e) Northern Karpathos - Saria and the Astakida islets; f) Kimolos and Polyaigos; g) Turkish coasts; h) Cyprus. Breeding nuclei in the locations listed above are effectively protected from deliberate and accidental killings, habitat degradation and human disturbance, so that seal numbers in such sites increase and young seals are able to disperse and re-colonise the surrounding areas. (Considering that in both Greece and Turkey monk seal’s marine habitat includes almost the entire coastline of the country up to a depth of 200 m., and that a large portion of it is included in Important Marine Mammal Areas (IMMAs) identified by the IUCN Marine Mammal Protected Areas Task Force²¹, priority should be paid to the locations listed above, but conservation actions should not be limited exclusively to them. In the case of Greece, the *National Action Plan for the Mediterranean Monk Seal in Greece*, officially adopted by the Greek Government in September 2024 -Official Gazette 5100/B/10-09-2024²²- should provide guidance on future conservation action since it presents the most recent and reliable information on the species at a National level..)

²⁰ The Monk Seal Rehabilitation program in Greece (on-going for well over three decades) offers an obvious choice to contribute to the training of managers from other countries of the Group A. Rescue and rehabilitation protocols have been officially adopted by the Greek state. Currently, the Greek monk seal rehabilitation program supports the Republic of Cyprus in the establishment of a monk seal rehabilitation structure.

²¹ See <https://www.marinemammalhabitat.org/imma-eatlas/>

²² <https://search.et.gr/el/fek/?fekId=770812>

43. **Objective 2.1.1.** Current legislation prohibiting to carry firearms and explosives aboard fishing vessels in Greece, Türkiye and Cyprus is enforced, with a special attention in locations listed in Goal Target 2.1. Monitoring and mitigating negative seal–fishery interactions schemes put in place.
44. **Objective Target 2.1.1.1.** Compliance with existing laws concerning firearms and explosives aboard fishing vessels in Greece, Türkiye and Cyprus is routinely enforced everywhere, to come into effect with immediate urgency. Appropriate statistics of infringements are kept and publicised. Infringements are prosecuted with penalties appropriate to address the destruction of an endangered, highly species. Enforcement of fishing regulations and eradication of illegal fishing practices.
45. **Objective 2.1.2.** Locations listed in Goal Target 2.1, and other equally important locations that may be eventually discovered in the future, are geographically delimited and legally protected/managed. The resulting MPA network should be ecologically coherent and effectively managed in order to guarantee favourable conservation status.
46. **Objective Target 2.1.2.1.** A monk seal MPA network encompassing the most important monk seal habitat in the area is formally established in the Greek Ionian islands by 2030. All areas within the Greek NATURA 2000 network and designated of exceptional importance for the breeding of the species should have the necessary institutional protection in order to minimize disturbance from human activities at the breeding sites of the species. A valid example is the islet of Formicula, in the Inner Ionian Sea Archipelago²³, where a decision by the Minister of the environment was adopted on 31/12/2024²⁴, establishing a strict protection regime²⁵ around Formicula.
47. **Objective Target 2.1.2.2.** Implementation and enforcement of specific interaction guidelines²⁶ to prevent any adverse effects of recently developed “monk seal tourism” in Lichadonisia islets off the northwestern end of the island of Evia.
48. **Objective Target 2.1.2.3.** Ensure continuity and the future effectiveness of a patrolling system of the National Marine Park of Alonissos Northern Sporades²⁷
49. **Objective Target 2.1.2.4.** The current Natura 2000 site around the island of Gyaros is formally established. The legislative status of the MPA must be finalized through the issuance of a definitive Presidential Decree by 2026 and a science-based, regularly updated Management Plan.
50. **Objective Target 2.1.2.5.** A monk seal MPA is formally established in Karpathos - Saria by 2026²⁸.
51. **Objective Target 2.1.2.6.** A monk seal MPA is formally established in Kimolos - Polyaigos by 2026.

²³ https://natura2000.eea.europa.eu/?sitecode=GR2220003&views=Sites_View

²⁴ link to Decision YΠEN/ΔΔΦΠΒ/123711/3066 of 31/12/2024 published in the Hellenic National Gazette, with maps: <https://tinyurl.com/mb5a9kx9>

²⁵ Measures aiming at mitigating tourist disturbance to monk seals include the delimitation of a 200 m-wide no-entry zone along the islet’s coast, except for a corridor to allow access to organised tours to a single ad hoc mooring. The fact that fishing is not excluded from the no-entry zone, offers a loophole potentially opening the door to indiscriminate access, undermining the measure’s effectiveness. Now the organisations that were actively involved in this process, together with the relevant government agencies, local communities and stakeholders should bring this plan to life.

²⁶ <https://ioniandolphinproject.org/mediterranean-monk-seals/monk-seal-watching-guidelines/>

²⁷ The Management Unit of Sporades National Park operates under the Natural Environment and Climate Change Agency (NECCA), Protected Areas Management Directorate (Sector A), based in Alonissos. <https://necca.gov.gr/en/mdpp/management-unit-of-alonissos-northern-sporades-national-park-and-protected-areas-of-eastern-thessaly/#Actions>

²⁸ Greece has already established the protected area Management Body in Karpathos in 2007, however the MPA has not been legally declared yet.

52. **Objective Target 2.1.2.7.** Monk seal MPAs are formally established along the Aegean and Mediterranean coastline of Türkiye by 2030, to protect monk seal critical habitat as determined and mapped by the Turkish National Monk Seal Committee. Continuity is given to both monk seal ongoing projects; a) in the Muğla Province, run in collaboration between MSA and the Ministry of Agriculture, and b) Forestry, and Fethiye and Babadağ Pilot Coastal Zoning and Management Planning supported by UNDP GEF-SGP. Similar initiatives to be developed in other important sites for the species.
53. **Objective Target 2.1.2.8.** Monk seal MPAs have been identified and are formally established in Cyprus²⁹.
54. **Objective 2.1.3.** Areas in locations listed under Goal Target 2.1 are effectively protected through a) appropriate management actions, and b) the involvement of the local communities, which will both ensure the good conservation status of monk seals found there. A management framework is in place and implemented, defining the spatial, temporal and specific measures needed in the species' critical habitats (e.g., regulating access to caves), thereby affording effective protection to haul out and pupping sites.
55. **Objective Target 2.1.3.1.** Until formal protection of the areas listed under Goal Target 2.1 is established and enforced, patrolling of the most important haul out and pupping locations and caves is organised at least during the summer and breeding season. Patrolling can be done by volunteers, well-trained and possibly local, who could also be performing awareness actions *in situ*, as well as solicit the intervention of law enforcers in case of need. Since this may be counterproductive if not properly executed, it should only happen under expert guidance (e.g., MSAC). In Greece, the competent management body is NECCA, which should coordinate any volunteer patrolling/monitoring scheme while extreme caution is taken to prevent any leaks of sensitive information (e.g., seal pupping cave locations) to the general public or to inadvertently cause an increase of disturbance.
56. **Objective Target 2.1.3.2.** All monk seal MPAs established under Objective 2.1.2, as well as those already created (e.g., National Marine Park of Alonissos – Northern Sporades), are endowed with an operant Management Body and a management plan that is adaptive, ecosystem-based and fully implemented by 2030.
57. **Objective Target 2.1.3.3.** Management in monk seal MPAs established under Objective 2.1.2 is conducted in a participatory fashion, with the full involvement of local relevant stakeholders, as considered necessary in a case-by-case basis (e.g., artisanal fishers, tourism operators, managers and politicians). All proposals and decisions aiming at establishing or modifying conservation and protection measures must be based on sound and indisputable scientific data and evidence. Elements of participatory approach will include awareness campaigns as well as the experimentation/adoption of innovative mechanisms to address opportunity costs, damage mitigation and the generation of alternative sources of income (e.g., ecotourism).

Goal Target 2.2. Implementation of Goal Target 2.1. is enabled through appropriate capacity building activities.

²⁹ In Cyprus, four MPAs were established through Ministerial Decrees (through the Fisheries Law and Regulations) for the protection of the Mediterranean monk seal and its habitats: Halavro MPA; Agios Georgios Alamanou MPA; Ayia Napa Sea Caves; Peyia Sea Caves:

[https://www.moa.gov.cy/moa/dfmr/dfmr.nsf/0/0021828B42D07413C2258B64002DE442/\\$file/Report%20MONACHUS%202020-2023%20-%20eng.pdf](https://www.moa.gov.cy/moa/dfmr/dfmr.nsf/0/0021828B42D07413C2258B64002DE442/$file/Report%20MONACHUS%202020-2023%20-%20eng.pdf)

58. **Objective 2.2.1.** Training sessions are organised in areas relevant to locations listed in Goal Target 2.1, with the support of the MSAC (see Objective Target 1.2.2.1). Training will concentrate, at least initially, on mitigating the main threats to monk seals (deliberate killing, habitat degradation, and accidental entanglements), and will target stakeholders identified by the MSAC (e.g., fishermen, tourist operators, enforcement officers, judges). Training will be developed together with the local groups and will be followed by a constant “advice service” or accompanying process to ensure that full advantage is taken from the effort. Lessons learnt from previously executed capacity-building initiatives will be implemented. Follow-up contacts by MSAC with those participating in capacity building activities will be scheduled to secure post-training support and guidance.

Goal 3. “Group B” countries.

59. Monk seal presence in sites where they are occasionally seen today in “Group B” countries is permanently established, and breeding resumes in areas characterised by sufficient and suitable coastal habitat. “Group B” countries are upgraded to “Group A”.

60. Monk seal presence in “Group B” countries must be verified with appropriate methods so as to define the actual species’ use of the coastal seas and identify the areas in which priority monitoring, awareness and protection actions need to be carried out. Priority areas of usage will be identified thorough sighting collection campaigns, habitat surveys in areas of hotspot sightings, and where the coastal habitat is most pristine (which implies analysis of coastal habitat characteristics and their distribution in each nation), followed by *in situ* monitoring to assess the eventual degree of habitat use by monk seals. Coastal areas with confirmed repeated use must be evaluated in terms of pressures and risks.

61. In areas where the importance for the species has been well established in recent years, even if monitoring and protection actions may be already in place, such actions must be given long-term continuity³⁰.

62. Awareness activities to be carried out in each site will depend on the type of use of the coasts by the species, the degree of the pressures insisting in each site, and the risks involved. Spatial protection measures are established and site-specific management actions are implemented to reduce the pressures on the basis of the monitoring and risk analysis outcomes.

Goal Target 3.1. Monk seal presence in Albania and specially in southern Albania (between the area bordering with Greece and north to the bay of Vlorë), is permanently established and monk seal breeding resumes.

63. **Objective Target 3.1.1.** A reporting scheme to detect monk seal presence and alert authorities continues to be implemented along the Albanian coastal zone and awareness actions are conducted.
64. **Objective Target 3.1.2.** Monk seal habitat along the coasts of Albania is completely mapped and populations are monitored, paying special attention to Southern Albania (between the area bordering with Greece and north to the bay of Vlorë).
65. **Objective Target 3.1.2.1.** Non-invasive and scientifically sound monitoring technologies as recommended by the MSAC are applied to caves in appropriate locations.
66. **Objective Target 3.1.2.2.** A programme targeting the local community and visitors, aimed at increasing awareness and fostering species’ protection measures is continued and enhanced.

Goal Target 3.2. Monk seal presence in Montenegro is permanently established.

³⁰ The Eastern Adriatic Monk Seal Project³⁰, funded by MSA, with dedicated actions and partners in Albania, Croatia, and Montenegro will be particularly relevant for Goal Targets 3.1, 3.2. and 4.3: <https://www.monksealalliance.org/en/projets/eastern-adriatic-monk-seal-project-phase-ii-00557>

67. **Objective 3.2.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is implemented along the coastal zone of Montenegro.
68. **Objective 3.2.2.** To take advantage of the Coastal habitat assessment studies conducted in recent years (Mačić et al., 2019) and give continuity, and expand as necessary, the on-going long-term cave monitoring programmes in Montenegro.

Goal Target 3.3. Monk seal presence in Italy, in areas with recurrent sightings, habitat availability and proximity to nearby breeding colonies, is permanently established, and monk seal breeding resumes.

69. **Objective 3.3.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is enhanced along the coastal areas characterised by recurrent sightings and coastal habitat historically used by the species
70. **Objective 3.3.2.** Monitoring of monk seal distribution, abundance and behaviour (including eventual pup production) is continued in the Egadi islands.
71. **Objective Target 3.3.2.1.** Non-invasive and scientifically sound monitoring technologies, applied to caves in appropriate locations within the Egadi Islands MPA, is continued and enhanced.
72. **Objective Target 3.3.2.2.** A programme targeting the local community and visitors, aimed at increasing awareness and fostering species' protection measures is continued and enhanced.
73. **Objective 3.3.3.** Regular monitoring of monk seal presence and awareness actions are conducted in areas historically containing monk seal habitat and characterised by recurrent sightings in Sardinia.
74. **Objective 3.3.4.** Regular monitoring of monk seal presence and awareness actions are conducted in areas historically containing monk seal habitat in the Tuscan Archipelago.
75. **Objective 3.3.5.** Regular monitoring of monk seal presence and awareness actions are conducted in areas historically containing monk seal habitat and recurrent recent sightings in the lesser islands of the Sicily Strait (Pantelleria, Pelagie islands).
76. **Objective 3.3.5.** Regular monitoring of monk seal presence is conducted in Salento (Apulia) in coastal areas containing historical monk seal habitat and characterised by recurrent sightings.

Goal Target 3.4. Monk seal presence in Lebanon is permanently established.

77. **Objective 3.4.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is implemented along the Lebanese coastal zone; awareness actions are conducted in the concerned areas.
78. **Objective 3.4.2.** A coastal habitat assessment study is conducted in the areas characterised by recent recurrent monk seal sightings and long-term cave monitoring program is initiated in northern Lebanon; conservation actions are implemented in the Palm Islands nature reserve by 2026³¹.

Goal Target 3.5. Monk seal presence in Israel is permanently established.³²

³¹ Project *Recolonization of the Monk Seal in Lebanon*, supported by MSA and led by IndyACT, sets up a favorable framework to achieve Goal target 3.4. <https://www.monksealalliance.org/en/projects/recolonization-of-the-monk-seal-in-lebanon-00563>

³² Project *Preparing the ground for the monk seal's return to the Israeli coast*, supported by MSA and led by Delphis, should greatly facilitate Goal target 3.6. <https://www.monksealalliance.org/en/projects/preparing-the-ground-for-the-monk-seal-s-return-to-the-israeli-coast-00565>

79. **Objective 3.5.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is enhanced along the Israeli coastal zone and awareness actions are conducted in areas characterised by recent sightings or coastal habitat suitability.

80. **Objective 3.5.2.** A coastal habitat assessment study is conducted, and a long-term cave monitoring program is implemented in northern Israel.

Goal Target 3.6. Monk seal presence in Syria is permanently established.

Objective 3.6.1. A reporting scheme to detect occasional monk seal presence and alert authorities is implemented along the Syrian coastal zone and awareness actions are conducted in areas characterised by recent sightings or coastal habitat suitability.

Objective 3.6.2. A coastal habitat assessment study is conducted, and a long-term cave monitoring program is implemented in Syria.

Goal Target 3.7. Implementation of Goal Targets 3.1 - 3.6 is enabled through appropriate capacity building activities and sub-regional cooperation.

81. **Objective 3.7.1.** Capacity building. Training sessions are organised in areas relevant to locations listed in Goal Targets 3.1 - 3.6, with the support of the MSAC (see Objective Target 1.2.2.1). Training will concentrate, at least initially, on national / local groups working on the development of monitoring and awareness programs directed at mitigating the main threats to monk seals (deliberate killing, habitat degradation, and accidental entanglements). Capacity building activities can also target stakeholders identified by national/local groups with the support of the MSAC (e.g., fishermen, tourist operators, enforcement officers, judges). Training will be developed together with the local groups and will be followed by a constant “advice service” or accompanying process to ensure that full advantage is taken from the effort.

82. **Objective 3.7.2.** Streamlining of sighting and cave monitoring results carried out in Goal Targets 3.1 - 3.6 above is discussed at sub regional level in order to better assess the population status in the “Group B” countries within a geographic context that goes beyond country borders, and in order to identify priority areas in which spatial protection measures are necessary.

83. **Objective 3.7.3.** Capacity building of MPA managers acting in monk seal distribution areas identified through the implementation of Goal Targets 3.1 - 3. 6, is carried out so as to discuss improved management and mitigation measures to be introduced in existing MPAs.

84. **Objective 3.7.4.** The implementation of Goals 3.1-3.6 is carried out, as much as possible, through the development of international collaboration frameworks, directed at guaranteeing sharing of expertise and monitoring results amongst neighbour countries for the purpose of sub regional status assessments and conservation goal attainment. The latter is particularly important for countries that have limited suitable coastal habitat and recurrent sightings and which border countries with breeding colonies or countries with sightings and extensive and suitable habitat. This may involve cross collaboration initiatives that involve an array mixture of Group A, B and C countries (i.e. Türkiye- Israel -Cyprus; Syria-Lebanon-, Libya-Egypt, Greece-Albania-Italy-Montenegro-Croatia, Italy-Tunisia-Algeria-Morocco).

Goal 4. “Group C” countries.

85. Monk seal presence is again repeatedly reported in the species’ historical habitat in “Group C” countries, and these “Group C” countries are upgraded to “Group B”. Once all “Group C” countries are upgraded, Group C is deleted.

Goal Target 4.1. Monk seal presence in locations of the Maghreb’s Mediterranean coasts and annexed islands in Algeria, Morocco, Tunisia, and the Chafarinas Islands (Spain) is repeatedly reported and permanently established.

86. **Objective 4.1.1.** A reporting scheme to detect monk seal presence through sightings and to alert authorities is implemented along Maghreb's Mediterranean coasts and annexed islands characterised by monk seal historical presence and recent sightings. This includes areas such as: northern Tunisia, Algeria, Morocco, and the Chafarinas Islands (Spain); awareness actions are conducted in the concerned areas.

87. **Objective 4.1.2.** Long-term cave monitoring activities are initiated in the coastal habitat identified as suitable in the Al Hoceima National Park³³ and Cap Trois Fourches in order to assess monk seal presence in the Mediterranean Moroccan coastal area.

88. **Objective 4.1.3.** Long-term cave monitoring activities are initiated in the coastal habitat identified as suitable in the Chafarinas islands in order to assess monk seal presence in the area.

89. **Objective 4.1.4.** Long-term cave monitoring activities are initiated in the coastal habitat identified as suitable in previous studies carried out in selected Algerian locations in order to assess monk seal presence in the area.

90. **Objective 4.1.5.** Long-term cave monitoring activities are initiated in the coastal habitat identified as suitable in the La Galite Archipelago³⁴ (North of Tunisia) in order to assess monk seal presence in the area.

Goal Target 4.2. Monk seal presence in the Balearic Islands, Spain, is repeatedly reported and permanently established.

91. **Objective 4.2.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is implemented; awareness actions are conducted around the Balearic Islands, Spain.

Goal Target 4.3. Monk seal presence in Croatia is repeatedly reported and permanently established.

