



**Deliverable D3.1**

**REGIONAL PROGRAMME OF MEASURES  
ANALYSIS:**

**ANALYSIS OF THE REGIONAL POMs GAP ANALYSIS  
CARRIED OUT IN THE FRAMEWORK OF THE  
UNEP/MAP ECAP INITIATIVE**

**Date: September 2016**

**Action Plans for Integrated Regional  
Monitoring Programmes, Coordinated  
Programmes of Measures and Addressing Data  
and Knowledge Gaps in Mediterranean Sea**

**ActionMed**

**11.0661/2015/712631/SUB/ENVC.2**

**Coordinator**

**Dr Kalliopi Pagou**

**Project start date and duration**

**1<sup>st</sup> November 2015, 15 months**

**[www.actionmed.eu](http://www.actionmed.eu)**

## **Acknowledgment**

This report was produced as a result of the ActionMed (Action Plans for Integrated Monitoring Programmes of Measures and Addressing Data and Knowledge Gaps in Mediterranean Sea) project. The project was co-financed by the European Union (EU). Grant No. 11.0661/2015/712631/SUB/ENVC.2

## **Disclaimer**

This deliverable reflects only the authors' views. The European Commission is not responsible for any use that may be made of the information it contains.

This deliverable should be referenced as:

ActionMed D3.1: 'Regional Programme of Measures Analysis - Analysis of the Regional PoMs: Gap analysis carried out in the framework of the UNEP/MAP EcAp initiative', September 2016, 125p.

Authors: Antoniadis S., Hema T.

Affiliation: UNEP/MAP

Contact person: Antoniadis S. (Stavros.Antoniadis@unep.org)

Edited by: Giannoudi L.<sup>1</sup>, Streftaris N.<sup>1</sup>, Pagou K.<sup>1</sup>, Antoniadis S.<sup>2</sup>

Affiliation: <sup>1</sup>HCMR, <sup>2</sup>UNEP/MAP



## CONTENTS

LIST OF TABLES AND FIGURES.....	III
ABBREVIATIONS .....	1
EXECUTIVE SUMMARY .....	3
INTRODUCTION AND CONTEXT .....	9
PART I. POLLUTION.....	18
I. EUTROPHICATION .....	19
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	19
2. EXISTING MEASURES AT REGIONAL LEVEL .....	20
3. GAPS AND PROPOSALS .....	24
II. CONTAMINANTS .....	26
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	26
2. EXISTING MEASURES AT REGIONAL LEVEL .....	27
3. GAPS AND PROPOSALS .....	38
III. MARINE LITTER .....	40
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	40
2. EXISTING MEASURES AT REGIONAL LEVEL .....	43
3. GAPS AND PROPOSALS .....	49
SPECIAL NOTE ON THE LINKS BETWEEN WFD AND MSFD MEASURES .....	55
PART II. MARINE SPECIES AND HABITATS .....	57
I. BIODIVERSITY .....	58
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	58

2. EXISTING MEASURES AT REGIONAL LEVEL .....	59
3. GAPS AND PROPOSALS .....	65
II. NON-INDIGENOUS SPECIES .....	68
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	68
2. EXISTING MEASURES AT REGIONAL LEVEL .....	70
3. GAPS AND PROPOSALS .....	74
III. FISH STOCKS.....	76
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	76
2. EXISTING MEASURES AT REGIONAL LEVEL .....	78
3. GAPS AND PROPOSALS .....	84
IV. SEE-FLOOR INTEGRITY .....	87
1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS .....	87
2. EXISTING MEASURES AT REGIONAL LEVEL .....	88
3. GAPS AND PROPOSALS .....	89
PART III. CROSS-CUTTING ISSUES .....	91
I. CLIMATE CHANGE.....	92
II. SUSTAINABLE CONSUMPTION AND PRODUCTION .....	97
III. INTEGRATED COASTAL ZONE MANAGEMENT .....	100
CONCLUSION.....	103
REFERENCES .....	104
ANNEX I. OUTPUTS SET OUT IN THE OFFSHORE ACTION PLAN AND THEIR RELEVANCE TO THE REGIONAL POM.....	107
ANNEX II. GFCM RECOMMENDATIONS ON CONSERVATION AND MANAGEMENT MEASURES AS APPEARED IN THE FAO 2016 REPORT	113
ANNEX III. ACTIONS SUGGESTED BY THE SCP ACTION PLAN ROADMAP AND THEIR RELEVANCE TO THE REGIONAL POM .....	116
ANNEX IV. OUTPUTS SET OUT IN THE ICZM ACTION PLAN AND THEIR RELEVANCE TO THE REGIONAL POM.....	122

## LIST OF TABLES AND FIGURES

<i>Table 1. Mediterranean Strategy for Sustainable Development (2016-2025) targets:</i>	11
<i>Table 2. Main pressures and relevant regional legislation and Programmes of Measures.</i>	14
<i>Figure 1. Nutrient input sources</i>	19
<i>Table 3. Activities provided for in the SAP/MED.</i>	21
<i>Table 4. Measures provided for in the Regional Plans for reduction of BOD5.</i>	23
<i>Table 5. Gaps related to measures for eutrophication</i>	24
<i>Table 6. Key contaminants related targets set out in SAP/MED</i>	28
<i>Table 7. Key measures provided for in pollution-related Regional Plans.</i>	31
<i>Figure 2. Overview of the major coastal cities with/without WWTPs in 2010</i>	37
<i>Table 8. Gaps related to measures for contaminants.</i>	38
<i>Figure 3. Sources of Marine Litter.</i>	41
<i>Table 9. Main impacts of marine litter (Original source: UNEP/MAP, 2015).</i>	42
<i>Table 10. Measures provided for in the Regional Plan on Marine Litter Management in the Mediterranean.</i>	45
<i>Table 11. Gaps related to measures for marine litter.</i>	49
<i>Figure 4. Common Recommendations for WFD measures</i>	56
<i>Table 12. Objectives and Priority Actions set out in the SAP/BIO.</i>	60
<i>Table 13. Gaps related to measures for biodiversity</i>	65
<i>Table 14. Main pressures and impacts of invasive alien species</i>	68
<i>Figure 5: Main pathways of NIS introduction per regional sea (source: EEA, 2015f)</i>	70
<i>Table 15. Measures provided for by the Action Plan on introductions of Species and Invasive Species.</i>	71
<i>Table 16. Gaps related to measures for non-indigenous species</i>	74
<i>Figure 6. Status of assessed stocks in Europe.</i>	76
<i>Figure 7. Range of discard behaviour by fishing activity.</i>	78
<i>Table 17. Targets, Outputs and Actions provided for by the GFCM Mid-term Strategy.</i>	80
<i>Figure 8. Total catch in ICES and GFCM fishing regions of Europe.</i>	83
<i>Table 18. Gaps related to measures for fish stock depletion.</i>	85
<i>Table 19. Gaps related to measures for sea-floor integrity.</i>	89
<i>Figure 9. Observed and projected changes in annual average surface temperature</i>	93
<i>Table 20. Relevant environmentally friendly measures extracted from the IPCC Report.</i>	95
<i>Table 21. Progress achieved on each article of the ICZM Protocol (Source: PAP/RAC. 2014)</i>	101
<i>Table 22. Gaps related to measures for ICZM.</i>	102

## ABBREVIATIONS

ACCOBAMS	Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area
ALDFG	Abandoned, lost or otherwise discarded fishing gear
BATs	Best Available Techniques
BEPs	Best Environmental Practices
BOD	Biochemical Oxygen Demand
BWC	Ballast Water Convention
BWM	Ballast Water Management
CAMP	Coastal Area Management Programme
CAP	Common Agricultural Policy
CFP	Common Fisheries Policy
CIS	Common Implementation Strategy
COP	Conference of Parties
EcAp	Ecosystem Approach
EFA	Ecological Focus Areas
EIA	Environmental Impact Assessment
ELV	Emission Limit Value
EMFF	European Maritime and Fisheries Fund
EMS	Environmental Management System
ENP	European Neighbourhood Policy
FAO	Food and Agriculture Organization
FRA	fisheries restricted areas
GES	Good Environmental Status
GFCM	General Fisheries Commission for the Mediterranean
HCB	Hexachlorobenzene
HELCOM	Baltic Marine Environment Protection Commission - Helsinki Commission
HNV	High Nature Value (farming)
IAS	Invasive Alien Species
ICC	International Coastal Cleanup
ICZM	Integrated Coastal Zone Management
ILUC	Indirect Land Use Change
IMAP	Integrated Monitoring and Assessment Programme
IMO	International Maritime Organisation
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IUU Fishing	Illegal, Unreported, and Unregulated Fishing
LBS	Land-based sources
MLRP	Regional Plan on Marine Litter Management in the Mediterranean
MMP	Multiannual Management Plans
MoU	Memorandum of Understanding
MPA	Marine Protected Areas
MSCG	Marine Strategy Coordination Group
MSFD	Marine Strategy Framework Directive
MSP	Maritime Spatial Planning
MSSD	Mediterranean Strategy on Sustainable Development

MSY	Maximum Sustainable Yield
MTA	Multi-Trophic Aquaculture
NAP	National Action Plans
NCFE	Natural Capital Financing Facility
NIS	Non-indigenous species
PAHs	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCCP	Personal Care and Cosmetic Products
PoM	Programmes of Measures
POP	Persistent Organic Pollutants
PRTR	Pollutant release and transfer register
RBMP	River Basin Management Plan
RFMO	Regional Fisheries Management Organization
ROV	Remotely Operated Vehicles
SAP/BIO	Strategic Action Plan for the conservation of marine and coastal biodiversity in the Mediterranean
SAP/MED	Strategic Action Programme to Address Pollution from Land-Based Activities
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SoER-MED	State of the Mediterranean Marine and Coastal Environment
SPA	Specially Protected Areas
SPAMI	Specially Protected Areas of Mediterranean Importance
UAS	unmanned aircraft systems
UNEP	United Nations Environment Programme
UNEP/MAP	United Nations Environment Programme – Mediterranean Action Plan
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive
WWTP	Wastewater Treatment Plant



## EXECUTIVE SUMMARY

1. Despite its ecological importance and vital role for the socioeconomic development of the region, Mediterranean Sea faces a lot of different pressures, often acting synergistically that cause serious impacts on the marine and coastal biodiversity, and threaten the continuation of human activities, which rely on healthy seas. The objective of reaching a Good Environmental Status (GES) of the Mediterranean Sea and Coast has been adopted both by the European Union in the framework of the MSFD and by UNEP/MAP Barcelona Convention, as its Contracting Parties have committed to implement the ecosystem approach (EcAp), as a strategy for the integrated management to achieve such an objective. Therefore, at regional level, a large number of measures have been adopted, in order to tackle the most important pressures and ensure the achievement of GES. However, although significant progress has been accomplished in some areas, there are pressures that continue to be present, while in some cases they are even increasing.

2. In this regard, the aim of this study is to review the main stressors and impacts on Mediterranean Sea and Coast, examine the existing measures at regional level and identify further actions that are required in order to reach GES, including strengthening of implementation and enforcement of existing measures or adoption of updated/new measures.

3. This study has been carried out under the framework of the ActionMed project funded by DG Environment, aiming to promote best practices for action plans to develop integrated regional monitoring programmes, coordinated programmes of measures and addressing data and knowledge gaps in coastal and marine waters. More specifically, this report is the first deliverable of Activity 3, aiming to provide assistance in the preparation of programmes of measures, by addressing particular gaps identified both at national/subregional and regional level. Following revision of the scope of Deliverable D3.1, it was decided that it would further the work undertaken in the framework of the EcAp regional gap analysis<sup>1</sup> and identify areas where existing measures are not sufficient, or have not been efficiently implemented, to bridge the gaps between the current situation and the Good Environmental Status of the Mediterranean Sea and Coast, by defining potential new/updated measures that could be adopted at the regional Mediterranean level.

4. The main pressures on the marine environment that have been considered in this study, are: i) pollution, including eutrophication, contaminants and marine litter ii) biodiversity loss, including species decline and habitats destruction iii) introduction and spread of non-indigenous species, iv) depletion of fish stocks and v) impact on sea-floor integrity. Moreover, crosscutting issues having synergetic effects on pressures have been also considered: climate change, unsustainable patterns of consumption and production and impacts from costal development. For each of those issues, important measures have already been adopted at regional level and the

---

<sup>1</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

primary need towards GES achievement is their full and effective implementation. In addition, some areas require further actions, including the consideration of updated/new measures.

5. The results of this study will be presented at national and regional workshops gathering stakeholders in charge to develop coastal and marine policies in the Mediterranean. These workshops will be organised both in the frameworks of the ActionMed project and UNEP/MAP, in order to elaborate in a participatory way a Regional Programme of Measures that could be adopted by the Mediterranean countries, in order to achieve the GES of the coastal and marine Mediterranean ecosystems.

6. Below is presented a summary of the findings for each of the main issues considered in this study:

- i. **Eutrophication:** Although the Mediterranean Sea is, in its biggest part, oligotrophic, there are important eutrophication hotspots caused by human induced nutrient enrichment. The sectors with the greater contribution to eutrophication are farming, wastewater treatment and industry. Eutrophication is tackled by different regional instruments, but there are still some areas where further actions are required:
  - Full implementation of measures providing for establishment of WWTP in all major coastal cities and promotion of secondary and tertiary treatment, and increased reuse of collected wastewater;
  - Adoption of new measures for agriculture, including restrictions in fertilisers use, optimised nutrient use, promotion of sustainable and organic farming, wider use of EFAs to combat eutrophication, use of EU CAP Pillar II for dark green measures, permanent grasslands, buffer strips etc.;
  - Adoption of technical guidelines and management standards for aquaculture activities;
  - Adoption of measures to prevent nutrient inputs from other sources (reduction of atmospheric depositions, better control of runoffs, introduction of wetlands as nutrient sinks etc.).
- ii. **Contaminants,** including heavy metals, POPs and PAHs, have been a priority issue for UNEP/MAP, since the first years of its adoption. The regional legal arsenal to tackle this problem includes Protocols (mainly the LBS, Dumping, Offshore and Hazardous Wastes Protocols), a Strategic Action Programme (SAP/MED) and a series of Regional Plans including measures and timetables for priority contaminants. The main findings on measures needed to address the gaps for contaminants are summarised as follows:
  - Full implementation of existing measures regarding urban and industrial wastewater treatment along with enhanced enforcement and control and better regulation of sludge management;
  - Stricter implementation and enforcement of measures aiming to eliminate some key contaminants that continue to be present in the Mediterranean;
  - Obligation for more frequent reporting;

- Adoption of measures to promote Green Infrastructure and nature-based solutions for storm water management;
  - Review and update of priority contaminants list;
  - Adoption of new measures or even Regional Plans for sectors contributing to pollution, including agriculture, aquaculture, desalination and tanneries;
  - Upscale ratifications of both the Dumping (not yet in force) and Offshore Protocols;
  - Adoption of new measures to better address the atmospheric deposition of contaminants.
- iii. **Marine litter** in the Mediterranean has been confirmed as a critical issue and UNEP/MAP was the first ever Regional Sea Convention to adopt a Regional Plan, setting out legally binding measures and timetables for marine litter management. Although significant progress has been achieved in controlling, preventing and reducing marine litter, there are still gaps that need to be addressed, mainly through:
- Better research, and monitoring and assessment programmes (through IMAP) to fill the knowledge gaps;
  - Stronger implementation and enforcement of existing measures and adoption of new measures to reduce plastics;
  - Adoption of new measures to address the emerging issues of microplastics and nanoplastics;
  - Adoption of targeted measures specifically addressing the issue of cigarette butts;
  - Better implementation of existing measures and adoption of new measures for pollution from ships, e.g. no-special-fee system;
  - Better implementation and enforcement of preventive measures set out in the MLRP;
  - Integration of circular economy measures in the MLRP;
  - More detailed categorization of marine litter sources.
- iv. **Biodiversity Loss:** The Mediterranean Sea is home to rich biodiversity of fauna and flora, and important habitats. However, human activities have caused a significant decline of species and deterioration of habitats. The most important drivers of pressures on marine biodiversity are fishing activities, pollution, and invasive alien species, while those pressures are exacerbated by climate change. UNEP/MAP system has a variety of instruments aiming at protecting biodiversity, including the SPA/BD Protocol, the SAP-BIO and Regional Plans. However, gaps related to measures have been identified that need to be addressed, mainly through:
- Stronger implementation of SAP/BIO and biodiversity related Action Plans, in the areas where gaps have been identified;
  - Stronger implementation of MPAs, in order to achieve enhanced coherence, connectivity and representatively of the network, better management and more efficient structure;
  - Adoption of new spatial measures to complement the MPAs network;
  - Improved research to fill the knowledge gaps;

- Adoption of technical guidelines and management standards for aquaculture activities;
  - Better regulation of fisheries;
  - Adoption of new measures to support and ensure restoration of degraded ecosystems (i.e. a restoration target of 15%, in line with the EU Biodiversity Strategy).
- v. **Non-indigenous species** represent a major problem for marine biodiversity in the Mediterranean, since it is the European sea with the largest number of non-indigenous species (EEA, 2015). In view of tackling this issue, regional measures have been adopted in the framework of the Barcelona Convention, including the Action Plan on introductions of Species and Invasive Species and related guidelines, as well as the Strategy on ship's Ballast Water Management (BWM). However, gaps still exist and further actions are required as presented below:
- Full implementation of the updated IAS Action Plan, especially regarding the adoption of national legislation and Action Plans, the measures to combat and monitor discharges of ballast water etc.;
  - Adoption of new measures to ensure efficient training of controllers at check points;
  - Enhanced research to fill the knowledge gaps;
  - Stronger ratification efforts to facilitate entry into force of the BWC;
  - Adoption of technical guidelines and management standards for aquaculture activities. New measures should include stricter permit system, special restrictions applying to open system plants, requirement of contingency plans, preventive maintenance actions, undertaking of SEA for aquaculture plans, better integration of aquaculture into MSP, creation of gene banks of wild species etc.;
  - Adoption of a Mediterranean List of Priority IAS.
- vi. **Depletion of fish stocks:** Fishing activities are responsible for a great part of biodiversity loss in the Mediterranean, with its main impacts being overexploitation of commercial fish stocks, by-catch of non-target species, and disturbance or destruction of critical habitats. The management of fisheries in the Mediterranean is undertaken by the General Fisheries Commission for the Mediterranean (GFCM) and many measures have already been adopted aiming at ensuring sustainable fishing and aquaculture activities. Despite the adopted measures, commercial fish stocks continue to decline, and by-catch numbers are still very high. Aquaculture itself may be a response to the pressures from fisheries, but in order not to cause additional damage to the fragile Mediterranean ecosystems it needs to be properly regulated. Below is a list of actions required to bridge the gaps related to measures:
- Enhanced research, monitoring and assessment of fish stocks;
  - Adoption of new measures to minimise discards, i.e. by imposing a landing obligation in line with EU CFP provisions;
  - Better enforcement and control for prohibited/restricted practices;

- Adoption of new measures to halt overfishing, including measures related to MSY, fleet capacity, IUU fishing, regulation of recreational fishing etc.;
- Adoption of new measures to minimise by-catch, including better data collection systems, testing of mitigation measures, technological modifications proven to reduce by-catch etc.;
- Expansion of FRAs;
- Better implementation of Multiannual Management Plans;
- Full integration of ecosystem approach into fisheries management;
- Adoption of technical guidelines and management standards for aquaculture activities.

vii. **Impacts on sea-floor integrity** are mainly caused by bottom fishing, but also by dredging and offshore installations. There are existing measures at regional level in order to protect deep-sea ecosystems from human induced pressures, mainly regarding fishing activities. However there are still some gaps that need to be bridged, mainly through:

- Stronger regulation of offshore activities, in order to prevent or minimise any adverse impacts of offshore installations on sea-floor integrity;
- Minimization of adverse impacts on seabed caused by fishing practices;
- Establishment of a network of marine reserves where bottom trawling is totally banned;
- Better enforcement and control for prohibited practices, such as the bottom towed gear at depths beyond 1,000 m;
- Expansion of the Fisheries Restricted Areas (FRA) measure to other sites;
- Better regulation of dredging activities to take into consideration impacts on sea-floor;

\* \* \*

7. Based on the main environmental pressures identified in UNEP/MAP Mid-term Strategy 2016-2021, it was considered relevant to address in the present gap analysis some cross-cutting issues, including Climate Change adaptation, Sustainable Consumption and Production and Integrated Coastal Zone Management and Marine Spatial Planning, which are relevant to the following environmental problems:

- i. **Climate Change:** the Mediterranean Sea is particularly vulnerable to impacts of climate change, including sea level rise, increased temperature, oxygen depletion and acidification. The Regional Climate Adaptation Framework for the Mediterranean Marine and Coastal Areas addresses directly issues of climate change adaptation. However climate change is expected get an even higher place in the political agenda at regional level. In this regard, some further actions need to be considered, including:

- More research to fill the important knowledge gaps;
- Better understanding and management of synergies and trade-offs with other policy areas (water, biodiversity, energy etc.);
- Promotion and support of Green Infrastructure and nature-based solutions;
- Better links of climate change with SCP;
- Integration of future projections into today's policies .

**ii. Unsustainable patterns of consumption and production** play a key role in environmental degradation. SCP is a cross-cutting policy that must be integrated into all the different policy areas, as has been the case in the Mediterranean, with the adoption of the SCP Action Plan that sets out a comprehensive framework for sustainable consumption and production, in line to the SDG 12 and the developments at EU level. Since the Action Plan was only adopted in 2016, it is early to draw any conclusions about its success, which will largely depend on its implementation. Some proposals for further action, even premature, include:

- Full implementation of the SCP Action Plan;
- Adoption of stricter measures for fishing and agriculture, to minimize unsustainable practices and ensure full coherence with environmental legislation;
- Sustainable management of waste agricultural biomass;
- Adoption of new measures to promote and support Green Infrastructure and nature based solutions.

**iii. Impacts from coastal development:** Coastal areas are very important for the Mediterranean basin as they host important species and habitats and support a large part of the regional economy. However, the pressures on coastal ecosystems are also significant and there is need for integrated management of human activities in coastal zones, in line with the ecosystem approach, that will be translated in a coherent and integrated marine spatial planning. In this regard, the main instruments at regional level are the ICZM Protocol and the ICZM Action Plan, providing for a list of important measures. Based on existing analyses of the implementation of the Protocol, following are some actions that should be taken into consideration:

- Stronger ratification efforts of the ICZM Protocol
- Development of national strategies and action plans by all Contracting Parties, in line with the provisions of the Protocol
- Better integration of MSP into the ICZM policies
- Better assessment of the management of coast, with the adoption of a common methodology
- Better integration of CAMP into wider strategies and plans
- Further research and assessment of climate change impacts on coastal ecosystems
- Adoption of harmonized legislation for urban development



## INTRODUCTION AND CONTEXT

### The Mediterranean Sea

The Mediterranean Sea is unique both in terms of ecological and geographical characteristics and in terms of its importance for the socioeconomic development of the region. The Mediterranean marine and coastal ecosystems support a very rich biodiversity in species and habitats, providing a wide range of ecosystem services, including provisioning, regulating, supporting and cultural services<sup>2</sup>.