92. **Objective 4.3.1.** A reporting scheme to detect occasional monk seal presence and alert authorities is enhanced along the Croatian coastal areas.

93. **Objective 4.3.2.** Long-term cave monitoring activities are implemented in selected locations identified as suitable habitat for monk seals based on previous observations.

Goal Target 4.4. Monk seal presence in Bosnia Herzegovina and Slovenia repeatedly reported and permanently established.

94. **Objective 4.4.1.** Regular monitoring of monk seal presence and awareness actions are conducted in the species' historical habitat in Bosnia Herzegovina and Slovenia.

Goal Target 4.5. Monk seal presence in Corsica is repeatedly reported and permanently established.

95. **Objective 4.5.1.** Regular monitoring of monk seal presence and awareness actions are conducted in the species' historical habitat in Corsica.

Goal Target 4.6. Monk seal presence is reported again from continental France.

96. **Objective 4.6.1.** Regular monitoring of monk seal presence and awareness actions are conducted in the species' historical habitat in Corsica and continental France.

³³ Project Med-Monk seal Project: Enhancing knowledge and awareness on monk seal in the Mediterranean, supported by MSA and led by SPA/RAC, sets up a favorable framework to achieve objective 4.1.2.

³⁴ Project Med-Monk seal Project: Enhancing knowledge and awareness on monk seal in the Mediterranean, supported by MSA and led by SPA/RAC, sets up a favorable framework to achieve objective 4.1.5

Goal Target 4.7. Monk seal presence in Libya and nearby western Egypt is repeatedly reported and permanently established.

97. **Objective 4.7.1.** Monk seal ecology and behaviour is monitored in Libya³⁵ (Cyrenaica) and nearby Egyptian coast³⁶ (from the border with Libya, including Sallum MPA, to Marsa Matrouh).

98. **Objective Target 4.7.1.1.** Full survey of monk seal habitat in the Libyan easternmost coast bordering with Egypt is conducted and long-term cave monitoring is established in this area as well as in the caves identified in previous projects.

99. **Objective Target 4.7.1.2.** Awareness actions are conducted in Libya, targeting local residents and most notably fishermen, with the aim of fostering respect and data collection on sightings.

100. **Objective Target 4.7.1.3.** Full survey of monk seal presence through data collection on sightings and awareness actions organised in Egypt (from the border, including Sallum MPA, to Marsa Matrouh) by 2025.

101. **Objective Target 4.7.1.4.** Full survey of monk seal habitat in the Egyptian areas characterised by recurrent sightings and a geomorphologically suitable coast is conducted, and long term cave monitoring is established.

Goal Target 4.8. Monk seal presence is reported from Malta.

102. **Objective 4.8.1.** Regular monitoring of monk seal presence and awareness actions are conducted in the species' historical habitat in Malta.

Goal Target 4.9. Implementation of Goal Targets 4.1 - 4.8. is enabled through appropriate capacity building activities and sub-regional cooperation.

103. **Objective 4.9.1.** Capacity building: training courses are organised in locations listed in Goal Targets 4.1-4.8, with the support of the -MSAC (see Objective Target 1.2.2.1).

104. **Objective 4.9.2.** The implementation of Goals 4.1-4.8 is carried out, as much as possible, through the development of international collaboration frameworks, directed at guaranteeing sharing of expertise and monitoring results amongst neighbour countries for the purpose of sub regional status assessments and conservation goal attainment (see Objective 3.7.4)

3. Revision of the Strategy

105. The suggested time horizon of this Strategy is six years, to be concluded in 2030, when a comprehensive review of the Strategy's accomplishments and failures, with a consideration for potential actions to be taken beyond 2030, should be conducted. Such timing also coincides with the process requiring EU Member States to report concerning the Habitats and Marine Strategy Framework Directives, thereby facilitating the implementation of the Strategy's actions by such States.

106. A mid-term assessment of the implementation results in 2028 is also recommended, to evaluate up-to-date attainment of Goals and Objectives within the Strategy's timeframe and to identify, if needed, moderate adjustments.

³⁵ Project Med-Monk seal Project: Enhancing knowledge and awareness on monk seal in the Mediterranean, supported by MSA and led by SPA/RAC, sets up a favorable framework to achieve objective 4.6.1

³⁶ Project Med-Monk seal Project: Enhancing knowledge and awareness on monk seal in the Mediterranean, supported by MSA and led by SPA/RAC, sets up a favorable framework to achieve objective 4.6.1

4. References

- Abd Rabou AN, Abd Rabou MA, Abd Rabou OA. 2023. On the arrival of the rare and endangered Mediterranean Monk Seal – Yulia (*Monachus monachus* Hermann, 1779) on the shores of Jaffa, Palestine (May 2023). International Journal of Fauna and Biological Studies 10(3): 19-23. DOI: <https://doi.org/10.22271/23940522.2023.v10.i3a.962>
- Adamantopoulou, S., Karamanlidis, A. A., Dendrinis, P., & Gimenez, O. (2022). Citizen science indicates significant range recovery and defines new conservation priorities for Earth's most endangered pinniped in Greece. Animal Conservation, 26(1), 115–125.
- Anonymous. 2008. Mediterranean News: Spain. Seal returns after 50-year absence. The Monachus Guardian 11(2).
- Anonymous. 2010. Mediterranean News: Lebanon. Seal sightings in Lebanon. The Monachus Guardian 13(2).
- Anonymous. 2012. <http://www.monachus-guardian.org/wordpress/2012/08/23/monk-seal-sighting-in-albania/>
- Alfaghi I.A., Abed A.S., Dendrinis P., Psaradellis M., Karamanlidis A.A. 2013. First confirmed sighting of the Mediterranean monk seal (*Monachus monachus*) in Libya since 1972. Aquatic Mammals 39(1):81-84. DOI 10.1578/AM.39.1.2013.81
- Antolovic J., Antolovic M., Antolovic N., Furlan B., Adamic-Antolovic Lj., Antolovic R., Cok I. 2007. Monk sea (*Monachus monachus*) sightings in the Croatian part of the Adriatic with a special reference to the population of open-sea islands. The Monachus Guardian 10(1).
- Bakiu R., Cakalli M. 2018. New Mediterranean biodiversity records (December 2017). 5.2 Recent sightings of the Mediterranean monk seal (*Monachus monachus*) in the Albanian Ionian Sea. Mediterranean Marine Science 18:542–544.
- Bouderbala M., Bouras D., Bekrattou D., Doukara K., Abdelghani M.F., Boutiba Z. 2007. First recorded instance of a hooded seal (*Cystophora cristata*) in Algeria. The Monachus Guardian 10(1).
- Bundone L., Panou A., Molinaroli E. 2019. On sightings of (vagrant?) monk seals, *Monachus monachus*, in the Mediterranean Basin and their importance for the conservation of the species. Aquatic Conservation, marine and freshwater ecosystems. Online version 20 February 2019 <https://doi.org/10.1002/aqc.3005>
- Bundone L, Hernandez-Milian G, Hysolako N, Bakiu R, Mehillaj T, Lazaj L. 2021. Mediterranean monk seal in Albania: historical presence, sightings and habitat availability. AJNTS (Albanian Journal of Natural and Technical Sciences) 53:89–100
- Bundone L, Hernandez-Milian G, Hysolako N, Bakiu R., Mehillaj T, Lazaj L, Deng H, Lusher A, Pojana G. 2022. First documented uses of caves along the coast of Albania by Mediterranean monk seals (*Monachus monachus*, Hermann 1779): ecological and conservation inferences. Animals 12:2620
- Font A., Mayol J. 2009. Mallorca's lone seal: the 2009 follow-up. The Monachus Guardian 12(2).
- Gomerčić T., Huber D., Duras Gomerčić M., Gomerčić H. 2011. Presence of the Mediterranean monk seal (*Monachus monachus*) in the Croatian part of the Adriatic Sea. Aquatic Mammals 37(3):243-247. DOI 10.1578/AM.37.3.2011.243.
- Güçlüsoy H., Kýraç C.O., Veryeri N.O., Savas Y. 2004. Status of the Mediterranean monk seal, *Monachus monachus* (Hermann, 1779) in the coastal waters of Turkey. E.U. Journal of Fisheries & Aquatic Sciences 21(3-4):201–210.
- Gucu A.C. 2004. Is the broken link between two isolated colonies in the Northeastern Mediterranean re-establishing? The Monachus Guardian 7(2).
- Gucu A.C., Ok M., Sakinan S. 2009a. A survey of the critically endangered Mediterranean monk seal *Monachus monachus* (Hermann, 1779) along the coast of Northern Cyprus. Israel Journal of Ecology & Evolution 55(1):77-82. DOI: 10.1560/IJEE.55.1.77

Gucu A.C., Sakinan S., Ok M. 2009b. Occurrence of the critically endangered Mediterranean monk seal, *Monachus monachus* (Hermann, 1779), at Olympos-Beydaglarý National Park, Turkey. *Zoology in the Middle East* 46:3-8.

Hamza A., Mo G., Tayeb K. 2003. Results of a preliminary mission carried out in Cyrenaica, Libya, to assess monk seal presence and potential coastal habitat. *The Monachus Guardian* 6(1).

Ibrahim A., Hussein C., Alshawy F., Ahmad AA. 2024. Distribution and habitats of the Mediterranean Monk Seal (*Monachus monachus*): In the Syrian Coast (Eastern Mediterranean). *Species* 2024; 25: e2s1624 doi: <https://doi.org/10.54905/disssi.v25i75.e2s1624>

IUCN/SSC. 2008. Strategic planning for species conservation: a handbook. Version 1.0. IUCN Species Survival Commission, Gland, Switzerland. 104 p.

Jony M., Ibrahim A. 2006. The first confirmed record for Mediterranean monk seals in Syria. Abstract, p. 54 in: UNEP/MAP, RAC/SPA. 2006. Report of the International Conference on Monk Seal Conservation. Antalya, Turkey, 17-19 September 2006. 69 p.

Karamanlidis, A. 2024. Current status, biology, threats and conservation priorities of the vulnerable Mediterranean monk seal. *Endangered Species Research* 53, 341–361. <https://doi.org/10.3354/esr01304>

Karamanlidis A.A., Dendrinos D., Fernández de Larrinoa P., Kiraç C.O., Nicolaou H., Pires R. 2023. *Monachus monachus*. The IUCN Red List of Threatened Species: e.T13653A238637039. <https://dx.doi.org/10.2305/IUCN.UK.2023-1.RLTS.T13653A238637039.en>

Khatib B. 2016. Evaluating the status of Monk seal population in Lebanon Date of Report: 25 January 2016. CEPF FINAL PROJECT COMPLETION REPORT <https://www.ceph.net/sites/default/files/sg71038-final-report.pdf>

Mačić V., Panou A., Bundone L., Varda D., Pavićević M. 2019. First Inventory of the Semi-Submerged Marine Caves in South Dinarides Karst (Adriatic Coast) and Preliminary List of Species. *Turkish Journal of Fisheries and Aquatic Science*, Vol. 19, No. 9: 765-774. DOI: 10.4194/1303-2712-v19_9_05.

Marcou, M. 2015. The Mediterranean monk seal *Monachus monachus* in Cyprus. *The Monachus Guardian*. Available at: <http://www.monachus-guardian.org/wordpress/2015/05/21/themediterranean-monk-seal-monachus-monachus-in-cyprus/>. (March 2017).

Marcou, M., Nicolaou H., Ioannou G. 2024. Report for the monitoring program of the Mediterranean monk seal *Monachus monachus* in cyprus for the period 2020 – 2023. Department of Fisheries and Marine Research Ministry of Agriculture, Rural Development and Environment. 28pp.

Mo G. 2011. Mediterranean monk seal (*Monachus monachus*) sightings in Italy (1998-2010) and implications for conservation. *Aquatic Mammals* 37(3):236-240. DOI 10.1578/AM.37.3.2011.236

Mo G., Bazairi H., Bayed A., Agnesi S. 2011. Survey on Mediterranean monk seal (*Monachus monachus*) sightings in Mediterranean Morocco. *Aquatic Mammals* 37(3):248-255. DOI 10.1578/AM.37.3.2011.248.

Mo G, Gazo M, Ibrahim A, Ammar I, Ghanem W. 2003. Monk seal presence and habitat assessment: results of a preliminary mission carried out in Syria. *The Monachus Guardian* 6(1).

Nicolaou H, Dendrinis P, Marcou M, Michaelides S, Karamanlidis A. 2021. Re-establishment of the Mediterranean monk seal *Monachus monachus* in Cyprus: priorities for conservation. *Oryx* 55, 526–528. <https://doi.org/10.1017/s0030605319000759>

Notarbartolo di Sciara G., Adamantopoulou S., Androukaki E., Dendrinis P., Karamanlidis A.A., Paravas V., Kotomatas S. 2009. National strategy and action plan for the conservation of the Mediterranean monk seal in Greece, 2009-2015. Report on evaluating the past and structuring the future. Publication prepared as part of the LIFE-Nature Project: MOFI: Monk Seal and Fisheries: mitigating the conflict in Greek Seas. Hellenic Society for the Study and Protection of the Mediterranean monk seal (MOM), Athens. 71 p.

Notarbartolo di Sciara G., Fouad M. 2011. Monk seal sightings in Egypt. *The Monachus Guardian*, online edition. 29 April 2011.

Panou A. 2009. Monk seal sightings in the central Ionian Sea: a network of fishermen for the protection of the marine resources. Archipelagos – Environment and Development, Greece. Presentation at the "Who are our seals?" Workshop, European Cetacean Society Annual Conference, Istanbul, Turkey, 28 February, 2009. 6 p.

Panou A., Varda D., Bundone L. 2017. The Mediterranean monk seal, *Monachus monachus*, in Montenegro. In V. Pešić (Ed.), *The Proceedings of the 7th International Symposium of Ecologists—ISEM7*, Sutomore, Montenegro, 4-7 October 2017 (pp. 94–101). Podgorica, Montenegro: Institute for Biodiversity and Ecology.

Panou A, Giannoulaki M, Varda D, Lazaj L, Pojana G, Bundone L. 2023. Towards a strategy for the recovering of the Mediterranean monk seal in the Adriatic-Ionian Basin. *Frontiers in Marine Science* DOI 10.3389/fmars.2023.1034124

RAC/SPA 2012. http://www.rac-spa.org/monk_seal_death

Roditi-Elasar, M., Bundone, L., Goffman, O., Scheinin, A.P. & Kerem, D.H. (2021). Mediterranean monk seal (*Monachus monachus*) sightings in Israel 2009–2020: Extralimital records or signs of population expansion? *Marine Mammal Science*, 37(1), 344–351. DOI: 10.1111/mms.12734

Scheinin A.P., Goffman O., Elasar M., Perelberg A., Kerem D.H. 2011. Mediterranean monk seal (*Monachus monachus*) resighted along the Israeli coastline after more than half a century. *Aquatic Mammals* 37(3):241-242. DOI 10.1578/AM.37.3.2011.241

SPA/RAC-UNEP/MAP, 2020. On the occurrence of the Mediterranean monk seal *Monachus monachus* (Hermann, 1779) in the Lebanese waters (Eastern Mediterranean Sea). By Badreddine, A., Limam, A., & Ben-Nakhla, L. Ed. SPA/RAC. Tunis: pages 12.

UNEP-MAP-RAC/SPA. 1994. Present status and trend of the Mediterranean monk seal (*Monachus monachus*) populations. Meeting of experts on the evaluation of the implementation of the Action Plan for the management of the Mediterranean monk seal, Rabat, Morocco, 7-9 October 1994.

UNEP(OCA)/MED WG. 87/3. 44 p.

UNEP-MAP-RAC/SPA. 2003a. Action Plan for the management of the Mediterranean monk seal (*Monachus monachus*). Reprinted, RAC/SPA, Tunis. 12 p.

UNEP-MAP-RAC/SPA. 2003b. The conservation of the Mediterranean monk seal: proposal of priority activities to be carried out in the Mediterranean Sea. Sixth Meeting of National Focal Points for SPAs, Marseilles, 17-20 June 2003. UNEP(DEC)/MED WG.232/Inf 6. 45 p.

UNEP-MAP-RAC/SPA. 2005. Rapid assessment survey of important marine turtle and monk seal habitats in the coastal area of Albania, October – November 2005, By M. White, I., Haxhiu, V. Kouroutos, A., Gace, A., Vaso, S. Beqiraj, A. Plytas and Z. Dedej. 36 p. UNEP-MAP-RAC/SPA. 2006. Propositions d'actions concrètes pour la mise en oeuvre d'un plan de conservation et de gestion pour le phoque moine sur le littoral ouest algérien. Par Z. Boutiba. 42 p.

UNEP-MAP-RAC/SPA, 2011. National action plan for the conservation of the Mediterranean monk seal in Cyprus. by Demetropoulos A. Contract RAC/SPA: N°20/RAC/SPA_2011. 24 p

UNEP-MAP-RAC/SPA, 2012. Action Plan for the conservation/management of the Monk seal in low density areas of the Mediterranean. by Gazo M., Mo G. Contract RAC/SPA, MoU n. 34/RAC/SPA_2011. 29 p.

UNEP-MAP-RAC/SPA 2013. Draft regional strategy for the conservation of the monk seals in the Mediterranean, 2014--2020. By G. Notarbartolo di Sciara. Contract RAC/SPA N° 33. 37 p.