The population of the Mediterranean region, of which more than one third live in coastal areas, relies largely on the ecosystem services provided by the Mediterranean Sea and coast, since fisheries, aquaculture, tourism, marine transport, and the offshore industry are five key economic sectors in the Mediterranean basin, generating 360 billion EUR in terms of production value and over four million direct jobs<sup>3,4</sup>. Those activities however, require a healthy, and productive environment, in order to continue developing. Unfortunately, the high number of human activities in the Mediterranean region and especially the fact that usually different activities coexist in the same area without adequate spatial planning and management, can cause cumulative impacts that affect the marine environment. The most important human-induced impacts on the Mediterranean marine and coastal environment, as identified by the Second State of the Mediterranean Marine and Coastal Environment Report, so-called SoER-MED<sup>5</sup>, are coastal degradation and sprawl, chemical contamination, eutrophication, marine litter, marine noise, invasive alien species, overexploitation of fish stocks, deterioration of sea floor integrity, changes in hydrographic conditions and biodiversity loss. The main drivers for the aforementioned impacts are among others the mass unsustainable tourism, industrial activities, fisheries and aquaculture, agriculture, poor waste management and maritime and offshore activities, while all the pressures are amplified by the impacts of climate change.

Similarly, the UNEP/MAP Mid-term Strategy 2016-2021, adopted by COP19 (Decision IG.22/1) identifies the following major environmental issues:

- Coastal development and urban sprawl;
- Chemical contamination of sediments and biota;
- Eutrophication (mostly of local concern);
- Marine litter, concentrated mostly in bays and shallow waters;
- Over-exploitation of coastal and marine resources beyond sustainable limits;
- Sea-floor integrity affected mainly by bottom fishing, but also by dredging and offshore installations;
- Invasive non-indigenous species;

---

<sup>2</sup> Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC

<sup>3</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

<sup>4</sup> The Socio-Economic Report did not assess agriculture and specific industry impacts, but focused on the key sectors that take place on the shore or in the sea.

<sup>5</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

- The impact of marine noise on biota, especially on marine mammals;
- Changed hydrographic conditions caused by local disruption of circulation patterns, due to humans-made structures;
- Marine food webs affected by fisheries pressures;
- Unsustainable patterns of consumption and production as upstream drivers of the above mentioned pressures and impacts on marine and coastal ecosystems;
- Pressures on biodiversity;
- Climate change impact.

### UNEP/MAP – Barcelona Convention

In order to respond to the pressures in the region, and more specifically pollution, 16 Mediterranean States together with the European Community adopted in 1975 the Mediterranean Action Plan, making the Mediterranean the first Regional Sea to adopt an Action Plan under the auspices of UNEP. A year later, the Convention for the Protection of the Mediterranean Sea Against Pollution, was adopted, serving as the legal basis for international cooperation in environmental protection. In 1995, under the need to enlarge the scope of the MAP system, the new Plan was adopted (MAP Phase II) and the Contracting Parties adopted the “Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols” which entered into force in 2004, replacing the 1976 Convention. In the framework of the Barcelona Convention, seven Protocols have been adopted, covering different aspects of marine environmental protection: Dumping Protocol, Prevention and Emergency Protocol, LBS Protocol, SPA & Biodiversity Protocol, Offshore Protocol, Hazardous Wastes Protocol, ICZM Protocol. The regional legal arsenal under the Barcelona Convention is complemented by two Strategic Action Programmes, aiming at addressing pollution from land-based activities and protecting the biodiversity in the Mediterranean region (SAP/MED and SAP/BIO), a series of Regional Plans on pollution, biodiversity, and Integrated Coastal Zone Management as well as the Mediterranean Strategy on Sustainable Development (MSSD).

Furthermore, The Ecosystem Approach (EcAp) is the overarching principle of UNEP/MAP with the ultimate aim of identifying and achieving the GES of the Mediterranean Sea. It was first adopted by the Contracting Parties in COP15, while in COP17 the Contracting Parties recognized the ecosystem approach as a guiding principle for the overall work under the Barcelona Convention and adopted the ecosystem approach Roadmap (Decision IG.20/4). The Ecosystem Approach, which is in line with the provisions under the MSFD, aims to ensure that all the different activities are managed in an integrated manner and that cumulative impacts are addressed, in the framework of the Barcelona Convention, in order to reach GES.

The revised Mediterranean Strategy for Sustainable Development (2016-2025) was adopted by the COP19 in 2016<sup>6</sup>, setting the following targets and timetables:

---

<sup>6</sup> Decision IG.22/2



**Table 1.** Mediterranean Strategy for Sustainable Development (2016-2025) targets:

Deadline	Target
2020	Conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information
2020	Effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
2020 [2030]	Take urgent and significant action to reduce the degradation and fragmentation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species, and take further action as needed by 2030
2030	Enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
2030	Substantially reduce waste generation through prevention, reduction, recycling and reuse
2025	The majority of Mediterranean countries are committed to green or sustainable public procurement programmes
2025	Two-thirds of Mediterranean countries have acceded to the Aarhus Convention

### Marine Strategy Framework Directive (MSFD)

The MSFD was adopted by the EU in 2008, in order to respond in an integrated manner to the multiple pressures faced by the European Seas. The Directive explicitly introduces, in its article 1, an ecosystem-based approach to the management of human activities, moving from a sectorial to an integrated protection of the marine environment. The central objective set out in the MSFD is to achieve a Good Environmental Status (GES) of all EU Seas by 2020, which is defined as “*The environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive*”. In order to better define the GES, eleven descriptors are set out in the Directive’s Annex I, covering all the different aspects of marine and coastal ecosystems, that need to be addressed: biodiversity, non-indigenous species, populations of commercial fish species, food webs, eutrophication, sea floor integrity, hydrographical conditions, contaminants, contaminants in seafood, marine litter, energy and underwater noise.

According to the provisions of the MSFD, the Member States have to develop their Marine Strategies, by following five main steps<sup>7</sup>:

Milestone	Deadline
Assessment of the current environmental status of national marine waters and impacts and socio-economic analysis of human activities (Initial Assessment)	2012
Determination of what GES means for each country	2012
Definition of environmental targets and associated indicators required to achieve GES by 2020	2012
Establishment of monitoring programmes	2014
Development of programmes of measures (PoM) to achieve or maintain GES by 2020	2015

An important element of the MSFD is that it introduces an adaptive management, meaning that the Marine Strategies must be periodically reviewed and updated every six years. This approach offers the Member States the opportunity to assess the gaps in each step, and therefore strengthen the efficient elements and change the weak points of their Strategies.

The Directive defines the EU marine regions and subregions and requires that the Member States take into account the fact that marine waters covered by their sovereignty or jurisdiction form an integral part of a marine region, for the development of their Marine Strategies. Therefore, cooperation and coordination at regional level is a precondition of successful implementation of the Directive and at this point, the role of the Regional Seas Conventions is crucial.

In view of supporting the implementation of the MSFD, a coordination Programme, called **Common Implementation Strategy (CIS)**, was established at EU level. CIS works at three levels, as follows: Three **Working Groups**, consisting of experts have been set up, in order to provide information and support the implementation of the MSFD in the areas of GES definition for all the descriptors, socioeconomic analysis, and data and knowledge exchange, while two technical groups are providing advice and guidance for marine noise and marine litter focusing on the issues of methodologies for monitoring and assessment and the establishment of targets. The work undertaken by the Working Groups is guided by the **Marine Strategy Coordination Group (MSCG)**, which steers the process and feeds the main outcomes into the **Marine Directors Meetings**, which is the high-level political group of the CIS, aiming at ensuring the overall implementation of the MSFD. Important outcomes have been delivered by the CIS that have supported the implementation of the MSFD, such as the Reports for the definition and assessment of all the descriptors, or the Report on Monitoring and others<sup>8</sup>.

<sup>7</sup> [http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/index\\_en.htm](http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/index_en.htm)

<sup>8</sup> <https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp>

## The ActionMed Project

It is of crucial importance for the Mediterranean Member States to implement both the MSFD (for the EU Member States) and the EcAp under the Barcelona Convention in an adequate and coherent manner. A full and harmonized implementation will not only benefit the marine and coastal environment, by reaching a Good Environmental Status, but it will also provide socio-economic stability by ensuring the sustainable continuation of the different activities taking place in the Mediterranean basin.

In this regard, the EU funded ActionMed Project, aims mainly to support and improve the implementation of the MSFD cycle across the Mediterranean focusing on the needs of its five steps, in close collaboration with the Regional Sea Convention in the Mediterranean (UNEP/MAP) and its Ecosystem Approach. The project will review the initial assessment, the GES definition and the environmental target setting in 2018, with emphasis on biodiversity, will develop integrated and coordinated and financially sustainable regional Action Plans (short, mid-term and long-term and best practices for monitoring programmes), and programmes of measures, test their implementation and finally support the establishment of an information Management System to fill data gaps for Mediterranean marine waters.

## Present Report

The main aim of the ActionMed Activity 3 is to assist EU Member States in the Mediterranean region in their work on programme of measures, by addressing particular gaps identified both at national and regional level, in a coordinated manner, both in line with the EU MSFD and the Barcelona Convention's Ecosystem Approach process. In this regard, and as part of the work under the Activity 3, the present Report has as its main goal to identify the main pressures and drivers in the Mediterranean Region, to list the measures adopted at regional level to combat the identified pressures, to assess their efficiency and to finally identify the gaps related to measures, meaning the capacity of measures to bridge the gap between the GES and the current situation. When gaps in measures are identified, the report highlights the need for either strengthened implementation, in cases where measures exist but a lack of implementation and enforcement is noticed or adoption of new measures, in cases where an environmental pressure is currently not addressed at regional level, by proposing for some cases potential measures to be considered. Following revision of the scope of Deliverable D3.1, it was decided that it would further develop the work undertaken in the framework of the EcAp regional gap analysis<sup>9</sup> to more deeply assess the identified gaps related to measures. It should be mentioned that this analysis has a regional dimension, analyzing the measures adopted in the framework of UNEP/MAP Barcelona Convention and its Protocols, while its geographical scope covers not only the EU marine waters, but the whole Mediterranean Region. However, existing measures adopted by the Mediterranean countries at national level, through the available Programmes of Measures (MSFD) and NAPs (Barcelona

---

<sup>9</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

Convention and pollution-related Protocols) have been reviewed defining potential measures that could be taken at regional level.

Originally, the intention was to focus on pollution related issues, including eutrophication, contaminants and marine litter. However, according to **UNEP/MAP Mid-term Strategy 2016-2021**, which identifies the main environmental pressures for which coordinated policy and management responses are required, it was decided to also address other environmental pressures that are of equal importance for the Mediterranean marine and coastal ecosystems. Therefore, the main pressures addressed by the present report are presented in the following table:

**Table 2.** Main pressures and relevant regional legislation and Programmes of Measures.

Pressure	Relevant regional legislation and programmes of measures
<b>Eutrophication</b>	LBS Protocol SAP/MED Regional Plans on BOD5
<b>Contaminants</b>	LBS Protocol Dumping Protocol HZ Protocol Offshore Protocol & Action Plan SAP/MED Regional Plans Regional Strategy on pollution from ships
<b>Marine Litter</b>	LBS Protocol SAP/MED Marine Litter Regional Plan
<b>Biodiversity Loss</b>	SPA/BD Protocol SAP/BIO Species Action Plans
<b>Non-indigenous species</b>	SPA/BD Protocol SAP/BIO Action Plan on Species and Invasive Species
<b>Depletion of fish stocks</b>	SPA/BD Protocol SAP/BIO GFCM measures
<b>Impacts on sea floor</b>	GFCM measures

<b>integrity</b>	SPA/BD Protocol SAP/BIO Action Plan on marine vegetation Offshore Protocol Offshore Action Plan
<b>Climate change</b>	Regional Climate Adaptation Framework
<b>Unsustainable patterns of consumption and production</b>	SCP Action Plan
<b>Impacts from coastal development</b>	ICZM Protocol ICZM Action Plan

## Measures

According to the Initial Measures Gap Analysis of UNEP/MAP<sup>10</sup> which is in line with the MSFD, *measures cover management measures undertaken on a common regional basis and where appropriate, with specific time limits for completion, with the overall aim of achieving the good environmental status of the Mediterranean coast and sea.* According to the MSFD Annex VI, those measures may consist of input controls, output controls, spatial and temporal distribution controls, management coordination measures, measures to improve traceability, economic incentives, mitigation and remediation tools, or communication, stakeholder involvement and awareness raising measures<sup>11</sup>.