Annex IV

Updated Action Plan for the conservation of the Coralligenous and Other Calcareous Bio-concretions in the Mediterranean Sea

Acronyms list

CA	: Coralligenous Assemblages
CI	: Common Indicator (from IMAP)
CITES	: Convention on International Trade of Endangered Animal and Plant Species
COP	: Conference of the Parties
CP	: Contracting Party (Barcelona Convention)
EcAp	: Ecosystem Approach under the Barcelona Convention
EC	: European Commission
EEC	: European Economic Community
EMODnet	: European Marine Observation and Data Network
EO	: Ecological Objective
EU	: European Union
EUNIS	: European Nature Information System
FAO	: Food and Agriculture Organisation of the United Nations
FRA	: Fisheries Restricted Area
GES	: Good Environmental Status
GFCM	: General Fisheries Commission for the Mediterranean
IG	: Intergovernmental meetings/documents/decisions
IMAP	: Integrated Monitoring and Assessment Programme
IUCN	: International Union for Conservation of Nature
MAP or PAM	: Mediterranean Action Plan
MBES	: Multi-Beam Echo Sounder
MHW	: marine heat wave
MPA	: Marine Protected Area
MSFD	: Marine Strategy Framework Directive
NGO	: Non-Governmental Organisation
NFP	: National Focal Point
OFB	: Office Français de la Biodiversité
POST-2020	: Post 2020 Strategic Action Programme for the Conservation of Biodiversity and sustainable management of natural resources in the Mediterranean Sea
SAPBIO	
ROV	: Remotely Operated Vehicle
RMB	: Rhodolith and Maerl Bed
SfM	: Structure from Motion
SPA/BD Protocol	: Protocol on Specially Protected Areas and Biological Diversity (Barcelona Convention)
SPAMI	: Specially Protected Areas of Mediterranean Interest

SPA/RAC or : Specially Protected Areas /Regional Activity Centre

RAC/SPA

SSS : Side Scan Sonar

UNEP or **PNUE** : United Nations Environment Programme

WG : Working Group meetings/documents

Table of contents

1.	<u>BACKGROUND</u>	1
2.	<u>HABITAT TYPES CONCERNED BY THE ACTION PLAN</u>	2
3.	<u>STATE OF THE ART</u>	3
3.1.	<u>Scientific knowledge</u>	3
3.1.1.	<u>Geographic and bathymetric distribution</u>	3
3.1.2.	<u>Composition and structure</u>	7
3.1.3.	<u>Population dynamics of typical/key species</u>	7
3.2.	<u>Legislation, regulation and conservation</u>	8
3.3.	<u>Main threats</u>	12
3.4.	<u>Assessment and monitoring</u>	13
4.	<u>NEEDS, GAPS AND CHALLENGES</u>	15
4.1.	<u>Scientific knowledge on spatial distribution</u>	15
4.2.	<u>Composition and structure</u>	15
4.3.	<u>Conservation issues</u>	15
4.4.	<u>Action Plan connexions with other policies and management tools</u>	16
4.5.	<u>Cooperation at sub-regional scale</u>	16
4.6.	<u>Challenges</u>	16
5.	<u>VISION, GOALS, OBJECTIVES, PRIORTIES and ACTIONS TIMETABLE</u>	17
5.1.	<u>Proposed long-term Vision (2050)</u>	17
5.2.	<u>Proposed strategic Goals (to 2030)</u>	17
5.3.	<u>Proposed objectives</u>	17
5.4.	<u>Priorities</u>	18
5.5.	<u>Proposed Actions for 2025-2030</u>	19
6.	<u>ACTION PLAN PARTNERS</u>	20
7.	<u>QUESTIONNAIRE</u>	20
8.	<u>REFERENCES</u>	24

BACKGROUND

1. The Contracting Parties to the Barcelona Convention, within the framework of the Mediterranean Action Plan, give priority to the conservation of the marine environment and to the components of its biological diversity. This was confirmed by the adoption of the new 1995 Barcelona Convention Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean ([SPA/BD Protocol](#)) and of its Annexes, among them a list of endangered or threatened species.
2. The development and implementation of action plans for the conservation of a species or group of species is an effective way of guiding, coordinating and reinforcing the efforts of Mediterranean countries to protect the natural heritage of the region.
3. Although not legally binding, these action plans have been adopted by the Contracting Parties as regional strategies setting out priorities and actions to be undertaken. In particular, they call for greater solidarity between the States of the region, and for coordination of efforts to protect the species concerned. This approach has been proved to be necessary to ensure the conservation and sustainable management of the species and habitats concerned in each Mediterranean area of their distribution.
4. These Action Plans are medium-term regional strategies that should be updated every five-year on the basis of an evaluation of their implementation at regional and national level.
5. The 2008 Ordinary Meeting of the Contracting Parties in Almeria (Spain) adopted the Action Plan for the Conservation of Coralligenous and other Calcareous Bio-concretions in the Mediterranean Sea (Decision IG17/15-2008), which resulted from the work programme drawn up at the ad hoc meeting held in Tabarka (Tunisia) on May 6th and 7th, 2006. The last update of the Action Plan dates back to 2016 (Decision IG.22/12-2016).
6. For the 2024-2025 biennium, the Contracting Parties to the Barcelona Convention requested SPA/RAC, during COP 23 (Portorož, Slovenia, 5-8 December 2023), to update (i) the Action Plan for the Conservation of the Coralligenous and Other Calcareous Bio-concretions in the Mediterranean Sea, (ii) the Action Plan for the Conservation of Mediterranean Marine Turtles, (iii) the Action Plan for the Conservation of Cartilaginous Fishes (Chondrichthyans) in the Mediterranean Sea, and (iv) the Regional Strategy for the Conservation of Monk Seal in the Mediterranean Sea, for consideration at COP 24.

HABITAT TYPES CONCERNED BY THE ACTION PLAN

7. The Action Plan is devoted to coralligenous assemblages and rhodolith/maerl³⁷ beds as defined here after:

- **Coralligenous:** a typical Mediterranean underwater seascape comprising coralline algal frameworks that grow in dim light conditions and relatively calm waters.
- **Mediterranean rhodolith/maerl beds:** sedimentary bottoms covered by free-living calcareous algae growing in dim light.

8. Therefore, surface bio-concretions are not covered here, as they are already included in the Action Plan for the Conservation of Marine Vegetation in the Mediterranean Sea.

9. Coralligenous and other calcareous bio-concretions are biogenic constructions of calcareous algae, as well as erect invertebrates, complexing the assemblage, providing multiple micro-habitats for many species and harbouring high biological diversity (UNEP/MAP-SPA/RAC, 2015a).

10. Coralligenous and other calcareous bio-concretions develop on vertical cliffs, rocky reefs, and biodetritic horizontal or subhorizontal bottoms (Basso *et al.*, 2016a; Ingrosso *et al.*, 2018; Romagnoli *et al.*, 2021; UNEP/MAP – SPA/RAC, 2021b; Angiolillo *et al.*, 2022; Innangi *et al.*, 2024). They can be found all around the Mediterranean Sea.

11. Coralligenous assemblages (CAs) show high spatial, morphological, and biological variability (Basso *et al.*, 2022) and due to great environmental variability, several different assemblages can coexist in a reduced space. They are considered among the most important assemblages of the Mediterranean (Ingrosso *et al.*, 2018) with slow growth, developing on both vertical and horizontal substrates (Basso *et al.*, 2022). Several species forming the CAs are endemic of the Mediterranean (Ferrigno *et al.*, 2023). Further, CAs provide habitat and food for many species and represent some of the most productive assemblages (Constantini *et al.*, 2018).

12. Rhodolith and/or maerl beds (RMBs) develop on horizontal or sub-horizontal surfaces, with water motion (either currents or waves) keeping the rhodoliths unburied and are generally composed of several coralline species (Basso *et al.*, 2016a).

13. The classification units concerned by the Action Plan are as follows:

In the revised Barcelona Convention classification system (Montefalcone *et al.*, 2021):

- Coralligenous assemblages. Infralittoral : **MB1.55** Coralligenous (enclave of circalittoral). Circalittoral: **MC1.5** Circalittoral rock/**MC1.51** Coralligenous cliffs, **MC1.52** Continental shelf /**MC1.52a** Coralligenous outcrops/**MC1.52b** Coralligenous outcrops covered by sediment, **MC2.5** Circalittoral biogenic habitat/**MC2.51** Coralligenous platforms.
- Rhodolith/maerl beds. Infralittoral: **MB3.51** Infralittoral coarse sediment mixed by waves/**MB3.511** Association with maerl or rhodoliths, **MB3.52** Infralittoral coarse sediment under the influence of bottom currents/**MB3.521** Association with maerl or rhodoliths. Circalittoral: **MC3.5** Circalittoral coarse sediment/**MC3.52** Coastal detritic bottoms with rhodoliths/**MC3.521** Association with maerl.

In the revised EUNIS classification system:

- Coralligenous assemblages. Infralittoral: **MB151a** Facies and association of coralligenous biocenosis (in enclave). Circalittoral: **MC151** Coralligenous biocenosis, **MC251** Coralligenous platforms, **MC252** Mediterranean circalittoral biogenic habitat.

³⁷ As written in Collin's Dictionary but can often be found spelled *maërl*. In this document the orthograph *maerl* is used except for references where it is spelled *maërl*.

³⁸ "Maerl beds" are included in the larger term of "rhodolith beds", but there is still debate on the exact definitions of rhodolith and maerl beds which should not be considered as synonyms. It was therefore decided to refer to this habitat as rhodolith/maerl beds (RMBs).

- Rhodolith/maerl beds. Infralittoral: **MB3511** Association with rhodoliths in coarse sands and fine gravels mixed by waves. Circalittoral: **MC351** - Association with rhodoliths on coastal detritic bottoms, **MC352** - Assemblages of Mediterranean coastal detritic bottoms biocenosis with rhodoliths, **MC3523** - Association with maerl (*Lithothamnion corallioides* and *Phymatholithon calcareum*) on coastal dendritic bottoms.

STATE OF THE ART

14. Annual publications on coralligenous assemblages and rhodolith/maerl beds have increased significantly since 2015, especially from north-western Mediterranean countries but not only (Ferrigno *et al.*, 2023). These publications are related to spatial and bathymetric distribution, composition and structure, environmental status assessments, ecosystem conservation and management, and anthropogenic impacts.

15. There are about four times as many documents on Coralligenous Assemblages (CAs) as on Rhodolith and Maerl Beds (RMBs).

Scientific knowledge

Geographic and bathymetric distribution

16. Coralligenous and other calcareous bio-concretions develop on vertical cliffs, rocky reefs, and biodetritic horizontal or sub-horizontal bottoms from 10 to 180 meters (Basso *et al.*, 2016a; Ingrosso *et al.*, 2018; Romagnoli *et al.*, 2021; UNEP/MAP – SPA/RAC, 2021b; Radicioli *et al.*, 2022; Innangi *et al.*, 2024), but occur most frequently between 50 and 150 m depth. Depth ranges of coralligenous on sub-horizontal to horizontal bottoms for different areas can be found in the document RAC/SPA (2003).

17. Light is an important factor controlling the vertical distribution of coralligenous assemblages as their main builders are macroalgae, which require sufficient light to grow, but low levels of irradiance (Pérès & Picard, 1964 and Laubier 1966 in RAC/SPA, 2003). In areas of high turbidity, coralligenous assemblages can thrive in shallow waters, whereas in areas of high-water transparency, these assemblages are typically found at greater depths (RAC/SPA, 2003 and reference therein).

18. Other variables, such as nutrient availability, hydrodynamics, temperature and salinity, also play an important role in the geographic and bathymetric distribution of coralligenous assemblages.

19. An attempt to collate recent available data at Mediterranean scale is presented in the following table:

Table 2 Available recent data relative to geographic distribution of coralligenous assemblages and rhodolith/maerl beds by country

Country/Region	Area/Specificities	Coralligenous	Rhodolith/maerl beds
Mediterranean Sea (maps)	Mediterranean Sea (maps)	- Martin <i>et al.</i> (2014)	- Martin <i>et al.</i> (2014) - Basso <i>et al.</i> (2016a)
	Habitat forming invertebrates of Coralligenous Assemblages	- CorMedNet website - Linares <i>et al.</i> (2020) - Linares <i>et al.</i> (2022)	
	NE Mediterranean Coralligenous formation with <i>E. cavolini</i>	- Sini <i>et al.</i> (2019)	
	Modelled spatial distribution	- EMODnet (2021) see here	- EMODnet (2021) see here
Albania	National Marine Park of Karaburun-Sazan	- Giménez <i>et al.</i> (2022a) - Andromede Oceanology (2016)	
Algeria	Taza MPA	- Belbacha, Semroud, & Ramos-Esplá (2011)	
	Rachgoun island	- PNUE/PAM-CAR/ASP (2016)	
	Plane (Paloma) island in Oran Bay and Habibas islands	- Hussein & Bensahla-Talet (2019) - UNEP/MAP-SPA/RAC (2020b)	
Croatia	National	- A preliminary map is available in RAC/SPA-UNEP/MAP (2014) - Updated map that gives more precise distribution is publicly available in Croatian: https://bioportal.hr/gis/ . (project “Mapping of coastal and seabed habitats in the Adriatic Sea under the national jurisdiction” (2018-2023))	- Updated map that gives more precise distribution is publicly available in Croatian: https://bioportal.hr/gis/ . (project “Mapping of coastal and seabed habitats in the Adriatic Sea under the national jurisdiction” (2018-2023))
	<i>E. cavolini</i> , <i>E. singularis</i> , <i>P. clavata</i> (compilation 2019)	- Ponti <i>et al.</i> (2019)	
Cyprus	Cyprus UK Overseas Territories Mesophotic zone (50-200m)	- Programme : Cyprus UK Overseas Territories Mesophotic zone (50-200m) exploring (2024-2025) see here	- Programme : Cyprus UK Overseas Territories Mesophotic zone (50-200m) exploring (2024-2025) see here
France	French Mediterranean	- A map of coralligenous assemblages in the French Mediterranean is available on the OFB site here	- Inventory of available data on maerl beds in French Mediterranean is available on the OFB site : here

Country/Region	Area/Specificities	Coralligenous	Rhodolith/maerl beds
		- The network of coralligenous sites and monitored sites RECOR maps their state of conservation here	
Greece	All Aegean Sea	- Sini <i>et al.</i> (2017) - Governmental site on selected species and habitats geographic distribution (maps)	- Sini <i>et al.</i> (2017) - Governmental site on selected species and habitats geographic distribution (maps)
Italy	National	- Ingrosso <i>et al.</i> (2018)	- Ingrassia et al. (2023)
	Coralligenous key species all around Italy, litter distribution on coralligenous outcrops	- Ponti et al. (2019) - Angiolillo <i>et al.</i> (2023)	
	South-eastern area of Lampedusa		- Maggio <i>et al.</i> (2022)
Lebanon	Sayniq area St George area	- Aguilar <i>et al.</i> (2018)	- Aguilar <i>et al.</i> (2018)
	Batroun Medfoun Byblos	- SPA/RAC-UN Environment/MAP (2017)	- SPA/RAC-UN Environment/MAP (2017)
Malta	North East Malta rhodolith/maerl beds interpolation		- ERA data viewer here - Deidun <i>et al.</i> (2022)
	South East Malta rhodolith accumulations		- LIFE BAHAR for N2K viewer - Tabone et al. (2024)
Monaco	Roches profondes du plateau	- Fourt et al. (2015)	
Montenegro	All Montenegro coast	- Petović & Mačić (2021) - UNEP/MAP-PAP/RAC i MEPU (2021) - UNEP/MAP-PAP/RAC-SPA/RAC and MSDT (2019).	- No rhodolith/maerl beds
Morocco	El Hoceima National Park	- UNEP/MAP-SPA/RAC (2020a)	- UNEP/MAP-SPA/RAC (2020a)
	Jbel Moussa MPA	- SPA/RAC - ONU Environnement/PAM & HCEFLCD (2019)	- SPA/RAC - ONU Environnement/PAM & HCEFLCD (2019)
Spain	Key species: <i>Paramuricea clavata</i> <i>Eunicella cavolini</i>	- Ponti et al. (2019)	
	Balearic Islands (map)	- Barrientos et al. (2022a)	- Barrientos et al. (2022b)

Country/Region	Area/Specificities	Coralligenous	Rhodolith/maerl beds
			- Additional information on Formentera and Ibiza islands can be found in the original study (Domínguez <i>et al.</i>, 2014)
	Minorca Channel (Balearic Islands)	- Barberá <i>et al.</i> (2012)	- Farriols <i>et al.</i> (2024) - Barberá <i>et al.</i> (2012)
	Costa Brava	- See poster here	
	Southeastern Iberian Peninsula (map)		- REGINA-MSP Project in Murcia Region has mapped RMBs in some areas and potential overlapping with aquiculture activities
	Seamounts of the Mallorca Channel (Balearic Islands)		The presence of RMBs has been documented by Marín <i>et al.</i> (2011) and by Massutí <i>et al.</i> (2022). A preliminary spatial distribution model has been developed by Frank <i>et al.</i> (2024), with further analyses currently in preparation.
Tunisia	Tunisian coast (table)	- Mustapha <i>et al.</i> (2002)	- Ghanem <i>et al.</i> (2022)
	Cap Negro-Cap Serrat	- Torchia <i>et al.</i> (2016)	- Torchia <i>et al.</i> (2016)
Türkiye	Aegean Sea Levantine Sea	- Çinar <i>et al.</i> (2020)	
	Foça Special Environmental Protection Area	- UNEP/MAP-SPA/RAC (2020c)	
	Marmara Sea	- IUCN Red list of habitats (A4.26) (see Gubbay <i>et al.</i> , 2016)	

Composition and structure

20. The primary builders of coralligenous assemblages are encrusting red algae (Bracchi *et al.*, 2022), on which other species may develop, forming secondary and tertiary layers and creating a three-dimensional structure. Various environmental factors shape the composition and structure of both coralligenous and rhodolith/maerl assemblages (Piazzi *et al.*, 2021; Basso *et al.*, 2022). These variables also influence the geographic and bathymetric distribution of these assemblages.

21. Using an ecosystem-based approach, the associated mobile fauna can also be considered as being part of the composition of these assemblages. Such approaches are increasingly being developed. However, characterising the composition and structure of coralligenous and rhodolith/maerl assemblages is challenging due to the difficulty of accessing and assessing them, which are often deeper than 20-30 m, and due to the lack of taxonomic expertise.

22. According to the latest assessment of the implementation of the Action Plan (document under review), only five Member States have characterised coralligenous assemblages at the national scale, while six others are in the process of doing so. However, the characterisation of the composition and structure of coralligenous assemblages and rhodolith/maerl beds at national or sub-regional scales is essential to assess their vulnerability to anthropogenic pressures and the impacts of climate change.

23. Several documents are available to assist in defining the composition and structure of coralligenous and rhodolith/maerl assemblages:

- [RAC/SPA. 2003. The coralligenous in the Mediterranean Sea. Definition of the coralligenous assemblage in the Mediterranean, its main builders, its richness and key role in benthic ecology as well as its threats. By Ballesteros E. RAC/SPA, Tunis.](#)
- Ballesteros, E. 2006. Mediterranean coralligenous assemblages: A synthesis of present knowledge. *Oceanography and Marine Biology*, 44: 123–195.
- [UNEP-MAP RAC/SPA. 2015. Standard methods for inventorying and monitoring coralligenous and rhodoliths assemblages.](#)
- SPA/RAC-UNEP/MAP, 2021. Mediterranean coralligenous assemblages: a synthesis of present knowledge. By E. Ballesteros. Ed. SPA/RAC, Tunis: 149 pp.
- [SPA/RAC-UN Environment/MAP. 2019. Updated Classification of Benthic Marine Habitat Types for the Mediterranean Region.](#)
- [UNEP/MAP. 2021. Interpretation manual of the reference list of marine habitat types in the Mediterranean Sea.](#)

Population dynamics of typical/key species

24. The typical/key species of coralligenous assemblages, such as calcareous algae, gorgonians, sponges or bryozoans, are generally long-lived species with low growth, natural mortality, and recruitment rates. For these sessile species, dispersal generally occurs at the larval stage.

25. The key species of the most studied coralligenous assemblages in terms of population structure and dynamics are conspicuous anthozoans such as *Paramuricea clavata*, *Eunicella cavolini* and *Eunicella singularis*.

26. Palma *et al.* (2018) describe and test a Structure from Motion (SfM) based method for the estimation of gorgonian population structure (e.g. height, density, fan surface etc.). Although this method seemed more accurate for medium to low population densities than for dense populations, it may contribute to a more efficient assessment of the dynamics of large three-dimensional coralligenous species.

27. The dispersal potential of anthozoans had already been studied in the past (e.g. Linares, 2006; Linares *et al.*, 2007), and several recent studies contribute to further understand the dynamics of these key structuring species (e.g. Pilczynska *et al.*, 2016 for *Paramuricea clavata* in Italy; Padrón *et al.*, 2018 for *Eunicella singularis* in the Gulf of Lions; Sciascia *et al.*, 2022 for *P. clavata*).

28. Although larval dispersal of sessile benthic species depends on many variables (e.g. environmental factors such as currents or larval characteristics such as pelagic larval duration etc.), modelling of larval dispersal and gene flow studies to better capture connectivity processes between populations under climate change context could be efficient in designing a network of protected areas capable of maintaining connectivity between populations (see Padrón *et al.*, 2018b; Sciascia *et al.*, 2021). An interesting study by Blouet (2023) highlights the role of artificial reefs in enhancing connectivity between populations of structuring anthozoans, compensating for the absence or degradation of natural hard substrates.

29. Straight forward guidelines for larval dispersal simulations have been drawn by Sciascia *et al.* (2021), which could be useful for studies and simulations in other areas. However, connectivity predictions for gorgonian species require specific precautions (Sciascia *et al.*, 2022).

30. Pilczynska *et al.* (2016) studied the genetic diversity and connectivity of *P. clavata* in Italy. Their findings showed that larval exchange between sites supported the hypothesis that deeper subpopulations unaffected by marine heat waves (MHWs) could provide larvae for shallower populations and allow recovery after mortality events. However, more recent scientific publications on this topic are less optimistic.

31. Key species of Rhodolith and Maerl Beds have been less studied, especially concerning population dynamics. Research remains mainly focused on species inventories, such as calcareous red algae in Southern Spain (see Del Río *et al.*, 2022), sponge species in RMBs in Ustica, Italy (see Longo *et al.*, 2020). Research must be encouraged to better understand the dynamics and functioning of RMBs.

Legislation, regulation and conservation

32. Listing the legal texts, regulations, and strategic action plans concerning Mediterranean coralligenous assemblages and rhodolith/maerl beds (Table 3) highlights the lack of conservation and protection measures for these assemblages.

Table 3 Legislation and regulations relevant to coralligenous and other calcareous bio-concretions' protection in the Mediterranean Sea.

International	Bern Convention on the conservation of European wildlife and natural habitats Council decision (98/746/EC) of 21 December 1998 amended Appendices II and III (Protected fauna species) to the Berne Convention on the conservation of European wildlife and natural habitats, and added the following species to Appendix III. The underlined species may be found in coralligenous assemblages: <u>Hippospongia communis</u>, <u>Spongia agaricina</u> (now <u>S. lamella</u>), <u>Spongia officinalis</u>, <u>Spongia zimocca</u>, Antipathes sp. plur., <u>Corallium rubrum</u>, <u>Paracentrotus lividus</u>, <u>Homarus gammarus</u>, <u>Maja squinado</u>, <u>Palinurus elephas</u>, <u>Scyllarides latus</u>, <u>Scyllarides pigmaeus</u>, <u>Scyllarus arctus</u>, <u>Epinephelus marginatus</u>, <u>Isurus oxyrinchus</u>, <u>Lamna nasus</u>, <u>Mobula mobular</u>, <u>Prionace glauca</u>, <u>Raja alba</u>, <u>Sciaena umbra</u>, <u>Squatina squatina</u>, and <u>Umbrina cirrosa</u> (all 22 species in the Mediterranean). Article 7 specifies that “Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna species specified in Appendix III.”
	Convention on International Trade of Endangered animal and plant Species (CITES) Very few species from coralligenous and maerl assemblages are listed under this convention: Scleractinia spp. (e.g. <i>Leptopsammia pruvoti</i>, <i>Caryophyllia</i> spp., <i>Hoplongia durotrix</i>) and Antipatharia spp. (which includes <i>Antipathella subpinnata</i> and to a lesser degree <i>Antipathes dichotoma</i>) which may be found in coralligenous or maerl assemblages) are listed in Appendix II (Species that are not necessarily threatened with extinction, but trade must be controlled in order to avoid utilisation incompatible with their survival). Whereas other <i>Corallium</i> species are listed, the Mediterranean <i>Corallium rubrum</i> is not listed.
European countries	Habitat Directive (Council Directive 92/43/EEC, 1992) and Natura 2000 network The Habitat Directive does not specifically address the coralligenous and other calcareous bio-concretions. However, pursuant to the Directive (Art. 2.2), member states must “<i>maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest</i>” listed in Annexes I and II of the Directive. Member States must designate, protect and manage core areas for habitat types listed in Annex I and species listed in Annex II of the Habitats Directive. Only <i>Corallium rubrum</i> which sometimes can be found in coralligenous habitats, is listed in Annex II. Annex I: <i>Natural habitat types of community interest whose conservation requires the designation of special areas of Conservation</i> includes the habitat 1170 “Reefs” which comprises coralligenous concretions as a sub-type, as long as they arise from the seafloor (topographically distinct from surrounding seafloor). Rhodolith/maerl beds are included in habitat 1100 “Sandbank” as long as depths do not exceed 20m depth (see the Interpretation manual of European Union Habitats listed under Annex I of the Habitats Directive). Therefore, the large majority of the Mediterranean rhodolith/maerl beds are not included in Annex I and specific protection of sub-types not being an obligation, coralligenous assemblages are not necessarily protected under this Directive. Discussions have been going on to include rhodolith/maerl beds as protected habitats under Annex I of the Habitat Directive (Aguilar <i>et al.</i>, 2018), without having yet succeeded. Annex V <i>Animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures</i> includes two corallinaceae <i>Lithothamnium coralloides</i> Crouan frat. and <i>Phymatholithon calcareum</i> (Poll.) Adey & McKibbin which are main coralligenous species but not exploited in the Mediterranean therefore not needing exploitation management. EU Marine Strategy Framework Directive (MSFD)

	EU countries assess and monitor coralligenous and rhodolith/maerl beds for the MSFD under D6 and to a lesser degree D1 and D10 (Italy). Good Environmental Status (GES) is to be attained or maintained.
	EU Biodiversity strategy for 2023 and Nature Restoration Law entered in force in August 2024
	Restoration measures are requested to be put in place: • By 2030, on at least 30% of the total area of seven groups of habitats including “maerl beds” and “sponge, coral and coralligenous beds” that is not in good condition • By 2040, on at least 60% and, by 2050 on at least 90%
	EU Council Regulation (EC) N° 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94
	Under this regulation, Article 4.2 stipulates “ <i>Fishing with trawl nets, dredges, shore seines or similar nets above coralligenous habitats and maerl beds shall be prohibited</i> ”. Further in part 4.4 “ <i>The prohibition shall (...) apply to all Natura 2000 sites, all special protected areas and all specially protected areas of Mediterranean interest (SPAMI) which have been designated for the purpose of the conservation of these habitats under either Directive 92/43/EEC or Decision 1999/800/EC</i> ”.
	Regulation (EU) 2023/2124 of the European Parliament and of the council of 4/10/2023 on certain provisions for fishing in the General Fisheries Commission for the Mediterranean (GFCM) Agreement area
	Regulates the red coral (<i>Corallium rubrum</i>) harvesting in terms of depths, minimum size, gear to be used, landing points, data collection etc. Article 38 prohibits red coral retention on board, transshipment or landing of red coral for recreational fisheries. Article 39 requests national management plans for red coral that transpose this regulation.
Mediterranean Sea countries	Agreement for the Establishment of the General Fisheries Commission for the Mediterranean (GFCM)
	Article 8 b) iv) of the Agreement stipulates that the Commission can recommend “ <i>to establish fisheries restricted areas for the protection of vulnerable marine ecosystems, including but not limited to nursery and spawning areas</i> ”. Several Fisheries Restricted Areas (FRAs) have been designated since to protect Vulnerable Marine Ecosystems.
	GFCM REC.CM-GFCM/46/2023/13 on the management plan for the sustainable exploitation of red coral in the Mediterranean Sea, amending Recommendation GFCM/45/2022/2 and GFCM/43/2019/4
	Management plan on the commercial exploitation of <i>Corallium rubrum</i> (red coral).
	IUCN Red list (see Otero <i>et al.</i> , 2017).
	<i>Corallium rubrum</i> is listed as Endangered and <i>Paramuricea clavata</i> is listed as Vulnerable.
Barcelona Convention	Integrated Monitoring and Assessment Programme (IMAP) (Decision IG.22/7)
	Member states are requested to assess and monitor specifically three habitats including coralligenous and rhodolith/maerl beds within IMAP under EO1/EO6. Good Environmental Status (GES) of these habitats is to be attained and/or maintained.
	SPA/BD Protocol of the Barcelona convention
	- Specially Protected Areas of Mediterranean Importance (SPAMI's List) (see criteria) - <i>Corallium rubrum</i> is listed in annex III, <i>list of species whose exploitation is regulated</i> . - <i>Axinella polypoides</i> which can be found in coralligenous assemblages is list in Annex II <i>list of endangered or threatened species</i> .
	Post-2020 SAPBIO

	The updated regional action plans for the selected priority habitats and species are expected to be adopted and passed on to national planning and implementation processes in most Mediterranean countries by 2027 (Action 1 of Post-2020 SAPBIO Actions table, UNEP/MAP-SPA/RAC, 2021a see Annex III) and decline of coralligenous habitats is expected to be halted by 2030. Regional Action Plan for the conservation of coralligenous and other calcareous bio-concretions in the Mediterranean Sea (Decision IG.22/12) The following recommendations had been made regarding legislation and regulations: • Coralligenous/maerl assemblages should be granted legal protection at the same level as <i>Posidonia oceanica</i> meadows. • Coralligenous concretions and maerl beds should be priority habitat type in the EU Habitat Directive (92/43/EU) which would enhance the number of Natura 2000 sites including these habitats. • It is necessary to further protect representative coralligenous/maerl assemblages by applying the protection and management measures recommended by Articles 6 and 7 of the SPA/BD Protocol.
--	--

33. It is of high importance and priority to acquire spatial data on coralligenous assemblages and rhodolith/maerl beds at national level in order to:

- apply fishing restrictions of the [EU Council Regulation \(EC\) N° 1967/2006](#) in European Barcelona Convention Member States which prohibits fishing with trawl nets, dredges, shore seines or similar nets above coralligenous habitats and maerl beds,
- assess and monitor the state of these habitats for MSFD and IMAF,
- attain the objectives of the Restoration Law.

34. It is important to apply at national level the EU Council Regulation (EC) N° 1967/2006 relative to the prohibition of fishing with trawl nets, dredges, shore seines or similar nets over coralligenous habitats and maerl beds. Fournier *et al.* (2020) show that the intensity of bottom fishing was still high in 2019, with almost 3,700 hours over coralligenous beds and 2,280 hours occurring over maerl beds.

35. It has been suggested that the fishing restrictions of EU Council Regulation (EC) N° 1967/2006 relative to the prohibition of fishing with trawl nets, dredges, shore seines or similar nets above coralligenous habitats and maerl beds, should be applied throughout the Mediterranean (see e.g. Aguilard *et al.*, 2018 ; Fournier *et al.*, 2020) through the Barcelona Convention - SPA/BD Protocol tools.

36. The European Habitats Directive (Council Directive 92/43/EEC, 1992) does not include Mediterranean rhodolith/maerl beds in Annex I (Natural habitat types of community interest whose conservation requires the designation of special areas of Conservation) and indirectly includes coralligenous assemblages (under habitat 1170 "Reefs")

37. Coralligenous assemblages and rhodolith/maerl beds should benefit of increased protection, similar to conservation/protection measures for the *Posidonia oceanica* beds.

38. The conservation of coralligenous assemblages and rhodolith/maerl beds can be managed through geographically defined areas such as Marine Protected Areas (MPAs) which may ultimately be SPAMIs, but also as suggested by Enrichetti *et al.* (2019), through area-based fisheries management tools such as Fisheries Restricted Areas (FRAs). FRAs are defined as "a geographically defined area in which all or certain fishing activities are temporarily or permanently banned or restricted in order to improve the exploitation and conservation of harvested living aquatic resources or the protection of marine ecosystems in the GFCM area of application" (FAO-GFCM, 2008). Therefore, it appears that a request for an FRA can be justified by the existence of vulnerable coralligenous assemblages and/or

rhodolith/maerl beds that need to be protected from relevant fishing activities. This tool is of particular interest for international cooperative management.

Main threats

39. Coralligenous assemblages and rhodolith/maerl beds provide many ecosystem services to society. However, they are under high anthropogenic pressure.

40. The integrity of coralligenous assemblages can be affected by several anthropogenic threats such as:

- anchoring,
- sedimentation due to activities like aquaculture (Piazzi *et al.*, 2019),
- eutrophication/chemical pollution and litter (e.g. Giménez *et al.*, 2022b),
- abandoned fishing gear (e.g. Enrichetti *et al.* 2019; Ferrigno *et al.*, 2021; Angiolillo *et al.*, 2023),
- fishing activities (e.g. Ferrigno *et al.*, 2018),
- diving activities (Betti *et al.*, 2023),
- various climate change impacts (i.e. increase in sea temperature, acidification (Zunino *et al.*, 2019), Marine Heat Waves (MHW) (Garrahou *et al.*, 2022; Martínez *et al.*, 2023), instalment of Non-Indigenous Species (NIS), development of mucilaginous blooms (e.g. Piazzi *et al.*, 2018)), and
- cumulative effects (e.g. Bevilacqua *et al.*, 2018).

41. It is possible to assess the impact of each pressure using different metrics (see the stressor metrics listed by Di Camillo *et al.* (2023)) and this may be of interest. However, it is essential for MPAs and stakeholders to be able to easily assess the overall condition of coralligenous assemblages.

42. Several rapid methods have been developed to assess the state of conspicuous species, such as the Mortality Rapid Assessment Method proposed by Figuerola-Ferrando *et al.* (2024). This method, applicable to several marine habitat-forming species, was applied to *Paramuricea clavata* colonies. Although such methods only provide information on the status of a selected species population within CAs, they can serve as a first assessment for stakeholders to identify vulnerable coralligenous assemblages.

43. A cumulative pressure and impact assessment (CPIA) approach was applied to coralligenous outcrops in Italy (Bevilacqua *et al.*, 2018). This approach mapped the expected cumulative pressures and impacts on CAs in six categories, but research has shown that the CPIA model needs refinement.

44. Three-dimensional structuring species of coralligenous assemblages can be severely affected by derelict fishing gear, that becomes entangled in their structures, injuring colonies and causing partial or total necrosis (e.g. as shown in Italy see Ferrigno *et al.*, 2018; Angiolillo & Fortibuoni, 2020; Enrichetti *et al.*, 2019; Giménez *et al.*, 2022b; Angiolillo *et al.*, 2023). In other cases, trawling activities may indirectly impact red coral populations by increasing turbidity (Ferrigno *et al.*, 2020).

45. However, recent scientific publications have mainly focused on the effects of climate change, such as increasing Sea Surface Temperature (SST), but especially on the effects of Marine Heat Waves (MHWs) and associated Mass Mortality Events (MMEs). These sudden events result in large-scale mortality of key species and alter the underwater landscape, particularly of coralligenous assemblages.

46. The loss of structural coralligenous species can (i) trigger a reduction in the resilience of the entire assemblages, especially at shallow depths, (ii) simplify habitat complexity, and (iii) increase vulnerability to colonisation by invasive species (Gómez-Gras *et al.*, 2021; Verdura *et al.*, 2019). The role of Marine Protected Areas in this context is crucial and should focus on mitigating local

pressures, such as fishing and diving impacts (Zentner *et al.*, 2023), to reduce the vulnerability of these structural species.

47. Future scenarios of acidification impact on coralligenous and their ecosystem services have been modelled by Zunino *et al.* (2019), predicting significant changes in the near future.

48. Regarding the impact of MHWs and MMEs on coralligenous assemblages, it is important to work at sub-regional scale as highlighted by the studies of Crisci *et al.* (2017), Gómez-Gras *et al.* (2022), and Bramanti *et al.* (2023). However, agreement on definitions and common references as well as on how to determine threshold values and indices are essential at the Mediterranean scale to ensure comparability (see Hobday *et al.*, 2016; Amaya *et al.*, 2023; Martínez *et al.*, 2023). Hobday *et al.* (2016) proposed a quantitative definition of MHW³⁹ based on a 30-year baseline value, which facilitates comparisons between different datasets across regions and seasons. However, other authors, such as Amaya *et al.* (2023), and Martínez *et al.* (2023) consider that while this approach is informative and appropriate for certain analyses, it is also necessary to use shifting baselines or detrended data.

49. TMEDNet is an initiative to develop an observational network of climate change impacts on coastal marine ecosystems through the widespread adoption of standard monitoring protocols for seawater temperature and biological indicators over large areas and long periods of time. The site provides guidance on monitoring mortality, temperature, and climate on fish. Data can be uploaded once logged in and visualized in different ways. Such initiatives at Mediterranean scale should be supported at the Mediterranean scale and could contribute to the Coralligenous Conservation Action Plan through collaboration between UNEP/MAP-SPA/RAC and TMEDNet.

50. Rhodolith/Maerl Beds are particularly vulnerable to several pressures, particularly trawling. Although they show recovery capacities (Farriols *et al.*, 2021, 2024), their resilience appears to be limited. Several studies have focused on the impacts of benthic trawling on RMBs in the Mediterranean Sea (e.g. Barberá *et al.*, 2017; Farriols *et al.*, 2021). Fragkopoulou *et al.* (2021) provide a global study of rhodolith distribution and threats, highlighting the combined impacts of climate change and benthic trawling on the distribution of rhodolith beds. Aquaculture activities have also been identified as a potential threat for RMBs off southern Iberian Peninsula (Aguado-Giménez & Ruiz-Fernández, 2012).

Assessment and monitoring

51. CAs and RMBs are elements for MSFD GES criteria D6 (seafloor integrity) and are requested to be assessed under descriptor 6 criteria D6C3, D6C4 and D6C5. However, few EU countries have reported on the extent and other parameters for these habitats (see Tornero Alvarez *et al.*, 2023).

52. CAs and RMBs are requested to assess against IMAP EO1 Biodiversity CI1 (Habitat distribution range to include habitat extent as a relevant attribute) and CI2 (Condition of typical habitat's species and communities). However, very few CPs have reported on these indicators for CAs and RMBs.

53. Surveys to map CAs and other calcareous bioconstructions generally use a variety of remote sensing techniques based on acoustic means coupled with ground truthing by means of photographs, videos or samples. Images are often acquired using Remotely Operated Vehicles (ROVs) (e.g. Pierdomenico *et al.*, 2021). The integration of multibeam and side-scan sonar data with ROV observations allows the identification of coralligenous reefs based on geomorphological and acoustic components and the characterisation of the coralligenous assemblages. Such approaches are used for example in Italy (e.g. Pierdomenico *et al.*, 2021) for MSFD assessment.

³⁹ Hobday *et al.*, 2016 propose to define MHW with the use of the threshold of the 90th percentile based on a 30-year historical baseline period and that lasts at least five continuous days above the threshold.

54. The spatial distribution of coralligenous cliffs appears to be more difficult to determine because cliffs are more difficult to identify from acoustic data (see Piazzini *et al.*, 2023).