The measures required to achieve GES can be either new or existing measures that have already been adopted in the framework of other policies, such as for example the designation of MPAs and the measures set to achieve their conservation objectives, fisheries restrictions, pollution reduction and control measures etc. In the case of existing measures, what needs to be examined is if those measures are fully implemented and if they are sufficient to bridge the gap between GES and the current situation. If the measures are inadequately implemented, more incentives, support or better enforcement and/or compliance mechanisms are required. In case of insufficient measures these have to be replaced or complemented by new/updated measures.

It is important to note that there is a considerable number of existing measures that continue to apply as they are relevant to the achievement of GES, as provided for under the MSFD and the Barcelona Convention COP decisions. However, their relevance to GES achievement needs to be assessed in order to measure the gap between GES and the current state and ensure a more coherent approach for their implementation. For example, the Natura 2000 network (or the MPAs at regional

<sup>10</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

<sup>11</sup> Directive 2008/56/EC, Annex VI

level) is one of the existing tools that will be used to achieve GES, but it will be coordinated with measures under other policies, such as the fisheries measures, the measures for control and eradication of the IAS etc., since the different activities will be managed in an integrated manner aiming at achieving GES.

The measures for the achievement of GES at EU level will be included in the Programmes of Measures that are developed by the Member States, by taking into account the regional conditions and needs. This set of measures has to be implemented and put into context with each other by the Member States, referring to the environmental targets they address<sup>12</sup>. Almost all the EU countries have prepared or are currently preparing their Programmes of Measures.

In the framework of UNEP/MAP, measures have been adopted at regional level with regards to different ecological objectives (which are fully in line the MSFD descriptors). Those measures will be presented below and cover the areas of pollution prevention and reduction (SAP/MED, Regional Plans for priority contaminants, Regional Action Plan for Marine Litter, Regional Strategy for prevention of and response to marine pollution from ships, Offshore Action Plan), biodiversity protection (SAP/BIO, Regional Plans, MPAs and SPAMIs), fisheries management (technical measures, spatial and temporal restrictions etc.) and other more horizontal policies (ICZM Action Plan, SCP Action Plan etc.). The measures adopted at regional level have to be transposed by the Contracting Parties and their implementation is assessed by the Compliance Committee, on the basis of the Reports provided by the Contracting Parties, according to the article 26 of the Barcelona Convention.

On national level, with regards to pollution combat and control, the Contracting Parties are requested to develop their National Action Plans (NAPs) in line with the provisions of the LBS Protocol, the SAP/MED, and the Regional Action Plans. The first National Action Plans were adopted by the Contracting Parties in 2003-2005 and they are now revised and updated, in order to take into account the new regional measures as well as the advancements in the framework of the Ecosystem Approach. The NAPs include measures relevant to the Ecological Objectives 5, 8 and 9 (eutrophication, contaminants and marine litter) and they need to be streamlined with the Programmes of Measures under the MSFD in the respective areas (descriptors 5, 8, 9, and 10 –eutrophication, contaminants, contaminants in seafood, marine litter).

## Methodology

The main pressures on the marine environment have been considered in this study: i) pollution, including eutrophication, contaminants and marine litter ii) biodiversity loss, including species decline and habitats destruction iii) the introduction and spread of non-indigenous species, iv) depletion of fish stocks and v) impact on sea-floor integrity. Moreover, crosscutting issues having synergistic effects on pressures have been also considered: Climate change, Unsustainable patterns of consumption and production and Impacts from coastal development. For each of those issues, further actions are required in most of the cases, even if measures have been adopted at regional level.

---

<sup>12</sup> European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)

For each of these issues, the analysis has been conducted following a homogenous methodology and systematic approach:

- Definition of main pressures on the Mediterranean sea and coast
- Assessment of their impacts and sources
- Identification of the existing measures at regional level
- Review of the main gaps
- Identification of areas where problems are already addressed by existing measures, but better implementation is required
- Identification of problems that are not sufficiently tackled by existing measures and for which additional measures are needed
- Proposal of measures to be considered for the areas that are inadequately addressed in the current framework

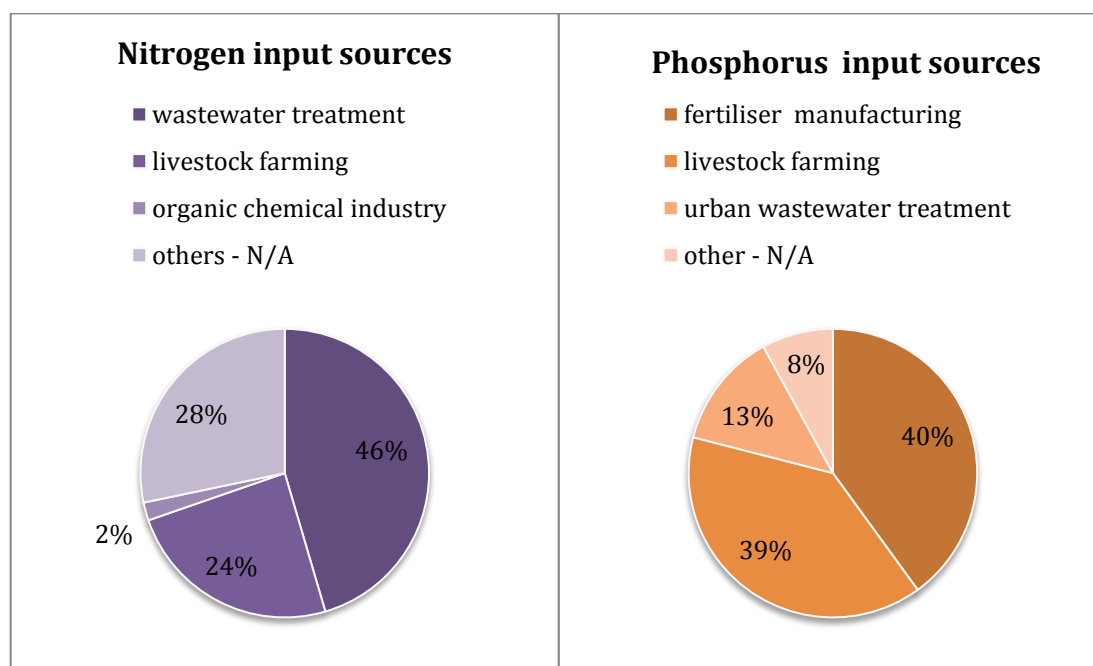
**PART I**  
**POLLUTION**



## I. EUTROPHICATION

### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

Although nutrients are essential for productive marine environments, their overload may cause the effect of eutrophication with negative impacts for the marine and coastal environment. Trophic conditions differentiate across the Mediterranean Sea. In its biggest part, the Mediterranean is oligotrophic, with very low nutrient concentrations. However, there are important eutrophication hotspots, due to nutrient enrichment from human activities, mainly nitrogen and phosphorus. The main sources for this type of marine pollution are sewage, agricultural run-off and organic chemical and fertilizer industry<sup>13</sup> (see figure 1 below, original sources SoER-MED, 2012). Eutrophication problems in the Mediterranean are therefore mainly occurring in areas with limited water exchange with the open sea<sup>14</sup>.



**Figure 1.** Nutrient input sources (Source: SoER-MED, UNEP/MAP 2012)<sup>15</sup>

Aquaculture is also a significant source of nutrients, especially in countries where aquaculture activities are more developed, such as Spain, Greece, Turkey, Italy and Croatia (UNEP/MAP MED POL, 2012)<sup>16</sup>.

<sup>13</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>14</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>15</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>16</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

Eutrophication has various adverse impacts on marine environment, such as changes in species composition, rapid growth of phytoplankton, reduced transparency of the water column, and oxygen depletion.<sup>17</sup> The most important impacts of eutrophication is the development of algal blooms and red tides. In large concentrations algal blooms can cause harmful impacts, including biotoxins production in some cases, to marine organisms and human health, and significant socioeconomic impacts<sup>18</sup>.

The reduced water transparency and the use of oxygen for the decomposition of dead algae may create hypoxic or even anoxic zones. Many Mediterranean species have been impacted by eutrophication, with echinoderms and crustaceans being the most vulnerable ones, while significant impacts on sea grass meadows have also been identified.<sup>19</sup>

In addition, there are considerable socioeconomic impacts, including reduced catches for fishermen, because of fish and shellfish mortality or ban of consumption, loss of employment and reduction of incomes, degradation of the landscape, loss of tourism etc.

## 2. EXISTING MEASURES AT REGIONAL LEVEL

The problem of eutrophication in the Mediterranean Sea is tackled at regional level mainly through the LBS Protocol to the Barcelona Convention, the Strategic Action Programme to Address Pollution from Land-Based Activities in the Mediterranean Region (SAP/MED) and the Regional Plans adopted in the framework of the implementation of Article 15 of the LBS Protocol.

The SAP/MED, adopted by the Contracting Parties in 1997 (COP10) specifically addresses eutrophication in its Point 5.2.5, identifying as main anthropogenic sources of nutrients the: a) Municipal sewage; b) Industrial waste water; c) Agriculture; and d) Atmospheric emissions. Specific targets and activities are provided for by the Programme, as indicated in the table below:

---

<sup>17</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>18</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>19</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

**Table 3.** Activities provided for in the SAP/MED.

Activities	Level
<b>Municipal sewage</b>	
Target 1. By the year 2025, to dispose all municipal waste water (sewage) in conformity with the provisions of the LBS Protocol	
Target 2. By the year 2005, to dispose sewage from cities and urban agglomerations exceeding 100.000 inhabitants and areas of concern in conformity with the provisions of the Protocol	
By the year 2000, to update and adopt the 1986 guidelines for sewage treatment and disposal and, as appropriate, environmental quality criteria and standards	Regional
To develop programmes for sharing and exchanging technical information and advice regarding environmentally sound sewage treatment and facilities, including the use of treated waste water and of sewage sludge	Regional
To promote research programmes to identify and validate sewage treatment technologies	Regional
To update and adopt, over a period of two years, national regulations concerning sewage discharges into the sea and rivers, which take into account the LBS Protocol and especially its Annex II and whenever appropriate, the common measures already adopted by the Parties	National
<p>By the year 2005, to develop National Plans and Programmes for the environmentally sound Management of Sewage, (NPS), and to this end to ensure:</p> <ul style="list-style-type: none"> <li>i. By the year 2005, that the coastal cities and urban agglomerations of more than 100.000 inhabitants are connected to a sewer system and dispose all waste water in conformity with a national regulation system</li> <li>ii. To locate coastal outfalls so as to obtain or maintain agreed environmental quality criteria and to avoid exposing shell fisheries, water intakes, and bathing areas to pathogens and to avoid the exposure of sensitive environments (such as lagoons, seagrass beds, etc.) to excess nutrient or suspended solid loads</li> <li>iii. To promote the primary, secondary and, where appropriate and feasible, tertiary treatment of municipal sewage discharged to rivers, estuaries and the sea</li> <li>iv. To promote and control the good operation and proper maintenance of existing facilities</li> <li>v. To promote the reuse of the treated effluents for the conservation of water resources. To this end, infrastructural measures, treatment at source and the segregation of industrial effluents, shall be encouraged, as well as: <ul style="list-style-type: none"> <li>a) the beneficial reuses of sewage effluents and sludges by the appropriate design of treatment plant and processes and controls of the quality of influent waste waters in accordance with national regulations;</li> <li>b) the environmentally sound treatment when domestic and compatible industrial effluents are treated together;</li> </ul> </li> <li>vi) To promote the separate collection of rain waters and municipal waste waters and ensure treatment of first rain waters considered particularly polluting;</li> <li>vii) To identify the availability and sustainability of productive uses of sewage sludge, such as land-spreading, composting, etc.</li> <li>viii) To prohibit the discharge of sludges into water in the Protocol \ Area</li> </ul>	National