55. Side scan sonar (SSS) and multibeam echosounder (MBES) are the most frequently used techniques to detect coralligenous outcrops (see Dimas *et al.*, 2022). Together with ground truthing acoustic data are processed and interpreted and classified to produce habitat maps. The use of other acoustic data such as sub-bottom profilers (SBP) has also been reported as being successful (Dimas *et al.*, 2022). These authors propose a classification scheme that may be useful for other CA spatial distribution surveys.

56. Similar methods are used for the spatial and bathymetric delineation of RMBs (UNEP-MAP-RAC/SPA, 2015; Ingrassia *et al.*, 2019). A two-step approach for the definition, identification, delimitation, description and monitoring of RMBs is proposed by Basso *et al.* (2016b). Since then, it is recognized that the use of dredges for sampling RMBs should be discouraged. However, this sampling method can be necessary to characterize this habitat and hence to estimate condition (e.g. density of rhodoliths, species composition and biodiversity, rhodoliths size and shape) in the CI2 indicator.

57. The main methods used in the Mediterranean for inventory and monitoring coralligenous and maerl habitats have been developed in several documents:

- [RAC/SPA - MedMPAnet Project \(Ed.\) 2014. Monitoring Protocol for Reefs - Coralligenous Community. By Garrabou J, Kipson S, Kaleb S, Kruzic P, Jaklin A, Zuljevic A, Rajkovic Z, Rodic P, Jelic K, and Zupan D. Tunis. 35 pp.+Annexes pp.](#)
- UNEP/MAP-SPA/RAC. 2019. Monitoring Protocols for the Ecosystem Approach Common Indicators 1 and 2 related to marine benthic habitats. Guidelines for monitoring coralligenous and other calcareous bioconcretions ([UNEP/MED WG.474/3](#), p51-98). UNEP/MAP-SPA/RAC, Tunis.
- [UNEP/MAP-SPA/RAC. 2021c. Guidelines for the assessment of environmental impact on coralligenous and maerl assemblages. UNEP/MED WG.502/Inf.3. UNEP/MAP SPA/RAC, Tunis.](#)
- SNPA 2024, Methodology sheets used in the second cycle of MSFD monitoring programmes in Italian marine waters. In fact, Italy has adopted specific standards applied on a national scale for monitoring coralligenous and rhodoliths/maerl within the MSFD and functional to the EcAp process.
- Other practical guidelines with **standard protocols** are available on the [TMEDNet](#) website for monitoring temperature conditions, mass mortality events, fish visual fish census in relation to climate change, urchin population assessment, rapid assessment of benthic habitat, rapid assessment of *Posidonia oceanica* and *Pinna nobilis*, photogrammetry tool for monitoring benthic habitat structure and dynamics. These simple protocols are available in Garrabou *et al.* (2022).

58. Furthermore, in order to assess the ecological status of coralligenous assemblages and the anthropogenic impacts on them, more than 16 indexes have been defined for the Mediterranean Sea since 2009. Di Camillo *et al.* (2023) have published a comprehensive review and comparison of these indexes, with the aim of proposing a framework to support the development of a cost-effective and practical index to assess the status of CAs.

59. Few specific indices have been developed and published to assess the status of the RMBs in the Mediterranean Sea. However, an attempt to define an ecosystem-based assessment of the RMBs has been published by Astruch *et al.* (2023). Yet, the method proposed by these authors seems complex to be applied over large areas and at many sampling sites. Another potential problem is its use deeper than 80 m depth, with moderate currents.

60. Assessment and monitoring of coralligenous assemblages and rhodolith/maerl beds should be improved at national level and based on IMAP indicators, criteria and existing protocols.

NEEDS, GAPS AND CHALLENGES

Scientific knowledge on spatial distribution

61. Knowledge of the spatial distribution of the two habitats has progressed. However, no data were found on the spatial distribution of coralligenous assemblages and rhodolith/maerl beds for Bosnia & Herzegovina, Egypt, Israel, Libya, Slovenia, and Syria.

62. There may be no coralligenous assemblages in Israel as suggested by RAC/SPA (2003) and Laborel (1987) and in Bosnia and Herzegovina, but the absence of these assemblages should be clearly stated. It is important to know whether the habitats are present or not and to complete the information on spatial distribution at national level for countries without available data. The comparison between the table of available data and the EMODnet modelled spatial distribution of coralligenous suggests that further data collection is needed around Cyprus, along the western coast of the Peloponnese (Greece), in front of the Nile Delta (Egypt) and along the eastern coast of Libya. Efforts are also needed to collect existing spatial data in other countries (e.g. Spain, Türkiye).

63. Several studies show the presence of coralligenous and maerl beds along the Spanish coast, but no document or large-scale map that summarises the available data for Spain. In particular, mapping of RMBs is needed along the whole continental shelf of the Iberian Peninsula and especially in the Balearic Islands where these beds are widely distributed.

64. Several studies refer to the presence of coralligenous assemblages along the Turkish coast, but no synthetic document or map was found collating spatial data on coralligenous assemblages or rhodolith/maerl beds for Türkiye.

65. Where data are lacking at national level, efforts to collect data on the distribution of CA and RMB habitats should be intensified. Comparison of current knowledge of spatial distribution with modelled spatial distribution (e.g. EMODnet) to identify areas of interest for assessment. Information on the non-existence of these habitats is also important to improve spatial distribution models. Efforts could also be made to collate existing data at national level.

Composition and structure

66. Coralligenous and maerl assemblages are variable throughout the Mediterranean Sea. Knowledge of the composition and structure of coralligenous assemblages and rhodolith/maerl beds has increased mainly in the north-western Mediterranean and some knowledge has also been acquired through programmes in MPAs of the south-eastern Mediterranean. However, a synthetic view of the composition and structure of these habitats at a regional scale with sub-regional/national characteristics is still not possible. National factsheets based on the habitats and facies of the Classification of the Benthic Marine Habitat Types, containing information on their known spatial distribution, bathymetric distribution, further characterisation of the assemblages as well as specific threats and perhaps socio-economic values could greatly contribute to a regional view of these assemblages.

67. Knowledge acquisition on composition and structure of coralligenous and maerl assemblages is still necessary at national level together with an effort to collate available information at regional scale.

Conservation issues

68. Local anthropogenic threats to coralligenous assemblages and rhodolith/maerl beds are known and their impacts on these habitats relatively well identified. However, the long-term effects of climate

change and cumulative impacts on these habitats and their key species are less well understood. In particular, repeated Mass Mortality Events due to intense Marine Heat Waves, represent currently one of the main threats to these habitats in certain areas of the Mediterranean.

69. Taking into account the rather weak international protection of the Mediterranean coralligenous assemblages and rhodolith/maerl beds, the vulnerability of these habitats, the slow growth rate of their key species, the multiple threats to which they are exposed as well as their socio-economic importance, it should be considered a priority to implement effective conservation measures at national, sub-regional and regional levels scale. The absence of complete mapping of these habitats, of coherent assessment approach and of coordinated management in the region hinders considerably the conservation efforts.

70. Contracting Parties may integrate these habitats into Marine Protected Areas by extending MPAs to include nearby coralligenous habitats, establishing new MPAs or using of FRAs (Fisheries Restricted Areas) to provide adequate protection for these habitats. In addition, national plans should be developed and improved to help reduce anthropogenic impacts on the habitats and to increase scientific knowledge and awareness. The specific inclusion of these habitats in national Environmental Impact Assessments could also contribute to a better conservation of these habitats.

71. Protection of coralligenous assemblages and rhodolith/maerl beds needs to be increased at Mediterranean and national scale.

Action Plan connexions with other policies and management tools

72. The assessment and monitoring required to better understand the habitats for an effective conservation should be carried out at national level using IMAF indicators. Existing, recognised protocols should be adopted, preferably common at least within a sub-region. The establishment of sub-regional working groups could help to homogenise protocols used and set up intercalibration exercises.

73. The data produced should be reported through the IMAF Info system. CP Reporting for the Action Plan could include a summary document on evaluation and monitoring, which could also be useful for future MED QSRs.

74. Further links could be sought with the assessment and monitoring of other benthic habitats such as *Posidonia oceanica* meadows and marine caves.

Cooperation at sub-regional scale

75. The sub-regional scale is important for the population dynamics of key species in coralligenous assemblages and rhodolith/maerl beds and for establishing a network of representative sites. In addition, assessment and monitoring methods should be similar enough to compare the status of these habitats at the sub-regional scale.

76. The development of subregional working groups could contribute to further cooperation between States on this issue, initiate international research programmes and conservation actions, and increase the interoperability of assessments through the organisation of calibration workshops.

Challenges

77. Coralligenous assemblages and rhodolith/maerl beds thrive mainly at depths between 50 and 150 meters. Therefore, access to these habitats is difficult and costly, often requiring remote acoustic sensing techniques coupled with ground-truthing methods either by diving or ROV. In general, CPs lack the resources and means to carry out such assessments effectively.

78. As these habitats exhibit considerable spatial variability in their composition and structure, the definition of baseline values or Good Environmental State (GES) at the Mediterranean or even sub-regional scale is challenging.

79. Geographical assessment data are often difficult to consolidate due to the use of heterogeneous references, scales and data quality. In addition, monitoring data are extensive and require considerable classification, organisation and storage capacity at national level and even more so at regional level. IMAP data submission, processing and analysis capacities need to be strengthened to better support the scientific knowledge required by all Action Programmes, including those for the conservation of coralligenous and other calcareous bio-concretions.

80. The integrity of benthic habitats can be affected by various local anthropogenic impacts. However, in recent years, climate change has had a significant impact on the Mediterranean Sea through rising sea temperatures, increased frequency and intensity of Marine Heat Waves causing Mass Mortality events, increased acidification and increased intensity and frequency of extreme events including flooding, affecting marine habitats even at greater depths. For vulnerable benthic habitats, such as coralligenous assemblages and rhodolith/maerl beds, which are already subject to local anthropogenic pressures, the effects of climate change may be irreversible.

VISION, GOALS, OBJECTIVES, PRIORITIES AND ACTIONS TIMETABLE

81. Following the structure of the Post-2020 SAPBIO and taking into account the Ecosystem Approach (EcAp)⁴⁰, the following long-term vision, strategic goals, objectives, priorities and actions are proposed to be led by SPA/RAC and GFCM at regional/sub-regional scale and by Contracting Parties at national and sub-regional level. The proposed actions are, to the extent possible, specific, measurable, achievable, relevant and time-bound.

Proposed long-term Vision (2050)

82. By 2050, the distribution, diversity, composition, structure and functions of coralligenous and other calcareous bio-concretions are sufficiently maintained to ensure the long-term conservation of these assemblages where they occur naturally in the Mediterranean.

Proposed strategic Goals (to 2030)

- **Goal 1.** To acquire sufficient scientific knowledge of these assemblages (spatial and bathymetric distribution, composition and structure, dynamics of key species...) to be able to act efficiently, adequately and effectively for their conservation and restoration.
- **Goal 2.** To share knowledge and resources on assessment and monitoring methods and to contribute to overcoming difficulties in the national implementation of the Action Plan on coralligenous/maerl assemblages.
- **Goal 3.** To reduce, prevent and manage the vulnerability of coralligenous and other calcareous bio-concretions to local and regional risks induced by human activities and natural events (close to strategic goals 3 of EcAp) in order to allow them to recover, function fully and maintain their resilience capacities.
- **Goal 4.** Increase awareness and communication on the distribution and the importance of these habitats and develop communication actions for targeted audiences.

Proposed objectives

The proposed objectives of the *Action Plan for the Conservation of Coralligenous and other Calcareous Bioconcretions in the Mediterranean Sea* are:

- i) To improving knowledge of these assemblages (Goals 1 and 2), in particular, but not only, in relation to the impacts of climate change;

⁴⁰ See UNEP/MAP COP Decision IG.17/6 and Decision IG.22/7 for IMAP

- ii) To support and enhance national and cooperative sub-regional monitoring based on IMAP (Goals 1 and 2);
- iii) To promote solidarity and scientific cooperation among Member States (Goal 2);
- iv) To support the national implementation of action plans on coralligenous and other calcareous bioconcretions (Goal 3);
- v) To increase, strengthen and improve the effectiveness of conservation actions for coralligenous and other calcareous bioconcretions in the Mediterranean Sea (Goal 3);
- vi) To increase the number and the effectiveness of Marine Protected Areas focused on the conservation of coralligenous and other calcareous bioconcretions (Goal 3);
- vii) To advocate for the extension of existing MPAs to include neighbouring coralligenous and rhodolith/maerl assemblages (Goal 3);
- viii) To consolidate available data on spatial distribution and human-induced impacts at the regional level (Goal 4).

Priorities

National level

83. Given the lack of scientific knowledge and the significant anthropogenic pressures that threaten the integrity of coralligenous assemblages and other calcareous bioconstructions, national priorities should be to:

- **Improve scientific knowledge:** Improve understanding of the geographical distribution, composition, structure and population dynamics of key species of these habitats considering current climate change conditions.
- **Conduct baseline studies and monitoring:** Establishing baseline studies and conducting continuous monitoring of a network of sites, including affected and less affected sites, and collecting data by using IMAP indicators and existing standardised protocols.
- **Centralise data collection and sharing:** Develop centralised data collection systems to facilitate data sharing and accessibility among stakeholders.
- **Strengthen habitat protection:** Strengthen habitat protection through spatial and/or management actions to mitigate natural and anthropogenic pressures.
- **Raise awareness:** Communicating the vulnerability of these habitats to target audiences (e.g. small-scale fishermen, recreational fishermen, etc.), to raise awareness and promote sustainable practices.

Regional level

84. Considering the scattered information available across the Mediterranean, the diversity of the habitat composition, the number of states surrounding the Mediterranean Sea, and the need to harmonise assessment methods, regional priorities should be set:

- **Coordination of exchanges and working groups:** Facilitating exchanges and organising working groups to address habitat-related challenges. A sub-regional level is recommended as an appropriate level for coordination efforts.
- **Strengthen cooperation:** Pursue further collaboration with other Mediterranean entities and policy instruments that can enhance the management of anthropogenic threats affecting these habitats at the Mediterranean level (e.g. GFCM).
- **Develop a centralised platform:** Create a platform for sharing and centralising key documents, which should be regularly updated. Cooperation with existing platforms should also be sought.
- **Support to Member States:** Assisting Member States to integrate this Action Plan at the national level by securing funding, promoting scientific exchanges, intercalibrating methods and protocols, and providing other appropriate support.

Proposed Actions for 2025-2030

Table 4 Proposed actions (2025-2030) for the Regional Action Plan for the conservation of coralligenous and other calcareous bioconcretions in the Mediterranean Sea

	Action	Deadline	Actors
Acquiring scientific knowledge			
1	Contribute to the development of research programmes on coralligenous and other calcareous bioconcretions, particularly in relation to an ecosystem approach and/or climate change impacts.	Continuously to 2050	CPs
2	Establish or develop a network of representative sites (protected/unprotected, impacted/unimpacted, deep/shallow, etc.) for monitoring coralligenous assemblages and maerl beds, and produce a fact sheet on the network and the state of these habitats.	By end of 2027	CPs
3	Assess and monitor coralligenous assemblages and rhodolith/maerl beds based on IMAP indicators EO1 and EO6 or MSFD criteria, using existing standard protocols	Continuously	CPs
Improve Knowledge Sharing and Implementation			
4	Organisation of the 5 th Mediterranean Symposium on the Conservation of Coralligenous and other Calcareous Bioconcretions	By 2026	SPA/RAC Contribution by the CPs is expected
5	Establishment of four (4) sub-regional working groups on the conservation and assessment of benthic habitats at sub-regional scale (coralligenous and maerl beds, possibly together with <i>Posidonia oceanica</i> beds). Synthesised results of meetings should be shared with National Focal Points.	By 2027 initially	<u>SPA/RAC</u> organise online meetings. CPs participation to WG
6	Compile and share a list of MPAs hosting coralligenous and rhodolith/maerl assemblages.	2026	<u>CPs</u>
Reducing Vulnerability and Building Resilience			
7	Work towards a ban on the use of harmful fishing gear (trawl nets, dredges, shore(bottom) seines or similar nets) over coralligenous and rhodolith/maerl beds in MPAs (including all Natura 2000 sites), all Special Protected Areas and all Specially Protected Areas of Mediterranean Interest (SPAMI) throughout the Mediterranean Sea.	By 2030	<u>SPA/RAC</u> and <u>GFCM</u> to consider elaborating a GFCM decision. <u>CPs</u> to integrate in national Action Plan or fisheries regulation.
8	Increase the representativeness of coralligenous assemblages and rhodolith/maerl beds in Marine Protected Areas and/or FRAs (Fisheries Restricted Areas)	By 2030	CPs
9	Identify (i) sites with impacted coralligenous assemblages and (ii) sites with impacted rhodolith/maerl beds where identified threats could be reduced, and restoration (passive or active) could be considered.	By end of 2027	CPs
Awareness and communication building			
10	Development of a coordination platform: Collect, make available and regularly update spatial data; bring together and update available reports, guidelines, programmes initiatives and publications on coralligenous and other calcareous bioconcretions.	By end of 2027	SPA/RAC

ACTION PLAN PARTNERS

85. Implementing the present action plan is the province of the national authorities of the Contracting Parties. Relevant international organisations, NGOs, laboratories, and any other entities are invited to join in the efforts necessary for the successful implementation of the Action plan. During their ordinary meetings, the Contracting Parties may, upon the recommendation of the meeting of National Focal Points for SPAs/BD, grant the status of «Action Plan Partner» to any organization or laboratory that requests it. This status will be awarded to those that carry out, or support (financially or otherwise), concrete actions (such as conservation, research, etc.) That contribute to the implementation of the present action plan, in line with its priorities. The conditions and criteria for the award of the regional action plan partner title are outlined in Annex VI to the [decision IG.26/5](#).

QUESTIONNAIRE FOR THE REPORTING FORMAT FOR THE IMPLEMENTATION OF ACTION PLAN FOR THE CONSERVATION OF CORALLIGENOUS AND OTHER CALCAREOUS BIO-CONCRETIONS

86. The following questionnaire is based and may need to be updated once the Action Plan has been approved by the Focal Points. It should be updated in the in the UNEP/MAP Barcelona Convention Reporting System (BCRS).

RAP for the conservation of coralligenous and other calcareous bio-concretions (COP Decision IG 22/12).

CAs: coralligenous assemblages, **RMBs:** rhodolith/maerl beds

[illegible]

Regional Plan requirements: measures and actions taken	Changes in the information provided in the previous report (Please tick the box that applies)		Status of implementation (Please tick the box that applies with an "X")							Difficulties/Challenges (Please tick "X" to all that apply)								
	Yes	No	Not implemented	In project	Implemented at:				Not applicable	Policy framework	Regulatory framework	Financial resources	Administrative management	Technical guidance capacities				
Assess and monitor CAs and RMBs based on IMAP indicators EO1 and EO6 or MSFD criteria, using existing standard protocols	If your answer is "Yes", please update accordingly If your answer is "No", please go to next question		If your answer is "Yes", on a voluntary basis please provide further information (<i>Indicate website/URL link or other reference</i>) If your answer is "No", please in the column difficulties/challenges, tick all that apply							On a voluntary basis , please briefly describe difficulties/challenges and the type of attention or assistance that is required								
Compile and share a list of MPAs hosting CAs and RMBs. Timeline: Year 2	If your answer is "Yes", please update accordingly If your answer is "No", please go to next question		If your answer is "Yes", on a voluntary basis please provide further information (<i>Indicate website/URL link or other reference</i>) If your answer is "No", please in the column difficulties/challenges, tick all that apply							On a voluntary basis , please briefly describe difficulties/challenges and the type of attention or assistance that is required								
Work towards a ban on the use of harmful fishing gear (trawl nets, dredges, shore(bottom) seines or similar nets) over CAs and RMBs in MPAs (including all Natura 2000 sites), all Special Protected Areas and all Specially Protected Areas of Mediterranean Interest (SPAMI) throughout the Mediterranean Sea. Timeline: Year 5	If your answer is "Yes", please update accordingly If your answer is "No", please go to next question		If your answer is "Yes", on a voluntary basis please provide further information (<i>Indicate website/URL link or other reference</i>) If your answer is "No", please in the column difficulties/challenges, tick all that apply							On a voluntary basis , please briefly describe difficulties/challenges and the type of attention or assistance that is required								
Increase the representativeness of CAs and RMBs in Marine Protected	If your answer is "Yes", please update accordingly		If your answer is "Yes", on a voluntary basis please provide further information (<i>Indicate website/URL link or other reference</i>)							On a voluntary basis , please briefly describe difficulties/challenges and the type of attention or assistance that is required								

Regional Plan requirements: measures and actions taken	Changes in the information provided in the previous report (Please tick the box that applies)		Status of implementation (Please tick the box that applies with an “X”)							Difficulties/Challenges (Please tick “X” to all that apply)				
	Yes	No	Not implemented	In project	Implemented at:				Not applicable	Policy framework	Regulatory framework	Financial resources	Administrative management	Technical guidance capacities
Areas and/or FRAs (Fisheries Restricted Areas). Timeline: Year 5	If your answer is “No”, please go to next question		If your answer is “No”, please in the column difficulties/challenges, tick all that apply											
Identify (i) sites with impacted CAs and (ii) sites with impacted RMBs where identified threats could be reduced and restoration could be considered. Timeline: Year 3														
	If your answer is “Yes”, please update accordingly If your answer is “No”, please go to next question		If your answer is “Yes”, on a voluntary basis please provide further information (<i>Indicate website/URL link or other reference</i>)							On a voluntary basis , please briefly describe difficulties/challenges and the type of attention or assistance that is required				

REFERENCES

- Aguado-Giménez, F., & Ruiz-Fernández, J. M. (2012). Influence of an experimental fish farm on the spatio-temporal dynamic of a Mediterranean maërl algae community. *Marine Environmental Research*, 74, 47-55. <https://doi.org/10.1016/j.marenvres.2011.12.003>
- Aguilar, R., García, S., Perry, A. L., Alvarez, H., Blanco, J., & Bitar, G. (2018). *2016 Deep-sea Lebanon Expedition: Exploring Submarine Canyons* (p. 94). Oceana.
- Amaya, D. J., Jacox, M. G., Fewings, M. R., Saba, V. S., Stuecker, M. F., Rykaczewski, R. R., Ross, A. C., Stock, C. A., Capotondi, A., Petrik, C. M., Bograd, S. J., Alexander, M. A., Cheng, W., Hermann, A. J., Kearney, K. A., & Powell, B. S. (2023). Marine heatwaves need clear definitions so coastal communities can adapt. *Nature*, 616(7955), 29–32. <https://doi.org/10.1038/d41586-023-00924-2>
- Andromede Oceanology. (2016). *Underwater marine habitats mapping of the National Marine Park Karaburun-Sazan (Albania) – Year 2016*. (p. 82). Andromede Oceanology / Agence de l'eau Rhône Méditerranée et Corse.
- Angiolillo, M., & Fortibuoni, T. (2020). Impacts of Marine Litter on Mediterranean Reef Systems: From Shallow to Deep Waters. *Frontiers in Marine Science*, 7. <https://doi.org/10.3389/fmars.2020.581966>
- Angiolillo, M., Fortibuoni, T., Di Lorenzo, B., & Tunesi, L. (2023). First baseline assessment of seafloor litter on Italian coralligenous assemblages (Mediterranean Sea) in accordance with the European Marine Strategy Framework Directive. *Marine Pollution Bulletin*, 187, 114597. <https://doi.org/10.1016/j.marpolbul.2023.114597>
- Astruch, P., Orts, A., Schohn, T., Belloni, B., Ballesteros, E., Bănar, D., Bianchi, C. N., Boudouresque, C.-F., Changeux, T., Chevaldonné, P., Harmelin, J.-G., Michez, N., Monnier, B., Morri, C., Thibaut, T., Verlaque, M., & Daniel, B. (2023). Ecosystem-based assessment of a widespread Mediterranean marine habitat: The Coastal Detrital Bottoms, with a special focus on epibenthic assemblages. *Frontiers in Marine Science*, 10. <https://doi.org/10.3389/fmars.2023.1130540>
- Ballesteros, E. (2006). Mediterranean coralligenous assemblages: A synthesis of present knowledge. *Oceanography and Marine Biology*, 44, 123–195.
- Barberá, C., Mallol, S., Vergés, A., Cabanellas-Reboredo, M., Díaz, D., & Goñi, R. (2017). Maërl beds inside and outside a 25-year-old no-take area. *Marine Ecology Progress Series*, 572, 77–90. <https://doi.org/10.3354/meps12110>
- Barberá, C., Moranta, J., Ordines, F., Ramón, M., Mesa, A., az-Valdes, M., Grau, A., & Massutí, E. (2012). Biodiversity and habitat mapping of Menorca Channel (western Mediterranean): Implications for conservation. *Biodiversity and Conservation*, 21, 701–728. <https://doi.org/10.1007/s10531-011-0210-1>
- Barrientos, N., Vaquer-Sunyer, R., Marsinyach, E., Julià, M., Moranta, J., Ballesteros, E., & Barbera, C. (2022a). «Coralígeno» (R. Vaquer-Sunyer & N. Barrientos, Eds.). Informe Mar Balear 2022. [Link](#)
- Barrientos, N., Vaquer-Sunyer, R., Marsinyach, E., Julià, M., Moranta, J., Ballesteros, E., & Barbera, C. (2022b). «Maërl» (Vaquer-Sunyer & N. Barrientos, Eds.). Informe Mar Balear 2022. [Link](#)
- Basso, D., Babbini, L., Espla, A. A., & Salomidi, M. (2016a). Mediterranean Rhodolith Beds. In R. Riosmena-Rodriguez, W. Nelson, & J. Aguirre (Eds.), *Rhodolith/maërl beds: A global perspective* (Vol. 15, pp. 281–298). Springer. https://doi.org/10.1007/978-3-319-29315-8_11
- Basso, D., Babbini, L., Kaleb, S., Bracchi, V. A., & Falace, A. (2016b). Monitoring deep Mediterranean rhodolith beds. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 26(3), 549–561. <https://doi.org/10.1002/aqc.2586>

- Basso, D., Bracchi, V. A., Bazzicalupo, P., Martini, M., Maspero, F., & Bavestrello, G. (2022). Living coralligenous as geo-historical structure built by coralline algae. *Frontiers in Earth Science*, 10. <https://doi.org/10.3389/feart.2022.961632>
- Belbacha, S., Semroud, R., & Ramos-Esplá, A. A. (2011). *Inventaire des peuplements du coralligène de l'aire marine de Taza (Wilaya de Jijel, Algérie)* (p. 67) [Rapport technique]. Programme 'MedPAN Sud', WWF Europe/Parc National de Taza
- Betti, F., Enrichetti, F., Garetto, C., Merotto, L., Cappanera, V., Venturini, S., & Bavestrello, G. (2023). Optimization of scuba diving activities in a Mediterranean marine protected area based on benthic vulnerability assessment. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 33(2), 191–201. <https://doi.org/10.1002/aqc.3918>
- Bevilacqua, S., Guarnieri, G., Farella, G., Terlizzi, A., & Fraschetti, S. (2018). A regional assessment of cumulative impact mapping on Mediterranean coralligenous outcrops. *Scientific Reports*, 8(1), 1757. <https://doi.org/10.1038/s41598-018-20297-1>
- Blouet, S. (2023). *Vers une approche spatialisée de la planification spatiale marine: Cas d'étude pour des populations d'invertébrés sessiles dans le Golfe du Lion*. Sorbonne Université.
- Bracchi, V. A., Bazzicalupo, P., Fallati, L., Varzi, A. G., Savini, A., Negri, M. P., Rosso, A., Sanfilippo, R., Guido, A., Bertolino, M., Costa, G., De Ponti, E., Leonardi, R., Muzzupappa, M., & Basso, D. (2022). The Main Builders of Mediterranean Coralligenous: 2D and 3D Quantitative Approaches for its Identification. *Frontiers in Earth Science*, 10. <https://doi.org/10.3389/feart.2022.910522>
- Bramanti, L., Manea, E., Giordano, B., Estaque, T., Bianchimani, O., Richaume, J., Méricot, B., Schull, Q., Sartoretto, S., GARRABOU, J., & Guizien, K. (2023). The deep vault: A temporary refuge for temperate gorgonian forests facing marine heat waves. *Mediterranean Marine Science*, 24. <https://doi.org/10.12681/mms.35564>
- Çinar, M. E., Féral, J.-P., Arvanitidis, C., David, R., Taşkin, E., Sini, M., Dailianis, T., Doğan, A., Gerovasileiou, V., Evcen, A., Chenuil, A., Dağlı, E., Aysel, V., Issaris, Y., Bakir, K., Nalmpantı, M., Sartoretto, S., Salomidi, M., Sapouna, A., ... Önen, M. (2020). Coralligenous assemblages along their geographical distribution: Testing of concepts and implications for management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 30(8), 1578–1594. <https://doi.org/10.1002/aqc.3365>
- Costantini, F., Ferrario, F., & Abbiati, M. (2018). Chasing genetic structure in coralligenous reef invertebrates: Patterns, criticalities and conservation issues. *Scientific Reports*, 8(1), 5844. <https://doi.org/10.1038/s41598-018-24247-9>
- Crisci, C., Ledoux, J.-B., Mokhtar- Jamaï, K., Bally, M., Bensoussan, N., Aurelle, D., Cebrian, E., Coma, R., Féral, J.-P., La Rivière, M., Linares, C., López-Sendino, P., Marschal, C., Ribes, M., Teixidó, N., Zuberer, F., & Garrabou, J. (2017). Regional and local environmental conditions do not shape the response to warming of a marine habitat-forming species. *Scientific Reports*, 7(1), 5069. <https://doi.org/10.1038/s41598-017-05220-4>
- Deidun, A., Marrone, A., Gauci, A., Galdies, J., Lorenti, M., Mangano, M. C., Cutajar, K., Mirto, S., & Sarà, G. (2022). Structure and biodiversity of a Maltese maerl bed: New insight into the associated assemblage 24 years after the first investigation. *Regional Studies in Marine Science*, 52, 102262. <https://doi.org/10.1016/j.rsma.2022.102262>
- Del Río, J., Ramos, D. A., Sánchez-Tocino, L., Peñas, J., & Braga, J. C. (2022). The Punta de la Mona Rhodolith Bed: Shallow-Water Mediterranean Rhodoliths (Almuñecar, Granada, Southern Spain). *Frontiers in Earth Science*, 10. <https://doi.org/10.3389/feart.2022.884685>

Di Camillo, C., Ponti, M., Pulido Mantas, T., & Roveta, C. (2023). Review of the indexes to assess the ecological quality of coralligenous reefs: Towards a unified approach. *Frontiers in Marine Science*, 10. <https://doi.org/10.3389/fmars.2023.1252969>

Dimas, X., Fakiris, E., Christodoulou, D., Georgiou, N., Geraga, M., Papathanasiou, V., Orfanidis, S., Kotomatas, S., & Papatheodorou, G. (2022). Marine priority habitat mapping in a Mediterranean conservation area (Gyaros, South Aegean) through multi-platform marine remote sensing techniques. *Frontiers in Marine Science*, 9. <https://doi.org/10.3389/fmars.2022.953462>

Enrichetti, F., Bava, S., Bavestrello, G., Betti, F., Lanteri, L., & Bo, M. (2019). Artisanal fishing impact on deep coralligenous animal forests: A Mediterranean case study of marine vulnerability. *Ocean & Coastal Management*, 177, 112–126. <https://doi.org/10.1016/j.ocecoaman.2019.04.021>

Farriols, M. T., Irlinger, C., Ordines, F., Palomino, D., Marco-Herrero, E., Soto-Navarro, J., Jordà, G., Mallol Martínez, S., Díaz, D., Martínez-Carreño, N., Díaz, J. A., Fernandez-Arcaya, U., Joher, S., Ramírez-Amaro, S., De la Ballina, N. R., Vazquez, J.-T., & Massutí, E. (2021). Recovery Signals of Rhodoliths Beds since Bottom Trawling Ban in the SCI Menorca Channel (Western Mediterranean). *Diversity*, 14, 20. <https://doi.org/10.3390/d14010020>

Farriols M.T., Joher S., Ordines F., Guijarr B., Peteiro C. & Massutí E. (2024). Recovery and expansion of rhodoliths beds and *Laminaria rodriguezii* forests after bottom trawl ban. *Biodiversity and Conservation*, <https://doi.org/10.1007/s10531-024-03000-x>

Ferrigno, F., Appolloni, L., Donnarumma, L., Di Stefano, F., Rendina, F., Sandulli, R., & Russo, G. F. (2021). Diversity Loss in Coralligenous Structuring Species Impacted by Fishing Gear and Marine Litter. *Diversity*, 13(7), Article 7. <https://doi.org/10.3390/d13070331>

Ferrigno, F., Appolloni, L., Rendina, F., Donnarumma, L., Russo, G. F., & Sandulli, R. (2020). Red coral (*Corallium rubrum*) populations and coralligenous characterization within “Regno di Nettuno MPA” (Tyrrhenian Sea, Italy). *The European Zoological Journal*, 87(1), 203–213. <https://doi.org/10.1080/24750263.2020.1742808>

Ferrigno, F., Appolloni, L., Russo, G. F., & Sandulli, R. (2018). Impact of fishing activities on different coralligenous assemblages of Gulf of Naples (Italy). *Journal of the Marine Biological Association of the United Kingdom*, 98(1), 41–50. <https://doi.org/10.1017/S0025315417001096>

Ferrigno, F., Rendina, F., Sandulli, R., & Russo, G. (2023). Coralligenous assemblages: Research status and trends of a key Mediterranean biodiversity hotspot through bibliometric analysis. *Ecological Questions*, 35, 1–32. <https://doi.org/10.12775/EQ.2024.002>

Figuerola-Ferrando, L., Garrabou, J., & Linares, C. (2024). A rapid assessment method to monitor the health status of habitat-forming species in coastal benthic ecosystems. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 34(3), e4120. <https://doi.org/10.1002/aqc.4120>

Fourt, M., Goujard, A., Canese, S., Salvati, E., Tunesi, L., Daniel, B., & Vissio, A. (2015). *Rapport de la campagne océanographique « RAMOGE Exploration canyons et roches profondes 2015 »* (p. 80) [Accord Ramoge - Agence des aires marines protégées]. [Link](#)

Fragkopoulou, E., Serrão, E. A., Horta, P. A., Koerich, G., & Assis, J. (2021). Bottom Trawling Threatens Future Climate Refugia of Rhodoliths Globally. *Frontiers in Marine Science*, 7. <https://doi.org/10.3389/fmars.2020.594537>

Frank, A., Farriols, M. T., Ordines, F., & Massutí, E. (2024). Distribution of benthic habitats in the Mallorca Channel seamounts (Western Mediterranean). *43rd CIESM Congress Proceedings*, 43, 38. [Link](#)

Garrabou, J., Gómez-Gras, D., Medrano, A., Cerrano, C., Ponti, M., Schlegel, R., Bensoussan, N., Turicchia, E., Sini, M., Gerasvileiou, V., Teixido, N., Mirasole, A., Tamburello, L., Cebrian, E., Rilov,

G., Ledoux, J.-B., Souissi, J. B., Khamassi, F., Ghanem, R., ... Harmelin, J.-G. (2022). Marine heatwaves drive recurrent mass mortalities in the Mediterranean Sea. *Global Change Biology*, 28(19), 5708–5725. <https://doi.org/10.1111/gcb.16301>

Ghanem, R., Ben Souissi, J., & Garrabou, J. (2022). Review of the geographic and bathymetric distribution of maërl beds in Tunisian waters. *Proceedings of the 4th Mediterranean Symposium on the Conservation of Coralligenous & Other Calcareous Bio-Concretions (Genoa, Italy, 20-21 September 2022)*, 65–69.

Giménez, G., Corriero, G., Beqiraj, S., Lazaj, L., Lazic, T., Longo, C., Mercurio, M., Nonnis Marzano, C., Zuccaro, M., Zuna, V., & Pierri, C. (2022a). Characterization of the Coralligenous Formations from the Marine Protected Area of Karaburun-Sazan, Albania. *Journal of Marine Science and Engineering*, 10(10), Article 10. <https://doi.org/10.3390/jmse10101458>

Giménez, G., Pierri, C., Coccia, I., Longo, C., Marzano, C. N., & Mercurio, M. (2022b). Insights into the impact of marine litter on coralligenous structuring species in Apulia (Italy). *2022 IEEE International Workshop on Metrology for the Sea; Learning to Measure Sea Health Parameters (MetroSea)*, 334–338. <https://doi.org/10.1109/MetroSea55331.2022.9950846>

Gómez-Gras, D., Bensoussan, N., Ledoux, J. B., López-Sendino, P., Cerrano, C., Ferretti, E., Kipson, S., Bakran-Petricioli, T., Serrao, E. A., Paulo, D., Coelho, M. a. G., Pearson, G. A., Boavida, J., Montero-Serra, I., Pagès-Escolà, M., Medrano, A., López-Sanz, A., Milanese, M., Linares, C., & Garrabou, J. (2022). Exploring the response of a key Mediterranean gorgonian to heat stress across biological and spatial scales. *Scientific Reports*, 12(1), 21064. <https://doi.org/10.1038/s41598-022-25565-9>

Gómez-Gras, D., Linares, C., López-Sanz, A., Amate, R., Ledoux, J. B., Bensoussan, N., Drap, P., Bianchimani, O., Marschal, C., Torrents, O., Zuberer, F., Cebrian, E., Teixidó, N., Zabala, M., Kipson, S., Kersting, D. K., Montero-Serra, I., Pagès-Escolà, M., Medrano, A., ... Garrabou, J. (2021). Population collapse of habitat-forming species in the Mediterranean: A long-term study of gorgonian populations affected by recurrent marine heatwaves. *Proceedings of the Royal Society B: Biological Sciences*, 288(1965), 20212384. <https://doi.org/10.1098/rspb.2021.2384>

Gubbay, S., Sanders, N., Haynes, T., Janssen, J. A. M., Rodwell, J. R., Nieto, A., Criado, M. G., Beal, S., & Borg, J. (2016). *European red list of habitats. Part 1: Marine habitats*. European Union.