### Industrial waste water

Target 1. By the year 2025, to dispose all waste water from industrial installations which are sources of BOD, nutrients and suspended solids, in conformity with the provisions of the LBS Protocol

Target 2. Over a period of 10 years, to reduce by 50 % inputs of BOD, nutrients and suspended solids from industrial installations sources of these substances

To prepare guidelines for the application of BAT and BEP in industrial installations which are sources of BOD, nutrients and suspended solids	Regional
By the year 2010, to formulate and adopt, as appropriate, environmental quality criteria and standards for point source discharges of BOD, nutrients and suspended solids	Regional
By the year 2010, to formulate and adopt guidelines for waste water treatment and waste disposal from industries which are sources of BOD, nutrients and suspended solids	Regional
To reduce discharges of pollutants as much as possible and, in order to do so, to promote the implementation of environmental audits and apply BEP and, if possible, BAT in the industrial installations which are sources of BOD, giving priority to installations located in hot spots	National
To develop National Programmes for the environmentally sound management of waste water and solid waste from industrial installations which are sources of BOD, and to this end to ensure: i) by the year 2005, that at least industrial installations which are sources of BOD, nutrients and suspended solids, located in areas of concern, dispose all waste water in conformity with national regulation system; ii) To locate coastal outfalls so as to obtain or maintain agreed environmental quality criteria and to avoid the exposure of sensitive environments (such as lagoons, seagrass beds, etc.) to excess nutrient or suspended solid loads; iii) To promote primary, secondary and, where appropriate and feasible, tertiary treatment of BOD waste water discharged into rivers, estuaries and the sea; iv) To promote sound operation and proper maintenance of facilities. v) The reduction and beneficial use of waste water or other solutions appropriate to specific sites, such as no-water and low-water solutions; vi) The identification of the availability and sustainability of productive uses of waste water sludge, and other waste, such as land-spreading, composting, energetic uses, animal feed, etc.; vii) To prepare environmental voluntary agreements to which authorities, producers and users are committed on the basis of a reduction plan.	National

### Agriculture

Target : To reduce nutrient inputs, from agriculture and aquaculture practices into areas where these inputs are likely to cause pollution

To participate in the programmes and activities of international organizations, especially FAO, on sustainable agricultural and rural development in the Mediterranean	Regional
To participate in the FAO programme on the sustainable use of fertilizers and to encourage the preparation of national and regional strategies based on the controlled, appropriate and rational use of seeds, fertilizers and pesticides	Regional
To prepare guidelines for the application of BEP (including good agricultural	Regional

practices) for the rational use of fertilizers and the reduction of losses of nutrients from agriculture	
To assess the quantities and types of fertilizers used	National
To assess the quantity of solid and liquid manure produced by farm animals	National
To promote the rational use of fertilizers and reduce the losses of nutrients by misuse of inorganic fertilizers and manure	National
To promote ecological agriculture and ecological aquaculture	National
To promote rules of good agricultural practices	National
To participate in the programmes and activities of international organizations, especially FAO, on sustainable agricultural and rural development in the Mediterranean.	National
To promote the implementation of the Convention on Desertification	National
<b>Atmospheric emissions</b>	
No targets or actions set out for atmospheric emissions as concluded that Mediterranean waters are not endangered by the atmospheric deposition of nutrients	

In the framework of the SAP/MED and LBS Protocol article 15, two regional Plans relevant to eutrophication were adopted, the Regional Plan on the reduction of BOD<sub>5</sub> from urban waste water (2009) and the Regional Plan on the reduction of BOD<sub>5</sub> in the food sector (2012), providing for important measures, in specific timelines, including the following:

**Table 4.** Measures provided for in the Regional Plans for reduction of BOD<sub>5</sub>

<b>Regional Plan on the reduction of BOD<sub>5</sub> from urban waste water</b>	
All agglomerations collect and treat their urban waste waters before discharging them into the environment	2015 -2019
Adoption of National BOD <sub>5</sub> ELVs for urban waste waters after treatment (i.e. maximum allowable concentration of BOD <sub>5</sub> to be finally discharged from WWTP to the receiving water environment)	2015 -2019
All characteristics of collected and treated urban waste waters are, before discharge in the environment, in accordance to ELVs provisions of the Regional Plan	2015 -2019
Competent authorities or appropriate bodies shall monitor discharges from municipal WWTP to verify compliance with the ELV requirements	2015 -2019
Ensure enforcement of measures	2015 -2019
<b>Regional Plan on the reduction of BOD<sub>5</sub> in the food sector</b>	
Reduction of pollution load by application of BEP and BAT Industrial Food Plants from 9 industry sectors which discharge more than 4 000 pe into water bodies shall meet the following requirements (24\ hour values): COD 160 mg/l, TOC 55 mg/l, BOD <sub>5</sub> or (BOD <sub>7</sub> ) 30 mg/l	2014
Ensure monitoring of related discharges into water to verify compliance with the requirements and enforcement	2014
Review of the values, on the basis of national reports prepared, taking into account new developments on BAT and BEP and on EQ standards in the region, and considering the possibility to develop ELVs based on contaminant's loads.	2015

### 3. GAPS AND PROPOSALS

#### Gaps related to measures:

The following table lists the main issues that need to be further addressed, either by adopting new/updated measures or ensuring better implementation and enforcement of existing measures:

**Table 5.** Gaps related to measures for eutrophication

Sources	Gaps related to measures
<b>Wastewater</b>	<p>Most of organic pollution from sewage comes results from direct/untreated or inadequately treated discharges<sup>20</sup></p> <ul style="list-style-type: none"> <li>• Despite the existing measure providing for the establishment of WWT systems in all agglomerations, there are many coastal cities without WWTPs, especially in the southern and eastern Mediterranean (see figure 4)<sup>21</sup>. This measure needs to be better implemented at least for the major coastal cities.</li> <li>• At regional level, 21% of treated wastewater (25% for ENP South countries) receives only primary treatment, while only 8% (1% for ENP-South countries) is subject to tertiary treatment<sup>22</sup> → New measures are required to ensure that secondary treatment is undertaken at the majority of WTTP (by setting a specific target) and to promote tertiary treatment (again with a measurable target)</li> <li>• Specific measures with quantifiable targets are required to increase the reuse of collected wastewater</li> <li>• Treatment systems need to be improved based on new technologies, i.e. extraction of nutrients for production of fertilizers, and use of sludge for production of energy</li> <li>• New measures should provide for application of pretreatment technologies</li> <li>• Revised standards and limits to assess and tackle overcapacity and mal function of WWTP should be adopted</li> </ul>
<b>Agriculture</b>	<p>Existing measures at regional level are not sufficient to adequately address the issue.</p> <p>Stricter technical guidelines and management standards, or even Regional Plans are required to tackle inputs from agricultural activities and promote more sustainable farming practices, in line with the provisions under the SCP Action Plan. Some potential measures to be considered are the following:</p> <ul style="list-style-type: none"> <li>- Better regulation of and restrictions in the use of fertilizers</li> </ul>

<sup>20</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>21</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>22</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.



- Optimized nutrient use
- Incentives for the establishment of more sustainable agriculture farms
- Better management of animal manure<sup>23</sup>
- Cultivation of nitrogen fixing crops and catch crops in EFAs (EU CAP)
- Better use of CAP Pillar II (Rural Development Programmes) for dark green measures under Priority 4 (e.g. Preservation and restoration of permanent grasslands)
- Promotion of organic and HNV farming, by setting a target of e.g. 10% of total arable land
- Creation of buffer stripes, especially in intensively farmed areas
- Application of water pollution charges for polluting industries, in line with the polluter pays principle

**Aquaculture** Existing measures at regional level are not sufficient to adequately address this sector. Stricter technical guidelines and management standards, or even Regional Plans are required to tackle inputs from aquaculture activities. New measures need to be adopted to ensure that aquaculture activities are adequately planned and developed sustainably and that the environmental impacts are minimized. Nutrient balanced aquaculture needs to be promoted.

- Potential new measures extracted from the European Commission Staff Working Document<sup>24</sup> that can be considered include:
  - limitation of site biomass and production levels to a maximum level,
  - limitation and control of discharges,
  - limitation of fertilizer use to the real requirements of the site,
  - use of nutrient enriched water for biogas production or irrigation,
  - use of efficient feeding systems to ensure minimization of uneaten feed,
  - site management such as fallowing, treatments, and exclusion zones,
  - implementation of measures to minimize the release of nutrients such as use of closed containment or partial recirculation,
  - drum filters for clean-up,
  - development of multi-trophic aquaculture (MTA) systems,
  - use of blue catch crops (e.g. mussels) as compensation measure,
  - recirculating aquaculture systems

**Other sources of nutrients** Potential measures for other sources include<sup>25</sup>

- Reductions in atmospheric sources of nitrogen,
- Better control of runoff from streets and storm sewers
- Introduction of wetlands as nutrient sinks

<sup>23</sup> [http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index\\_en.htm](http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index_en.htm)

<sup>24</sup> European Commission; SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture; Brussels 2016

<sup>25</sup> [http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index\\_en.htm](http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index_en.htm)

Overall issues	Gaps related to measures
<b>Future policy development</b>	The problem of eutrophication is currently spotted mainly in the Northern Mediterranean, where wastewater management is relatively more developed. However, in order to tackle the issue in the long-term, the future conditions in the Southern Mediterranean must be taken into account. According to the Horizon 2020 Mediterranean Report <sup>26</sup> , the problem could be expanded in the southern coasts in the future, since population is expected to increase and agricultural and industrial activities to be further developed. Those future scenarios need to be taken into account for the development of regional measures for wastewater treatment
<b>Knowledge/data Monitoring</b>	During the Sub-regional Workshop under ActionMed Activity 3, stakeholders from the Adriatic countries identified as main gaps on eutrophication the modelling mesoscale, the insufficiency and/or bad design of monitoring programmes and the lack of data/information sharing systems. New measures are needed, providing for the establishment of a bottom-up approach in monitoring, the transboundary cooperation and the development of harmonized indicators/metrics

## II. CONTAMINANTS

### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

The Mediterranean Sea is the largest semi-closed European Sea, receiving relatively large amounts of drainage, while population and economic activities are highly concentrated in coastal areas. The unique characteristics of the Mediterranean Sea make it particularly vulnerable to pollutants from land-based sources, such as oxygen-depleting substances, heavy metals, POPs, hydrocarbons, and nutrients (see chapter I. Eutrophication). With regards to the sources of this kind of pollution they are mainly land-based, and can be either point-sources (including discharge points, dumping grounds etc.) or nonpoint sources (including fluvial and storm water run-offs and sewage discharges). Other potential pathways for the introduction of contaminants can be the atmospheric deposition, or sea-based activities (fishing, shipping, offshore activities etc.).<sup>27</sup>

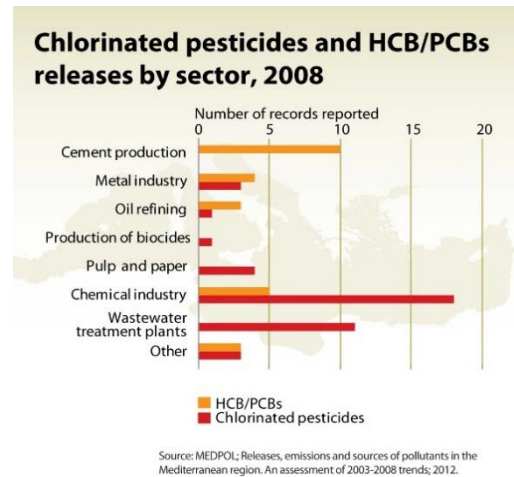
<sup>26</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>27</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012



The introduction of those contaminants causes significant impacts on marine biodiversity and risks to human health. One priority pollution type for the Mediterranean are **heavy metals** (toxic metals that are persistent and bioaccumulate in human and animal tissues). The most critical heavy metals for the Mediterranean Sea are mercury, cadmium and lead, and their sources include urban and industrial wastewater, fluvial run-offs and atmospheric deposition. Although there are not accurate estimates of the level of toxicity of contaminants, heavy metals adversely affect marine and coastal organisms, even at low levels, by among others lowering their immune system and increasing susceptibility to infections. Their bioaccumulation in tissues poses significant risks also to human health.<sup>28</sup>

**Persistent Organic Pollutants (POPs)** are resistant to environmental degradation and therefore persistent, easily transported by wind and water, while they bioaccumulate in tissues and biomagnify in food chains<sup>29</sup>. These characteristics make POPs extremely dangerous for the environment and human health. POPs include chlorinated pesticides, HCB, PCBs, PAHs etc. Exposures to POPs have been linked to *declines, diseases, or abnormalities* of animal species, as they may affect the endocrine and reproductive systems of some species, such as the Mediterranean swordfish. In addition, studies have revealed potential trans-generational impacts in small cetaceans (Abdulla and Linden 2008). With regards to human health, reproductive, developmental, behavioral, neurologic, endocrine, and immunologic health effects have been linked to POPs<sup>30, 31</sup>.



**Polycyclic aromatic hydrocarbons (PAH)** and oil pollution are mainly caused by marine transport through activities such as dumping, discharging, bunkering, dry-docking, and discharging of bilge oil (Abdulla and Linden 2008). Aquaculture activities are also responsible for the introduction of PAHs. PAHs have significant impacts on marine organisms, including genetic, cellular, biochemical and physiological.<sup>31</sup>

## 2. EXISTING MEASURES AT REGIONAL LEVEL

As already mentioned, marine pollution reduction was the initial focus of UNEP/MAP since its adoption, as confirmed by the title of the Convention adopted in 1976

<sup>28</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>29</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>30</sup> <https://www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response#affect>

<sup>31</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

“Convention for the Protection of the Mediterranean Sea Against Pollution” and the first Protocols that were adopted in its framework (Dumping, LBS, Emergency).

Pollution remains until today a priority issue for UNEP/MAP and the legal arsenal is now more comprehensive and efficient to address it. With regards to the pressures identified in this chapter (contaminants) there are four Protocols directly applying: **LBS Protocol, Dumping Protocol, Prevention and Emergency Protocol, Hazardous Wastes Protocol**. Furthermore, in 1997, and based on the provisions of the LBS Protocol, the Strategic Action Programme to Address Pollution from Land-Based Activities in the Mediterranean Region (**SAP/MED**) was adopted, identifying priority target categories of substances and activities to control or eliminate them. More specifically the SAP/MED provides for regional activities to be implemented by the Secretariat (MED POL), 33 regional pollution reduction targets relating to municipal sewage, solid waste, and air pollution, and the requirement for the Contracting Parties to develop their **National Action Plans (NAPs)**, aiming at integrating SAP/MED objectives and targets into actions at national or local levels, by identifying priority policy, legal, institutional, and pollution reduction targets. The key targets under the SAP/MED, related to contaminants, are presented in the following table:

**Table 6.** Key contaminants related targets set out in SAP/MED

Sector	Target	Timetable
<b>Municipal sewage</b>	To dispose all municipal waste water (sewage) in conformity with the provisions of the LBS Protocol	2025
	To dispose sewage from cities and urban agglomerations exceeding 100.000 inhabitants and areas of concern in conformity with the provisions of the Protocol	2005
<b>Urban solid waste</b>	To base urban solid waste management on reduction at source, separate collection, recycling, composting and environmentally sound disposal	2025
	To base urban solid waste management on reduction at source, separate collection, recycling, composting and environmentally sound disposal in all cities and urban agglomerations exceeding 100.000 inhabitants and areas of concern	2005
<b>Industrial development</b>	Point source discharges and air emissions into the Protocol Area from industrial installations to be in conformity with the provisions of the Protocol and other agreed international and national provisions	2025
	to reduce by 50 % discharges, emissions and losses of substances that are toxic, persistent and liable to bioaccumulate from industrial installations	2007
	to reduce by 50% discharges, emissions and losses of polluting substances from industrial installations in hot spots and areas of concern	2007
<b>POPs</b>	To phase out inputs of the 9 pesticides and PCBs and reduce to the fullest possible extent inputs of unwanted contaminants: hexachlorobenzene, dioxins and furans	2010
	To reduce 50 % inputs of the priority 12 POPs	2005

	To collect and dispose all PCB waste in a safe and environmentally sound manner	2005
<b>PAHs</b>	To phase out to the fullest possible extent inputs of PAHs	2025
	To reduce by 25 % inputs of PAHs	2010
<b>Heavy metals</b>	To phase out to the fullest possible extent discharges and emissions and losses of heavy metals (mercury, cadmium and lead)	2025
	To reduce by 50 % discharges, emissions and losses of heavy metals (mercury, cadmium and lead)	2005
	To reduce by 25 % discharges, emissions and losses of heavy metals (mercury, cadmium and lead)	2000
<b>Organometallic compounds</b>	To phase out to the fullest possible extent discharges, emissions and losses of organomercuric compounds and reduce to the fullest possible extent those of organolead and organotin compounds.	2010
	To reduce by 50 % discharges, emissions and losses of organometallic compound	2010
	To phase out the use of organomercuric compounds	2005
<b>Other heavy metals</b>	To eliminate to the fullest possible extent pollution of the Mediterranean Sea caused by discharges, emissions and losses of zinc, copper and chrome	
	To reduce discharges, emissions and losses of zinc, copper and chrome	2010
<b>Organohalogen compounds</b>	To eliminate to the fullest possible extent pollution of the Mediterranean Sea caused by discharges, emissions and losses of organohalogen compounds	
	To reduce discharges, emissions and losses into the Mediterranean Sea of organohalogen compounds.	2010
<b>Radioactive Substances</b>	To eliminate to the fullest possible extent inputs of radioactive substances	
<b>Industrial wastewater</b>	To dispose all waste water from industrial installations which are sources of BOD, nutrients and suspended solids, in conformity with the provisions of the LBS Protocol	2025
	To reduce by 50 % inputs of BOD, nutrients and suspended solids from industrial installations sources of these substances	2007
<b>Agriculture</b>	To reduce nutrient inputs, from agriculture and aquaculture practices into areas where these inputs are likely to cause pollution.	
<b>Hazardous wastes</b>	To dispose all hazardous wastes in a safe and environmentally sound manner and in conformity with the provisions of the LBS Protocol and other international agreed provisions	2025
	To reduce as far as possible by 20 % the generation of hazardous waste from industrial installations	2007
	To dispose 50 % of the hazardous waste generated, in a safe and environmentally sound manner and in conformity with the provisions of the LBS Protocol and other internationally agreed provisions	2010
<b>Obsolete</b>	To collect and dispose all obsolete chemicals in a safe	2005

<b>chemicals</b>	and environmentally sound manner.	
<b>Used lubricating oil (luboil)</b>	To collect and dispose 50 % of used lubricating oil in a safe and environmentally sound manner	2005
<b>Batteries</b>	To dispose all used batteries in a safe and environmentally sound manner and in conformity with the provisions of the Protocol and other internationally agreed provisions	2025
	To reduce by 20 % the generation of used batteries	2007
	To dispose 50 % of used batteries in a safe and environmentally sound manner and in conformity with the provisions of the Protocol and other agreed international provisions	2010

In line with the provisions under the SAP/MED and in the framework of the article 15 of the LBS Protocol, the Contracting Parties adopted a series of **Regional Pans** aiming at pollution prevention and reduction:

- Regional Plan on the reduction of inputs of Mercury in the framework of the implementation of Article 15 of the LBS Protocol (2012);
- Regional Plan on the reduction of BOD5 in the food sector (2012);
- Regional Plan on the phasing out of Hexabromodiphenyl ether, Hetabromodiphenyl ether, Tetrabromodiphenyl ether, and Pentabromodiphenil ether in the framework of the implementation of Article 15 of the LBS Protocol (2012);
- Regional Plan on the on the phasing out of lindane and endosulfane in the framework of the implementation of Article 15 of the LBS Protocol (2012);
- Regional Plan on the phasing out of perfluorooctane sulfonic acid, its salts, and perfluorooctane sulfonyl fluoride in the framework of the implementation of Article 15 of the LBS Protocol (2012);
- Regional Plan on the elimination of Alpha hexachlorocyclohexane, Betahexachlorocyclohexane, Chlordecone, Hexabromobiphenyl, and Pentachlorobenzene in the framework of the implementation of Article 15 of the LBS Protocol (2012);
- Regional Plan on the Phasing Out of DDT in the framework of the implementation of Article 15 of the LBS Protocol (2009);
- Regional Plan on the reduction of BOD5 from urban waste water in the framework of the implementation of Article 15 of the LBS Protocol (2009);
- Regional Plan on the elimination of Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex, and Toxaphene in the framework of the implementation of Article 15 of the LBS Protocol (2009).

**Table 7.** Key measures provided for in pollution-related Regional Plans

Measures	Timetable	Problem addressed
All agglomerations collect and treat their urban waste waters before discharging them into the environment	2015 - 2019	BOD <sub>5</sub> in urban WW
<b>Adoption of National BOD<sub>5</sub> ELVs for urban waste waters after treatment (i.e. maximum allowable concentration of BOD<sub>5</sub> to be finally discharged from WWTP to the receiving water environment)</b>	2015 - 2019	BOD <sub>5</sub> in urban WW
<b>All characteristics of collected and treated urban waste waters are, before discharge in the environment, in accordance to ELVs provisions of the Regional Plan</b>	2015 - 2019	BOD <sub>5</sub> in urban WW
<b>Competent authorities or appropriate bodies shall monitor discharges from municipal WWTP to verify compliance with the ELV requirements</b>	2015 - 2019	BOD <sub>5</sub> in urban WW
<b>Ensure enforcement of measures</b>	2015 - 2019	BOD <sub>5</sub> in urban WW
<b>The Parties shall prohibit and/or take legal and administrative measures necessary to eliminate the production and use of 7 substances. Imports and exports are only permitted for the purpose of environmentally sound disposal</b>	2011 – 2012	Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene
<b>The Parties shall take appropriate measures so that such wastes, including products and articles upon becoming wastes are (a) handled, collected, transported and stored in an environmentally sound manner; (b) disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines, and relevant global and regional regimes governing the management of hazardous wastes and the Basel Convention; (c) not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants; and (d) not transported across international boundaries without taking into account relevant international rules, standards and guidelines.</b>	2011 – 2012	Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene
<b>Application of BAT and BEPs for environmentally sound management of POPs</b>	2011 – 2012	Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Mirex and Toxaphene
<b>The Parties shall prohibit and/or take legal and administrative measures necessary to Eliminate the production and use of DDT. Imports and exports are only permitted for the purpose of environmentally sound disposal and for emergency situations for disease vector control</b>	2011 – 2012	DDT
<b>The Parties shall take appropriate measures so that DDT wastes, including products and articles upon becoming wastes</b>	2011 - 2012	DDT