Hobday, A. J., Alexander, L. V., Perkins, S. E., Smale, D. A., Straub, S. C., Oliver, E. C. J., Benthuyssen, J. A., Burrows, M. T., Donat, M. G., Feng, M., Holbrook, N. J., Moore, P. J., Scannell, H. A., Sen Gupta, A., & Wernberg, T. (2016). A hierarchical approach to defining marine heatwaves. *Progress in Oceanography*, 141, 227–238. <https://doi.org/10.1016/j.pocean.2015.12.014>

Hussein, K., & Bensahla-Talet, L. (2019). A preliminary inventory of biodiversity and benthic habitats of ‘Plane’ Island (Paloma) in Oran Bay, north western Algeria (western Mediterranean). *Journal of the Black Sea/Mediterranean Environment*, 25(1), 49–72.

Ingrassia, M., Martorelli, E., Sañé, E., Falese, F. G., Bosman, A., Bonifazi, A., Argenti, L., & Chiocci, F. L. (2019). Coralline algae on hard and soft substrata of a temperate mixed siliciclastic-carbonatic platform: Sensitive assemblages in the Zannone area (western Pontine Archipelago; Tyrrhenian Sea). *Marine Environmental Research*, 147, 1–12. <https://doi.org/10.1016/j.marenvres.2019.03.009>

Ingrassia, M., Pierdomenico, M., Casalbone, D., Falese, F. G., & Chiocci, F. L. (2023). A Review of Rhodolith/Maerl Beds of the Italian Seas. *Diversity*, 15(7), 859. <https://doi.org/10.3390/d15070859>

Ingrasso, G., Abbiati, M., Badalamenti, F., Bavestrello, G., Belmonte, G., Cannas, R., Benedetti-Cecchi, L., Bertolino, M., Bevilacqua, S., Bianchi, C. N., Bo, M., Boscari, E., Cardone, F., Cattaneo-Vietti, R., Cau, A., Cerrano, C., Chemello, R., Chimienti, G., Congiu, L., ... Boero, F. (2018). Chapter Three—

Mediterranean Bioconstructions Along the Italian Coast. In C. Sheppard (Ed.), *Advances in Marine Biology* (Vol. 79, pp. 61–136). Academic Press. <https://doi.org/10.1016/bs.amb.2018.05.001>

Innangi, S., Ferraro, L., Innangi, M., Di Martino, G., Giordano, L., Bracchi, V. A., & Tonielli, R. (2024). Linosa island: A unique heritage of Mediterranean biodiversity. *Journal of Maps*, 20(1), 2297989. <https://doi.org/10.1080/17445647.2023.2297989>

Laborel, J. (1987). Marine biogenic constructions in the Mediterranean. *Scientific Reports of Port-Cros National Park*, 13, 97–126.

Linares, C. (2006). *Population ecology and conservation of a long-lived marine species: The red gorgonian Paramuricea clavata* [University de Barcelona]. <https://digital.csic.es/handle/10261/198687>

Linares, C., Doak, D. F., Coma, R., Díaz, D., & Zabala, M. (2007). Life history and viability of a long-lived marine invertebrate: The octocoral *Paramuricea clavata*. *Ecology*, 88(4), 918–928. <https://doi.org/10.1890/05-1931>

Linares, C., Figuerola, L., Gómez-Gras, D., Pagés-Escalà, M., Olvera, À., Aubach, À., Amate, R., Figuerola, B., Kersting, D., Ledoux, J.-B., López-Sanz, A., López-Sendino, P., Medrano, A., & Garrabou, J. (2020). *CorMedNet- Distribution and demographic data of habitat-forming invertebrate species from Mediterranean coralligenous assemblages between 1882 and 2019*. [Dataset]. Marine Data Archive. <https://doi.org/10.14284/467>

Linares, C., Figuerola-Ferrando, L., Gómez-Gras, D., Pagés-Escalà, M., & Olvera, À. (2022). CorMedNet: Building a database on the distribution, demography and conservation status of sessile species for Mediterranean coralligenous assemblages. In C. Bouafif & A. Ouerghi (Eds.), *Proceedings of the 4th Mediterranean Symposium on the conservation of Coralligenous & other Calcareous Bio-Concretions (Genova, Italy, 20-21 September 2022)* (pp. 80–85). SPA/RAC publi., Tunis.

Longo, C., Corriero, G., Cardone, F., Mercurio, M., Pierri, C., & Marzano, C. N. (2020). Sponges from rhodolith beds surrounding Ustica Island marine protected area (southern Tyrrhenian Sea), with a comprehensive inventory of the island sponge fauna. *Scientia Marina*, 84(3), Article 3. <https://doi.org/10.3989/scimar.04991.29A>

Maggio, T., Perzia, P., Pazzini, A., Campagnuolo, S., Falautano, M., Mannino, A. M., Allegra, A., & Castriota, L. (2022). Sneaking into a Hotspot of Biodiversity: Coverage and Integrity of a Rhodolith Bed in the Strait of Sicily (Central Mediterranean Sea). *Journal of Marine Science and Engineering*, 10(12), Article 12. <https://doi.org/10.3390/jmse10121808>

Marín, P., Aguilar, R., García, S., & Pardo, E. (2011). *Montañas Submarinas de Las Islas Baleares : Canal de Mallorca. Propuesta de Protección Para Ausias March, Emile Baudot y Ses Olives*. (p. 60). OCEANA. [Link](#)

Martin, C. S., Giannoulaki, M., De Leo, F., Scardi, M., Salomidi, M., Knittweis, L., Pace, M. L., Garofalo, G., Gristina, M., Ballesteros, E., Bavestrello, G., Belluscio, A., Cebrian, E., Gerakaris, V., Pergent, G., Pergent-Martini, C., Schembri, P. J., Terribile, K., Rizzo, L., ... Fraschetti, S. (2014). Coralligenous and maërl habitats: Predictive modelling to identify their spatial distributions across the Mediterranean Sea. *Scientific Reports*, 4(1), Article 1. <https://doi.org/10.1038/srep05073>

Martínez, J., Leonelli, F. E., García-Ladona, E., Garrabou, J., Kersting, D. K., Bensoussan, N., & Pisano, A. (2023). Evolution of marine heatwaves in warming seas: The Mediterranean Sea case study. *Frontiers in Marine Science*, 10. <https://doi.org/10.3389/fmars.2023.1193164>

Massutí, E., Sánchez-Guillamón, O., Farriols, M. T., Palomino, D., Frank, A., Bárcenas, P., Rincón, B., Martínez-Carreño, N., Keller, S., López-Rodríguez, C., J.a, D., López-González, N., Marco-Herrero, E., Fernandez-Arcaya, U., Valls, M., Ramírez-Amaro, S., Ferragut-Perello, F., Joher, S., Ordines, F., & J.t, V. (2022). *Improving scientific knowledge of Mallorca Channel seamounts (western Mediterranean) within the framework of natura 2000 network*. <https://doi.org/10.3390/d14010004>

- Montefalcone, M., Tunesi, L., & Ouerghi, A. (2021). A review of the classification systems for marine benthic habitats and the new updated Barcelona Convention classification for the Mediterranean. *Marine Environmental Research*, 169, 105387. <https://doi.org/10.1016/j.marenvres.2021.105387>
- Mustapha, K. B., Komatsu, T., Hattour, A., Sammari, C., Zarrouk, S., Souissi, A., & Abed, A. E. (2002). Tunisian mega benthos from Infra (*Posidonia meadows*) and circalittoral (Coralligenous) sites. *INSTM Bulletin : Marine and Freshwater Sciences*, 29, 23–36. <https://n2t.net/ark:/68747/INSTM.Bulletin.v29.795>
- Padrón, M., Costantini, F., Baksay, S., Bramanti, L., & Guizien, K. (2018). Passive larval transport explains recent gene flow in a Mediterranean gorgonian. *Coral Reefs*, 37(2), 495–506. <https://doi.org/10.1007/s00338-018-1674-1>
- Palma, M., Rivas Casado, M., Pantaleo, U., Pavoni, G., Pica, D., & Cerrano, C. (2018). SfM-Based Method to Assess Gorgonian Forests (*Paramuricea clavata* (Cnidaria, Octocorallia)). *Remote Sensing*, 10, 1154. <https://doi.org/10.3390/rs10071154>
- Pérès, J.-M., & Picard, J. (1964). Nouveau manuel de bionomie benthique de la mer Méditerranée. *Recueil Des Travaux de La Station Marine d'Endoume*, 47(31), 3–137.
- Petović, S., & Mačić, V. (2021). Marine Habitats of Special Importance Along the Montenegrin Coast. In A. Joksimović, M. Đurović, I. S. Zonn, A. G. Kostianoy, & A. V. Semenov (Eds.), *The Montenegrin Adriatic Coast: Marine Biology* (pp. 233–247). Springer International Publishing; pdf in RAP Cor. https://doi.org/10.1007/698_2021_750
- Piazzzi, L., Atzori, F., Cadoni, N., Cinti, M. F., Frau, F., & Ceccherelli, G. (2018). Benthic mucilage blooms threaten coralligenous reefs. *Marine Environmental Research*, 140, 145–151. <https://doi.org/10.1016/j.marenvres.2018.06.011>
- Piazzzi, L., Cecchi, E., Cinti, M. F., Marino, G., Nicastro, A., Pacciardi, L., Pertusati, M., Ria, M., & Biasi, A. M. D. (2023). Coralligenous cliffs: Distribution and extent along the Tuscany coasts and spatial variability of the associated assemblages. *Mediterranean Marine Science*, 24(2), Article 2. <https://doi.org/10.12681/mms.32119>
- Piazzzi, L., Cecchi, E., Cinti, M. F., Stipcich, P., & Ceccherelli, G. (2019). Impact assessment of fish cages on coralligenous reefs through the use of the STAR sampling procedure. *Mediterranean Marine Science*, 20(3), Article 3. <https://doi.org/10.12681/mms.20586>
- Piazzzi, L., Cinti, M. F., Guala, I., Grech, D., La Manna, G., Pansini, A., Pinna, F., Stipcich, P., & Ceccherelli, G. (2021). Variations in coralligenous assemblages from local to biogeographic spatial scale. *Marine Environmental Research*, 169, 105375. <https://doi.org/10.1016/j.marenvres.2021.105375>
- Pierdomenico, M., Bonifazi, A., Argenti, L., Ingrassia, M., Casalbone, D., Aguzzi, L., Viaggiu, E., Le Foche, M., & Chiocci, F. L. (2021). Geomorphological characterization, spatial distribution and environmental status assessment of coralligenous reefs along the Latium continental shelf. *Ecological Indicators*, 131, 108219. <https://doi.org/10.1016/j.ecolind.2021.108219>
- Pilczynska, J., Cocito, S., Boavida, J., Serrão, E., & Queiroga, H. (2016). Genetic Diversity and Local Connectivity in the Mediterranean Red Gorgonian Coral after Mass Mortality Events. *PLOS ONE*, 11(3), e0150590. <https://doi.org/10.1371/journal.pone.0150590>
- PNUE/PAM-CAR/ASP. (2016). *Algérie: Île de Rachgoun. Cartographie des habitats marins clés de Méditerranée et initiation de réseaux de surveillance. Par Ramos Esplá A., Benabdi M., Sghaier Y.R., Forcada Almarcha A., Valle Pérez C. & Ouerghi A.* (Ed. CAR/ASP-Projet MedKeyHabitats). [Link](#)
- Ponti, M., Turicchia, E., Costantini, F., Gori, A., Bramanti, L., Di Camillo, C., Linares, C., Rossi, S., Abbiati, M., Garrabou, J., & Cerrano, C. (2019). Mediterranean gorgonian forests: Distribution patterns

and ecological roles. *Proceedings of the 3rd Mediterranean Symposium on the Conservation of Coralligenous & Other Calcareous Bio-Concretions (Antalya, Turkey, 15-16 January 2019)*, 7–14. [Link](#)

RAC/SPA. (2003). *The coralligenous in the Mediterranean Sea. Definition of the coralligenous assemblage in the Mediterranean, its main builders, its richness and key role in benthic ecology as well as its threats*. By Ballesteros E. (p. 87). RAC/SPA. [Link](#)

RAC/SPA - MedMPAnet Project (Ed.). (2014). *Monitoring Protocol for Reefs—Coralligenous Community*. By Garrabou J, Kipson S, Kaleb S, Kruzic P, Jaklin A, Zuljevic A, Rajkovic Z, Rodic P, Jelic K, and Zupan D. [Link](#)

Radicioli, M., Angiolillo, M., Giusti, M., Proietti, R., Fortibuoni, T., Silvestri, C., & Tunesi, L. (2022). Monitoring coralligenous reefs in Italian coastal waters within the Marine Strategy Framework Directive. *4th Mediterranean Symposium on the conservation of Coralligenous & other Calcareous Bio-Concretions (Genoa, Italy, 20-21 September 2022)*, 96-101. [Link](#)

Romagnoli, B., Grasselli, F., Costantini, F., Abbiati, M., Romagnoli, C., Innangi, S., Di Martino, G., & Tonielli, R. (2021). Evaluating the distribution of priority benthic habitats through a remotely operated vehicle to support conservation measures off Linosa Island (Sicily Channel, Mediterranean Sea). *Aquatic Conservation: Marine and Freshwater Ecosystems*, 31. <https://doi.org/10.1002/aqc.3554>

Sciascia, R., Guizien, K., & Gatimu Magaldi, M. (2021). *Guidelines for larval dispersal simulations: Flow field representation versus biological traits*. <https://hal.science/hal-03365790>

Sciascia, R., Guizien, K., & Magaldi, M. G. (2022). Larval dispersal simulations and connectivity predictions for Mediterranean gorgonian species: Sensitivity to flow representation and biological traits. *ICES Journal of Marine Science*, 79(7), 2043–2054. <https://doi.org/10.1093/icesjms/fsac135>

Sini, M., Garrabou, J., Trygonis, V., & Koutsoubas, D. (2019). Coralligenous formations dominated by *Eunicella cavolini* (Koch, 1887) in the NE Mediterranean: Biodiversity and structure. *Mediterranean Marine Science*, 20(1), Article 1. <https://doi.org/10.12681/mms.18590>

Sini, M., Katsanevakis, S., Koukourouvli, N., Gerovasileiou, V., Dailianis, T., Buhl-Mortensen, L., Damalas, D., Dendrinos, P., Dimas, X., Frantzis, A., Gerakaris, V., Giakoumi, S., Gonzalez-Mirelis, G., Hasiotis, T., Issaris, Y., Kavadas, S. G., Koutsogiannopoulos, D. D., Koutsoubas, D., Manoutsoglou, E., ... Zotou, M. (2017). Assembling Ecological Pieces to Reconstruct the Conservation Puzzle of the Aegean Sea. *Frontiers in Marine Science*, 4. <https://doi.org/10.3389/fmars.2017.00347>

SNPA (2024). *Schede metodologiche utilizzate nei programmi di monitoraggio del secondo ciclo della Direttiva Strategia Marina (D.M. 2 febbraio 2021)*, Pubblicazioni tecniche SNPA - ISBN 978-88-448-1236-2. [Schede metodologiche utilizzate nei programmi di monitoraggio del secondo ciclo della Direttiva Strategia Marina \(D.M. 2 febbraio 2021\) – SNPA – Sistema nazionale protezione ambiente](#)

SPA/RAC-ONU Environnement/PAM & HCEFLCD. (2019). *L'aire protégée de Jbel Moussa: Une perle dans le Détroit de Gibraltar*. Par Ali Aghnaj, Hocein Bazairi et Atef Limam. (SPA/RAC. Projet MedMPA Network, Ed.). [Link](#)

SPA/RAC-UN Environment/MAP. (2017). *Ecological characterization of potential new Marine Protected Areas in Lebanon: Batroun, Medfoun and Byblos*. By Ramos-Esplá, A.A., Bitar, G., Forcada, A., Valle, C., Ocaña, O., Sghaier, Y.R., Samaha, Z., Kheriji, A., & Limam A (SPA/RAC. MedMPA Network Project, Ed.). [Link](#)

SPA/RAC-UN Environment/MAP. (2019). *Updated Classification of Benthic Marine Habitat Types for the Mediterranean Region* (p. 23). [Link](#)

Tabone, L., Leyla, K., Aguilar, R., Alvarez, H., Borg, J. A., García, S., Schembri, P., & Evans, J. (2024). Habitat characterization, anthropogenic impacts and conservation of rhodolith beds off southeastern Malta. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 34. <https://doi.org/10.1002/aqc.4148>

Torchia, G., Rais, C., Pititto, F., Langar, H., Bouafif, C., Abidi, A., Trainito, E., Romano, C., Dragan, M., Camisassi, S., Tronconi, D., Berutti, P., Sghaier, Y. R., & Ouerghi, A. (2016). *Tunisie: Cap Negro-Cap Serrat. Cartographie des habitats marins clés de Méditerranée et initiation de réseaux de surveillance*. (CAR/ASP-Projet MedKayHabitats, Ed.). [Link](#)

Tornero Alvarez, M. V., Palma, M., Boschetti, S., Cardoso, A. C., Druon, J.-N., Kotta, M., Louropoulou, E., Magliozzi, C., Palialexis, A., Piroddi, C., Ruiz-Orejón, L. F., Vasilakopoulos, P., Vighi, M., & Hanke, G. (2023). *Marine Strategy Framework Directive—Review and analysis of EU Member States' 2020 reports on Monitoring Programmes*. [Link](#)

UNEP/MAP. (2021). *Interpretation manual of the reference list of marine habitat types in the Mediterranean Sea* (p. 426). [Link](#)

UNEP/MAP-PAP/RAC i MEPU. (2021). *The State and Pressures of the Marine Environment in Montenegro. Authors (alphabetically): Bataković Milena, Cigoj Sitar Nika, Ćurović Mirko, Jovičević Mihailo, Mandić Milica, Marković Marina, Mišurović Ana, Mlakar Aleš, Pešić Ana, Stojanović Ivana. Ur* (PAP/RAC – GEF Adriatic project, Ed.). [Link](#)

UNEP/MAP-PAP/RAC-SPA/RAC and MSDT. (2019). *Results of Marine Research in Montenegro – Summary* (PAP/RAC – GEF Adriatic project, Ed.). [Link](#) UNEP/MAP-RAC/SPA. (2015). *Standard methods for inventorying and monitoring coralligenous and rhodoliths assemblages*. Gérard Pergent, Sabrina Agnesi, Paul Arthur Antonioli, Lorenza Babbini, Said Belbacha, Kerim Ben Mustapha, Carlo Nike Bianchi, Ghazi Bitar, Silvia Cocito, Julie Deter, Joaquim Garrabou, Jean-Georges Harmelin, Florian Hollon, Giulia Mo, Monica Montefalcone, Carla Morri, Valeriano Parravicini, Andrea Peirano, Alfonso Ramos-Espla, Giulio Relini, Stéphane Sartoretto, Rachid Semroud, Leonardo Tunesi, Marc Verlaque. (RAC/SPA).

UNEP-MAP/SPA-RAC. (2015a). *Status of implementation of the Action Plan concerning the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea* (No. UNEP(DEPI)/MED WG.408/inf.7; p. 12). SPA/RAC. [Link](#)

UNEP/MAP-SPA/RAC. (2019). *Monitoring protocols of the Ecosystem Approach Common Indicators 1 and 2 related to marine benthic habitats Guidelines for monitoring coralligenous and other calcareous bioconcretions (UNEP/MED WG.474/3)* (Meeting Report No. UNEP/MED WG.474/3; pp. 51–98). [Link](#)

UNEP/MAP-SPA/RAC. (2020a). *Cartographie des habitats marins clés et évaluation de leur vulnérabilité aux activités de pêche dans le Parc National d' El Hoceima au Maroc*. Par Bazairi H., Sghaier Y.R., Mechmech A., Benhoussa A., Malouli Idrissi M., Benhissoune S., Boutahar L., Selfati M., Khalili A., Inglese O., Marquez J.L., Martinez A., Perez E., Mauri G., Gonzalez A.R., Ostalé-Valriberas E., Sempre-Valverde J. & Espinosa F. (SPA/RAC, Ed.). [Link](#)

UNEP/MAP-SPA/RAC. (2020b). *Cartographie des Habitats marins clés et évaluation de leur vulnérabilité face aux activités de la pêche dans les îles Habibas et l'île Paloma en Algérie*. (SPA/RAC, Ed.). <https://doi.org/10.13140/RG.2.2.34953.62563>

UNEP/MAP-SPA/RAC. (2020c). *Mapping of marine key habitats and assessing their vulnerability to fishing activities in Foça Special Environmental Protection Area*. By Kaboğlu, G., Akçalı, B., Kızıldağ, N., Tıraşın, E. M., Atgın, O., Özel, Ö., Oğuz Kaboğlu, S., Cihangir, B., Özdaş, A. H., Açık Çınar, Ş., Yılmaz, F., Önen, S., Bitlis, B., Yılmaz, E. C., Bizsel, K. C., Yıldız, İ. Karayalı, O. & Özgen, Ö. Ed (SPA/RAC, Ed.). [Link](#)

UNEP/MAP-SPA/RAC. (2021a). *Post-2020 Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region* (SPA/RAC). [Link](#)

UNEP/MAP-SPA/RAC. (2021b). *Interpretation Manual of Marine Habitat Types in the Mediterranean Sea (UNEP/MED WG.502/Inf.4)* (p. 426). [Link](#)

UNEP/MAP-SPA/RAC. (2021c). *Guidelines for the assessment of environmental impact on coralligenous and maërl assemblages* (No. UNEP/MED WG.502/Inf.3; p. 58). UNEP/MAP SPA/RAC. [Link](#)

Verdura, J., Linares, C., Ballesteros, E., Coma, R., Uriz, M. J., Bensoussan, N., & Cebrian, E. (2019). Biodiversity loss in a Mediterranean ecosystem due to an extreme warming event unveils the role of an engineering gorgonian species. *Scientific Reports*, 9(1), 5911. <https://doi.org/10.1038/s41598-019-41929-0>

Zentner, Y., Rovira, G., Margarit, N., Ortega, J., Casals, D., Medrano, A., Pagès-Escolà, M., Aspillaga, E., Capdevila, P., Figuerola-Ferrando, L., Riera, J. L., Hereu, B., Garrabou, J., & Linares, C. (2023). Marine protected areas in a changing ocean: Adaptive management can mitigate the synergistic effects of local and climate change impacts. *Biological Conservation*, 282, 110048. <https://doi.org/10.1016/j.biocon.2023.110048>

Zunino, S., Canu, D. M., Zupo, V., & Solidoro, C. (2019). Direct and indirect impacts of marine acidification on the ecosystem services provided by coralligenous reefs and seagrass systems. *Global Ecology and Conservation*, 18, e00625. <https://doi.org/10.1016/j.gecco.2019.e00625>

Annex V

Recommendations for the way forward for the Regional Action Plans approach for selected species and habitats adopted under the SPA/BD Protocol

Introduction

1. The Contracting Parties to the Barcelona Convention, within the framework of the Mediterranean Action Plan, give priority to the conservation of the marine environment and to the components of its biological diversity. This was confirmed by the adoption of the new 1995 Barcelona Convention Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol) and of its annexes, among them a list of endangered or threatened species.
2. The Protocol sets out very detailed requirements for endangered or threatened species listed in Annex II and III to the Protocol.
3. Elaborating and implementing action plans to conserve one species or group of species is an effective way of guiding, coordinating and strengthening the efforts that the Mediterranean countries are making to safeguard the natural heritage of the region.
4. All the Regional Action Plans (RAPs) adopted⁴¹ under the SPA/BD Protocol are meant to contribute to the conservation of Mediterranean Sea biodiversity and ecosystems. Three concern benthic habitats (marine vegetation, coralligenous and other calcareous bio-concretions, dark habitats), five concern the conservation of species or groups of species (monk seal, marine turtles, cetaceans, cartilaginous fish, birds of the Protocol's Annex II), one is relative to the assessment and management of invasive species, and one is a restoration programme of a species threatened by extinction *Pinna nobilis*.
5. Although they do not have a binding legal character, these action plans were adopted by the Contracting Parties as regional strategies setting priorities and activities to be undertaken. In particular, they call for greater solidarity between the States of the region, and for coordination of efforts to protect the species in question. This approach has been proved to be necessary to ensure conservation and sustainable management of the concerned species in every Mediterranean area of their distribution.
6. These Action Plans, strategies and Programme constitute midterm regional strategies which are planned to be updated generally each five-year, based on an evaluation of their implementation at regional and national levels.
7. For the biennium 2024-2025, the Contracting Parties to Barcelona Convention requested SPA/RAC during the COP 23 (Portorož, Slovenia, 5-8 December 2023) to evaluate the Regional Action Plans Approach for selected species and habitats adopted under the SPA/BD Protocol and to identify recommendations for the way forward, in the light of the new Global Biodiversity Framework, POST-2020 SPABIO and the EcAp/IMAP processes of the Barcelona convention and submit them for consideration of CoP 24.
8. The recommendations suggested hereafter derive from the assessment of Regional Action Plans (RAPs) under the SPA/BD Protocol, the comparison of their approaches and structure as well as from the feedback from national SPA/BD Focal Points and resource experts on the RAPs' strengths and

⁴¹ Regional strategy for the conservation of Monk Seal in the Mediterranean, Action Plan for the conservation of marine turtles, Action Plan for the conservation of cetaceans, Action Plan for the conservation of marine vegetation, Action Plan for the conservation of bird species listed in annex II of the SPA/BD Protocol, Action Plan for the conservation of cartilaginous fishes (Chondrichthyans) in the Mediterranean Sea, Action Plan concerning species introduction and invasive species, Action Plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea, Action Plan for the conservation of habitats and species associated with seamounts, underwater caves and canyons, aphotic hard beds and chemo-synthetic phenomena in the Mediterranean Sea (Dark habitats Action Plan) and, Restoration Programme of *Pinna nobilis*

weaknesses. A SWOT (Strength, Weaknesses, Opportunities and Threats) analysis was conducted, incorporating questionnaire responses, RAP assessments, identified gaps, and other regional/international strategies and policies .

Recommendations for the way forward for the Regional Action Plans approach for selected species and habitats adopted under the SPA/BD Protocol

General points:

1. The recommendations hereinafter take in account the Ecosystem Approach (decision IG.17/6 adopted by COP 15), the associated IMAp (Integrated Monitoring and Assessment Programme for the Mediterranean Sea and Coast and related assessment criteria; decision IG.22/7 adopted by COP 19) and the Post-2020 SAPBIO (Post-2020 Strategic Action Plan for the Biodiversity and sustainable management of Natural resources in the Mediterranean region; Decision IG.25/11 adopted by COP 22).
2. Appendix I presents a diagram proposed for the evaluation and updates of future Regional Action Plan (RAP) taking in account several propositions/recommendations including the creation of a RAP Working Group. It is based on the current updating process of the RAPs.
3. Appendix II details what could be included in the proposed two parts of future RAPs and which could be taken in consideration for future updates.
4. The 10 RAPs which have been developed concern the main emblematic vulnerable species, groups of species, habitats and the NIS. For the following years, it is recommended to focus on the implementation and efficiency of the current RAPs at national and regional level, before developing new RAPs on other species or habitats.
5. The fact that RAPs are not legally binding reduces the action implementation at national scale. However, if they were binding, RAPs would be adopted with more difficulty. The role of RAPs is to define an action plan and request participation of CPs to contribute as much as possible. Therefore, it is recommended that the actions requested in the RAPs remain not legally binding. However, these should be considered by the CPs as high priority conservation actions to be implemented.
6. It is recommended to persist in enforcing knowledge acquisition on species and habitats concerned throughout all RAPs, starting with geographic distribution and continuing with composition, structure and ecosystem functioning

1. CREATING A REGIONAL ACTION PLAN (RAP) WORKING GROUP

7. It has been suggested by several questioned people but also within certain RAPs, to create a working group, advisory committee or task force for the RAP. It is recommended to consider creating a RAP Working Group (which would be the same for all RAPs), which could have an overall view of the RAPs and their difficulties and handle several points including (but not only): necessity to review or not RAPs, increase collaboration between RAPs and between RAPs and other organisations etc. The RAP Working Group should include at least one representative of each RAP expert and/or stakeholder. The frequency of meeting is to be define but once a year starting by online meetings could seem appropriate.

2. RAP STRUCTURE AND CONTENTS

8. When updating a RAP, it is recommended to take in consideration the Post-2020 SAPBIO requested actions and expected results for 2027 and 2030.

9. RAPs concern very different species and habitats, and it is normal to find differences between RAPs. However, it is recommended to suggest a common plan/structure when RAPs will be updated so that same type of content can be found in each RAP.

10. Further, it is recommended to consider dividing the structure of RAPs in two parts: one general part including a clear list of species or habitats concerned, a state of knowledge and related policies, threats, methods of assessment as well as vision/goals and targets etc. (see Appendix II). This part could be reviewed less frequently. A second part containing mainly the short-term action plan would be evaluated and updated more frequently than the first part

11. If the proposition of RAP format in two parts as suggested is adopted, the first part needs to be updated less frequently than the second part is evaluated. If a RAP Working Group is created, it could decide when these parts need to be evaluated and/or updated. Otherwise, it is suggested to update Part 1 every 10 year, and that Part 2 (action plan table) be evaluated and updated every 5 years.

12. When defining the short-term actions to be implemented, it is recommended to propose as much as possible actions which are Specific, Measurable, Achievable, Relevant and Time-bound (SMART). This will facilitate their implementation as well as their evaluation.

13. The more a RAP is specific, the easier it is to implement at national level because the object of conservation is clear. Also, species or habitats can be grouped under a same RAP if they have numerous common points and threats or are found in same ecosystems. This is not the case of deep-sea habitats and caves. Therefore it is recommended that these two types of habitats be separated in two RAPs.

14. If a RAP Working Group is created, it is recommended to discuss the creation of a RAP only on rhodolith/mäerl beds (currently this habitat is regrouped with the coralligenous habitats).

3. NATIONAL IMPLEMENTATION OF THE RAPs

15. It is recommended to suggest a list of priority RAPs for each CP (the most relevant species/habitats for the CP) in collaboration with the SPA/BD Focal Points and taking in account scientific knowledge.

16. At national level, it is recommended to search for further integration and connections with other relevant policies e.g. Marine/Maritime Spatial Planning (MSP), Integrated Coastal Zone Management ICZM.

17. Actions requested by RAPs are more likely to be implemented at national scale if supported by a project. It is recommended to pursue support through projects for RAP implementation at national scale.

4. REGIONAL ASPECTS

18. For each species or habitat considered, it is recommended to spatially identify a regional network of MCPAs which contribute effectively to their conservation. This could contribute to identify spatial/functional gaps in conservation of the species or habitat at regional scale (for reproduction, gene flow, feeding etc.). This could be a task for the RAP Working Group.

5. CONNECTING AND COOPERATING

19. It is recommended to :

- maintain and develop relations between CPs and international organisations. Further, developing connections with other Protocols such as Integrated Coastal Zone Management (ICZM) Protocol would be fruitful for the RAPs implementation.

- elaborate a list of regional/international collaborators and indicate to which RAP they contribute and in what way (simple table).
- make clear reference to relevant IMAF indicators in all RAPs.

20. The creation of a RAPs Working Group could also be in charge of enforcing the relations RAPs-IMAF also by identifying RAP needs in terms of assessment and monitoring which could be covered by IMAF indicators.

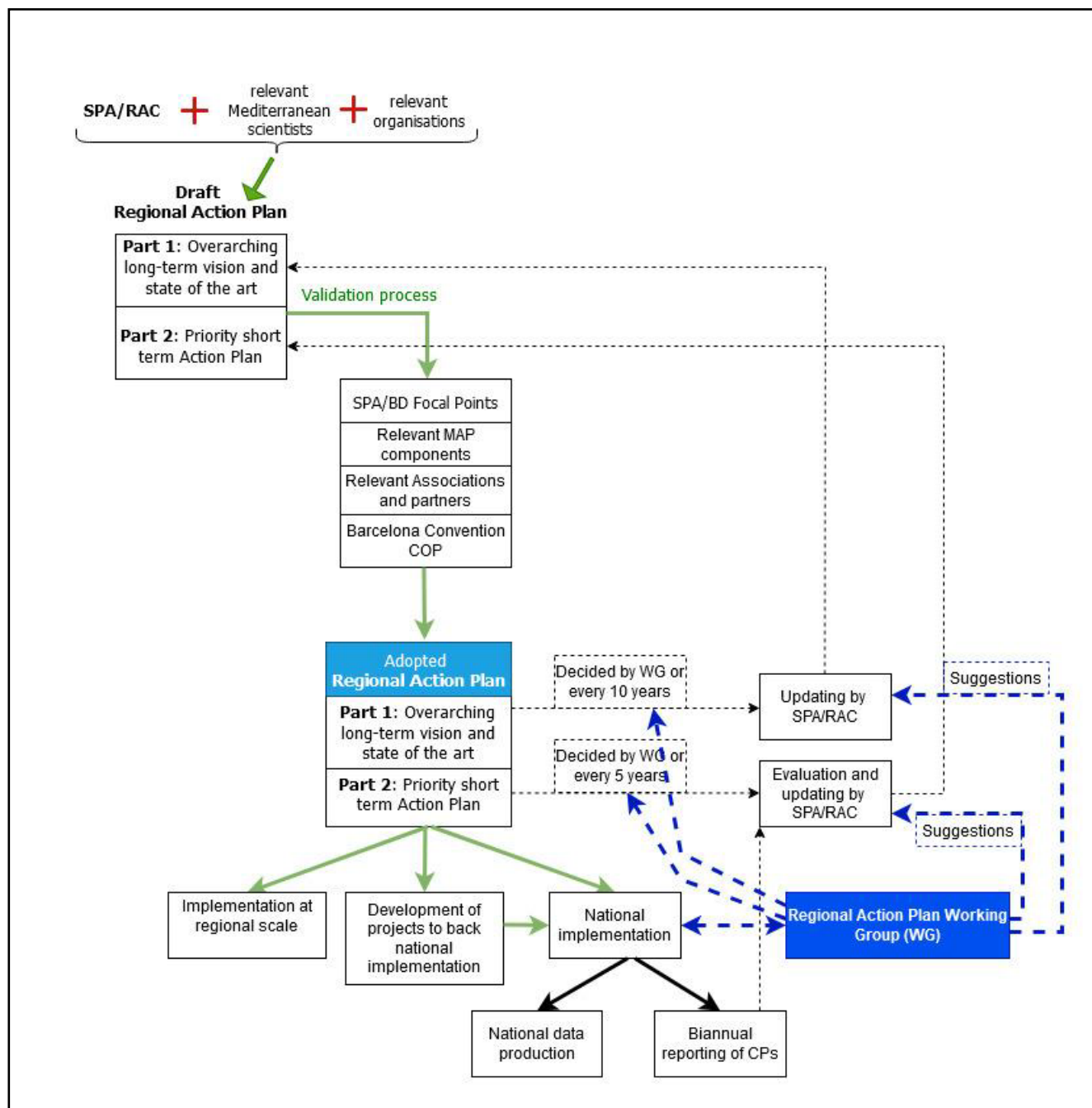
6. EVALUATION AND UPDATING PROCESS (SEE APPENDIX I)

21. It is recommended to:

- suggest a common structure for the evaluations especially in the presentation of the national implementation evaluation.
- inform whether results of the national implementation should be presented by CP or more globally to assess the global implementation of the action evaluated.
- keep the format of reporting which is well known and accepted by CPs. However, reporting needs to be more systematic and enhanced.
- consider replacing in the reporting format, “under development” by more precise choice such as “under project”, “implemented at 1-25%”, “26-50%”, “51-75%”, “76-100%”.
- integrate a RAP expert Working Group (WG) in the updating process as presented in Annex B which could contribute e.g. to increase relations between RAPs, evaluate the need to update and/or evaluate a RAP, suggest priorities to the updating RAP process, identify the network of MCPAs contributing to the conservation of species/habitats for each RAP, and identify spatial gaps by sub-region for an efficient network of MCPAs to conserve the species/habitat within its distributional range

Appendix I

RAP evaluation and update process including a RAP Working Group and a RAP format in two parts



Appendix II

**Proposed common format/pattern for Regional Action Plans on selected species and habitats
under the SPA/BD Protocol**

Regional Action Plan document

Part 1

- I. Introduction
 - a. UNEP/MAP policy context
 - b. RAP history
- II. Definition of the conservation object
 - a. List of habitats concerned using UNEP-SPA/RAC reference list of habitats (see [Interpretation manual of Marine Habitat types in the Mediterranean Sea](#))
 - b. List of species concerned exhaustive in the case of RAPs on species or list of key taxa in the case of RAPs on habitat.
- III. Relevant international, European, regional policies and legislation presented in a table emphasising the appropriate elements.
- IV. Current state of the art in terms of knowledge on species or habitats
 - a. Geographic distribution. Summarise knowledge from previous RAP and list with references the knowledge acquired since then.
 - b. Composition and structure
 - c. Population dynamics of typical/key species
- V. Main anthropogenic threats
Describe the impact of each main threat on species or habitat.
- VI. Methods and indices used and eventual “best practices” with a list of relevant documents
- VII. Needs, gaps and challenges
 - a. In knowledge
 - b. Relative to specific or new anthropogenic threats
- VIII. Long-term vision, goals and targets
The Post-2020 SAPBIO hierarchical pattern and terminology can be used as a model.
- IX. Priorities at regional, sub-regional and national scales
- X. Action Plan active partners
A list of key Mediterranean organisms contributing to the implementation of the RAP and their contribution could be useful.
- XI. Evaluation and update process
Short paragraph on the process which can be common to all RAPs or not.

Part 2

- Present Vision, goals, targets and actions in a diagram.
- Role of each partner and of CPs should be clearly defined for the implementation of the RAP.
- Any sub-regional specificities for the implementation of the actions should be specified.
- Table of actions requested. Actions should be limited in number (e.g. no more than 15) and as much as possible Specific, Measurable, Achievable and Time-based (SMART).