are (a) handled, collected, transported and stored in an environmentally sound manner; (b) disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines, and relevant global and regional regimes governing the management of hazardous wastes; (c) not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants; and (d) not transported across international boundaries without taking into account relevant international rules, standards and guidelines.		
Application of BAT and BEPs for environmentally sound management of POPs	2011 – 2012	DDT
The parties shall prohibit the installation of new Chlor alkali plants using mercury cells with immediate effect.		Mercury from Chlor Alkali industry
The parties shall prohibit the installation of vinyl chloride monomer production plants using mercury as a catalyst with immediate effect		Mercury from Chlor Alkali industry
The parties shall ensure that the releases of mercury from the activity of Chlor alkali plants shall cease by 2020 at the latest and i) that the environmentally sound management of metallic mercury from the decommissioned plants is achieved, including the prohibition of its re-entry into the market. ii) that the total releases of mercury (to the air, the water and to the products) from existing Chlor alkali plants are progressively reduced until their final cessation with the view not to exceed 1.0g per metric tonne of installed chlorine production capacity in each plant. In doing so, the air missions should not exceed 0.9g per metric tonne of installed chlorine production capacity in each plant.	2020	Mercury emissions from Chlor Alkali industry
The Parties shall adopt by 2015 and 2019 National ELVs for Mercury emissions according to the provisions of the Regional Plan	2015 - 2019	Mercury emissions from non Chlor Alkali industry
The Parties shall adopt National ELVs for Mercury emissions from incineration plants (Waste gas 0.05 mg/ Nm <sup>3</sup> )	2015 - 2019	Mercury emissions from non Chlor Alkali industry
The Parties shall take the appropriate measures to reduce the inputs of Mercury emissions from other sectors and use alternatives as appropriate.	2015 - 2019	Mercury emissions from non Chlor Alkali industry
The Parties shall take the appropriate measures to isolate and contain the mercury containing wastes to avoid potential contamination of air, soil or water	2015 - 2019	Mercury emissions from non Chlor Alkali industry
The Parties shall identify existing sites which have been historically contaminated with mercury including at least the old mines and decommissioned Chlor alkali plants, and take, with regard to these sites, environmentally sound management measures such as safety works, use restrictions or decontamination	2015 - 2019	Mercury emissions from non Chlor Alkali industry
The Parties shall neither open new mines nor re-open old	2015 -	Mercury emissions from

mercury mining sites	2019	non Chlor Alkali industry
<b>Reduction of pollution load by application of BEP and BAT Industrial Food Plants from 9 industry sectors which discharge more than 4 000 pe into water bodies shall meet the following requirements (24 hour values): COD 160 mg/l, TOC 55 mg/l, BOD5 or (BOD7) 30 mg/l</b>	2014	BODs in the Food sector
<b>Ensure monitoring of related discharges into water to verify compliance with the requirements and enforcement</b>	2014	BODs in the Food sector
<b>Review of the values, on the basis of national reports prepared, taking into account new developments on BAT and BEP and on EQ standards in the region, and considering the possibility to develop ELVs based on contaminant's loads.</b>	2015	BODs in the Food sector
<ul style="list-style-type: none"> <li>• <b>The Parties shall prohibit and/or take legal and administrative measures necessary to eliminate production and use of the chemicals.</b></li> <li>• <b>Imports and exports are only permitted for the purpose of their environmentally sound disposal and under specific conditions, in accordance with the relevant international rules, standards and regulations.</b></li> <li>• <b>The Parties shall take appropriate measures so that wastes, including products and articles upon becoming wastes are (a) handled, collected, transported and stored in an environmentally sound manner; (b) disposed of in such a way that the persistent organic pollutant content is destroyed or irreversibly transformed so that they do not exhibit the characteristics of persistent organic pollutants or otherwise disposed of in an environmentally sound manner when destruction or irreversible transformation does not represent the environmentally preferable option or the persistent organic pollutant content is low, taking into account international rules, standards, and guidelines, and relevant global and regional regimes governing the management of hazardous wastes; (c) not permitted to be subjected to disposal operations that may lead to recovery, recycling, reclamation, direct reuse or alternative uses of persistent organic pollutants; and (d) not transported across international boundaries without taking into account relevant international rules, standards and guidelines.</b></li> <li>• <b>The Contracting Parties shall endeavor to apply BEPs for environmentally sound management</b></li> <li>• <b>The Parties should identify to the extent practicable stock piles consisting of or containing these chemicals and report to the Secretariat</b></li> </ul>	2013	Alpha hexachlorocyclohexane; Beta hexachlorocyclohexane; Hexabromobiphenyl; Chlordecone; Pentachlorobenzene; Tetrabromodiphenyl ether and Pentabromodiphenyl ether; Hexabromodiphenyl ether and Heptabromodiphenyl ether; Lindane; Endosulfan, Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride
<ul style="list-style-type: none"> <li>• <b>The production and use of Perfluorooctane sulfonic acid (PFOS), its salts and Perfluorooctane sulfonyl fluoride (PFOSF) shall be eliminated by all Parties except as provided in Appendix A of the RP</b></li> <li>• <b>Parties that produce and/or use these chemicals shall take into account, as appropriate, guidance such as that given in the relevant parts of the general guidance on best available techniques and best environmental practices given in Appendix B of the RP</b></li> </ul>	2013	Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride

<ul style="list-style-type: none"> <li>• <b>Every two years each Party that uses and/or produces these chemicals shall report on progress made to eliminate PFOS, its salts and PFOSE</b></li> <li>• <b>With the goal of reducing and ultimately eliminating the production and/or use of these chemicals, the Contracting Parties shall encourage:</b> <ul style="list-style-type: none"> <li>- <b>action to phase out uses when suitable alternatives substances or methods are available;</b></li> <li>- <b>research on and development of safe alternative chemical and non-chemical products and processes, methods and strategies</b></li> <li>- <b>Synergy with the work carried out under the Stockholm convention</b></li> </ul> </li> </ul>		
<p><b>Each Party shall at a minimum take measures to reduce the total releases derived from anthropogenic releases of Pentachlorobenzene, with the goal of their continuing minimization and, where feasible, ultimate elimination in accordance with the obligations of the Stockholm Convention taking into consideration the Guidelines on BAT and BEP and new progresses on this issue developed within the framework of the mentioned Convention.</b></p>	<p>2013</p>	<p>Alpha hexachlorocyclohexane, Beta hexachlorocyclohexane, Chlordecone, Hexabromobiphenil, Pentachlorobenzene</p>

In the framework of the Protocol concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea, **the Regional Strategy for Prevention of and Response to Marine Pollution from Ships** was adopted by the COP14, while a revised Strategy for the period 2016-2021 was adopted in 2016 by the COP19. The overarching objectives of the revised Regional Strategy are prevention of pollution from ships; prevention of maritime accidents; and preparation for response to major pollution incident. The Operational objectives are broken down to Specific objectives and associated goals, and some of them can have a direct effect in preventing/reducing pollution, such as:

- To strengthen the Memorandum of Understanding (MoU) on port State control (PSC) in the Mediterranean region (Mediterranean MoU);
- To ensure the provision of appropriate port reception facilities;
- Delivery of ship-generated wastes;
- Improved follow-up of pollution events as well as monitoring and surveillance of illicit discharges;
- To improve the level of enforcement and the prosecution of discharge offenders;
- To reduce the pollution generated by pleasure craft activities;
- To establish procedures for the designation of places of refuge in order to minimize the risks of widespread pollution;
- To ensure that adequate emergency towing capacity is available throughout the Mediterranean to assist vessels, including tankers, in distress;
- To enhance the levels of pre-positioned spill response equipment under the direct control of Mediterranean coastal States;
- To improve the quality, speed and effectiveness of decision-making process in case of marine pollution incidents through the development and introduction of technical and decision support tools;



- To increase as much as practical, the level of knowledge in the field of preparedness and response to accidental marine pollution by oil and other harmful substances;
- To revise the existing recommendations, principles and guidelines, and to develop new ones aimed at facilitating international cooperation and mutual assistance within the framework of the 2002 Prevention and Emergency Protocol;
- To strengthen the capacity of individual coastal States to respond efficiently to marine pollution incidents through development of sub-regional operational agreements and contingency plans.

Finally the **Offshore Action Plan**, which was adopted by the COP19 in 2016, for the implementation of the Offshore Protocol, also sets out relevant provisions. It has as its general objective to define measures which, if applied at regional level and by each Contracting Party within their jurisdiction will ensure the safety of offshore activities and reduce their potential impact on the marine environment and its ecosystem.

In Annex I there is a full list of the specific objectives and outputs provided for by the Offshore Action Plan, ranked according to their relevance to the pollution related measures that can be included in the Regional PoM. Since it was very recently adopted, it is difficult at this stage to assess effectiveness of the adopted measures. Therefore, the outputs that can contribute to the objectives of the MSFD and EcAp, should be used as existing measures in the framework of the Regional PoM, provided they will be fully implemented.

Despite the comprehensive regulatory framework developed at regional level to combat pollution, there are still important issues present in this area, which can be grouped under the following categories:

#### **i. Knowledge/data gaps**

- A lot of progress has been made at regional level, on data collection and we have a good knowledge of the situation. However there are short time series and differences in sampling conditions that don't allow for robust trend analysis of the available data (UNEP/MAP/MED POL 2011) while data availability on oil discharges is very limited<sup>32</sup>
- Reporting under MED POL is not at annual basis<sup>33</sup>.
- Monitoring activities across the region lack harmonization.
- Monitoring and reporting is particularly problematic in the area of wastewater management. According to the H2020 Mediterranean Report, wastewater that remains uncollected is currently not accounted for<sup>34</sup>.

#### **ii. Insufficient implementation/enforcement of legislation**

---

<sup>32</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>33</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>34</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

- The amendments of the Dumping Protocol are not yet in force.
- The Offshore Protocol has entered into force, but it is still ratified by a minority of Contracting Parties.
- Enforcement of environmental legislation on marine pollution is in general weak especially in the ENP-South countries.
- MARPOL Convention has been ratified by a big number of Mediterranean countries. However gaps are identified with regards to the establishment of coherent legal frameworks for its implementation<sup>35</sup>.
- According to the assessment of pollution data conducted by Gomez-Gutierrez *et al.* 2007, POPs have declined. However this decline is more evident for DDTs than for PCBs, which should, according to the SoER-MED<sup>36</sup>, be alarming as an indicator of possible ongoing inputs. Moreover, in areas where trend analysis can be carried out, PCB concentrations in biota are relatively constant or even slightly increased (northwestern and eastern Mediterranean).<sup>37</sup>

### iii. Waste and wastewater management gaps

- There is still 21% of wastewater quantity (25% in ENP South Countries) that undergo only primary treatment, while the percentage of wastewater quantity undergoing tertiary treatment is very low (8% at regional level), especially in the ENP South Countries (only 1%) (UNEP/MAP MED POL, 2011)<sup>38</sup>.
- In ENP South Countries 58% of the collected municipal solid waste is disposed in open dumps<sup>39</sup>.
- There are insufficient accounting and cost-recovery mechanisms in most of the countries regarding wastewater and solid waste management<sup>40</sup>.
- According to the H2020 Mediterranean Report<sup>41</sup>, in most ENP South Mediterranean countries municipal solid waste management has the following gaps that need to be addressed: i. weak legislation, ii. No waste reduction policies, iii. Lack of separate collection, iv. Lack of knowledge, v. Strong regional disparities between urban and rural areas, vi. Lack of data.
- There are gaps in stormwater management, with very limited use of green infrastructure and nature based solutions.

<sup>35</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

<sup>36</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>37</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

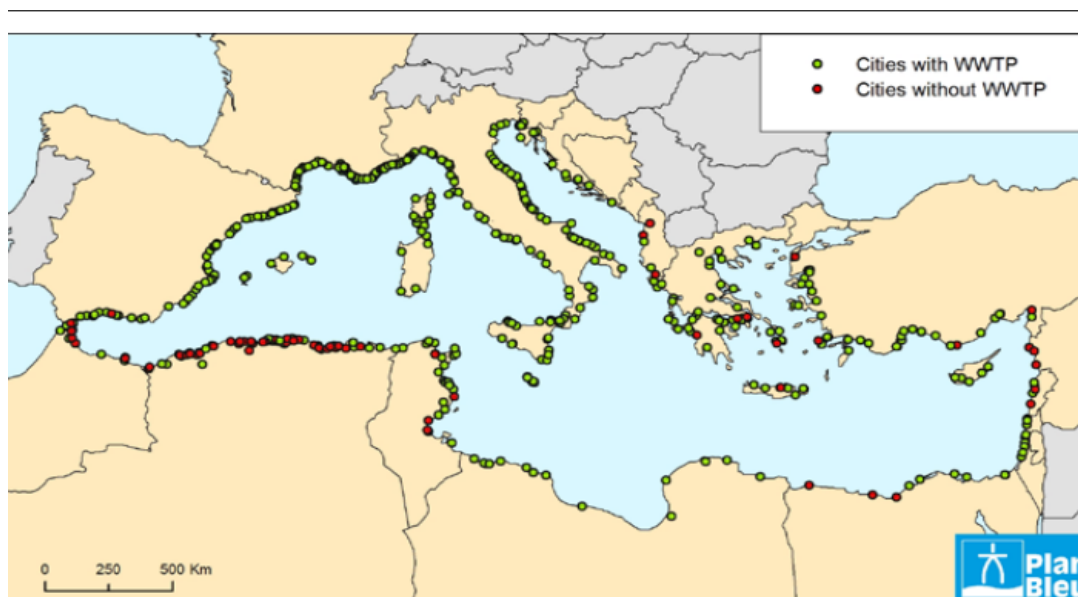
<sup>38</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>39</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>40</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>41</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

- Despite the existing measure providing for the establishment of WWT systems in all agglomerations, there are many coastal cities without WWTPs, especially in the southern and eastern Mediterranean (see figure 2)<sup>42</sup>.
- There are important sectors contributing to pollution from contaminants that are not adequately regulated at regional level, including desalination, agriculture, aquaculture and tanneries<sup>43</sup>.
- A general upward trend for mercury and lead has been identified in the period between 1998 and 2012<sup>44</sup>.



Source: Based on MAP Technical Report Series No 157, 2004; UNEP/MAP, 2011 UNEP(DEPI)/MED WG.357/Inf.7

**Figure 2.** Overview of the major coastal cities with/without WWTPs in 2010 (Source: Horizon 2020 Mediterranean Report, EEA, 2014).

#### iv. Planning

- The urban population growth projections are not fully taken into account.
- Although set out as a waste management objective under the MSSD the decoupling of municipal waste generation from economic growth was not achieved in many Contracting Parties<sup>45</sup>.
- New technologies must be further promoted in the region, including cleaner production and material light-weighting, and the introduction of

<sup>42</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

<sup>43</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

<sup>44</sup> State of Europe's seas, European Environment Agency, 2015

<sup>45</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

new waste utilization technologies, such as biogas production (SEEP-NET).

- The depollution gap, anticipated by the UfM Secretariat (*difference between the pollution that will be produced in 2025 and the pollution and flows that will be treated by the facilities that are already in place or are planned with secured funding*)<sup>46</sup> is not adequately addressed and reflected in UNEP/MAP framework to combat pollution.

### 3. GAPS AND PROPOSALS

The following table lists the environmental pressures and overall aspects for which there are not efficient measures adopted at regional level, or the existing measures are not adequately implemented.

**Table 8.** Gaps related to measures for contaminants

Priority sources and pressures	Gaps related to measures
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• Existing measures set out in the Regional Plans for municipal and industrial wastewater treatment need to be fully implemented</li> <li>• Control and inspections in industrial facilities should be enhanced (e.g. control over the emptying of cesspits, particularly in hotels and industrial facilities)</li> <li>• New measures should promote the application of enhanced treatment and management systems and the use of new technologies</li> <li>• Revised standards and limits to assess and tackle overcapacity and mal function of WWTP should be adopted</li> </ul>
<b>Stormwater</b>	Measures are needed to promote separate collection of stormwater and enhance the use of Green Infrastructure and nature-based solutions for stormwater management
<b>Oil discharges</b>	Our knowledge and data are very limited in this area. New measures should be considered to enhance the data collection, through the use of new technologies
<b>Dumping</b>	<p>The Dumping Protocol is not yet in force.</p> <ul style="list-style-type: none"> <li>• The ratification of the Protocol by all Contracting Parties should be supported.</li> <li>• Full alignment of all Dumping Protocol Annexes and Guidelines with the international legislation (London Protocol) should be achieved.</li> </ul>
<b>Offshore activities</b>	Despite its entry into force, the Protocol is ratified only by a few Parties. According also to the objectives of the Offshore Action Plan, the number of ratifications has to increase.
<b>Atmospheric</b>	Atmospheric deposition of contaminants should be further

<sup>46</sup> [http://ufmsecretariat.org/wp-content/uploads/2014/06/FinalReport-Reduced\\_file\\_size.pdf](http://ufmsecretariat.org/wp-content/uploads/2014/06/FinalReport-Reduced_file_size.pdf)

<b>deposition</b>	addressed at regional level, as source of marine pollution
<b>POPs</b>	<ul style="list-style-type: none"> <li>• There is a general downward trend in DDT and PCBs, following the adoption of the Regional Plans. However the decline is more evident for DDT than PCB, which may indicate an ongoing input → stricter implementation and enforcement of measures for the elimination of PCB is required.</li> <li>• Enforcement of the existing measures to ensure that all new installations apply BAT and BEPs for environmentally sound management of POPs</li> </ul>
<b>Mercury and lead</b>	<p>An upward trend for both contaminants has been observed over the period 1998-2012<sup>47</sup></p> <p>There is need for full implementation of measures for the elimination of mercury inputs and the adoption of strict measures for lead inputs as well as assessment of the need for new measures</p>
<b>“New” contaminants</b>	The list of priority contaminants should be reviewed and updated, to take into account “emerging pollutants”, i.e. pharmaceuticals, nano-materials etc.
<b>Other sources of contaminants</b>	Stricter technical guidelines and management standards, or, if need be, regional plans on sectors contributing to marine pollution such as agriculture, aquaculture, tanneries and desalination should be considered
<b>Overall issues</b>	<b>Gaps related to measures</b>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>• It should be made annually in the framework of MED POL</li> <li>• A Regional PRTR should be established</li> <li>• New measures are required for improved monitoring /reporting of wastewater, in order to fully account for uncollected wastewater</li> </ul>
<b>Depollution</b>	<ul style="list-style-type: none"> <li>• New measures should provide for decontamination and restoration of degraded sites (i.e. as part of a restoration target of 15% of all degraded ecosystems, in line with the provision under the EU Biodiversity strategy)</li> <li>• New measures should promote the accounting of depollution/degradation cost, as part of the ecosystem services assessment</li> </ul>
<b>Legislation enforcement</b>	Enforcement of environmental legislation needs to be strengthened, through better permission, control and prosecution mechanisms, reform of sanctions to be more dissuasive and facilitated access to justice
<b>Implementation of MARPOL</b>	Support should be provided for the development of harmonised legal frameworks at national levels for the implementation of the Convention by all the countries that have ratified MARPOL

<sup>47</sup> State of Europe’s seas, European Environment Agency, 2015

### III. MARINE LITTER

#### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

Marine litter is one of the most critical issues, oceans are facing today, causing serious impacts on the marine and coastal environment and biodiversity and also hindering human activities. It is estimated that every year oceans receive six million tons of debris, with plastics being the most abundant marine litter type<sup>48</sup>. According to the Joint Group of Experts on the Scientific Aspects of Marine Environmental Pollution (GESAMP), 80% of marine litter entering the seas originate from land-based sources. The international community is highly concerned about this emerging issue and the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities identifies marine litter as one of the 8 key contaminants for which action is required at international level<sup>49</sup>. In that view, the Manila Declaration, which was adopted in 2012 highlights marine litter as a priority source category for the period 2012-2016, while the Honolulu Commitment and the Honolulu Strategy are key-steps in combating marine litter on international level.

With regards to the situation in the Mediterranean basin, it is considered as one of the most affected areas by marine litter and thus, marine litter has been an issue of concern since the first years of UNEP/MAP. According to the Marine Litter Assessment in the Mediterranean<sup>50</sup>, cigarette butts is by far the most commonly found type of marine litter in the Mediterranean **beaches**; with regards to **floating litter**, plastics are the most prevailing type, accounting even for 95-100% of total wastes in some areas; plastics is an equally important type of litter also on the **sea floor** (62.7% +/- 5.47). The figures coming to light from different surveys are alarming: 19.6 cigarette filters per volunteer in Mediterranean beaches in 2013 (with a global average of 3.66 cigarette filters per volunteer in 2006), evaluated number of more than 62 million macro-litter items floating in the Mediterranean, evaluation of 0.5 billion items lying on the Mediterranean Sea floor<sup>51</sup>. On top of the traditional marine litter types, particular importance is currently paid both at international and regional levels on the emerging issues of microplastics and nanoplastics as well as on the distribution and impacts of the abandoned, lost or discarded fishing gears (ALDFG).

With regard to the sources of marine litter, the traditional classification distinguishes between land-based and sea-based sources, with LBS accounting for around 80% of marine litter. The concentration of population in coastal areas, along with the high number of tourists during the summer period, and the inappropriate waste management in some areas, make the Mediterranean Sea even more vulnerable to marine litter from land-based sources. According to a recent study (Jambeck *et al.* 2015) the population of Mediterranean coasts produces 360,939 tons of waste every day, of which 36,560 is plastic, while 20% of plastic waste is inadequately managed (7,451 tons)<sup>52</sup>. According to some predictions, plastic waste dumping may be

<sup>48</sup> <http://www.perseus-net.eu/site/content.php?locale=1&sel=517&artid=565>

<sup>49</sup> UNEP(OCA)/LBA/IG.2/7, 5 December 1995

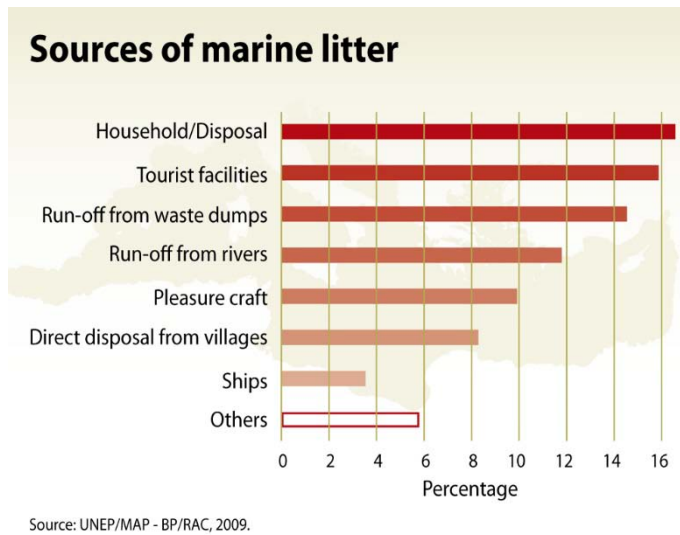
<sup>50</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>51</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>52</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015



increased by a factor of 2.17 between 2010 and 2025 in the Mediterranean, if no management measures are applied<sup>53</sup>. Land-based sources of marine litter include households, tourist facilities, municipal dumps, riverine run-offs, uncontrolled discharges, improper disposals etc. while sea-based sources include shipping, and pleasure crafts, commercial and recreational fishing, offshore activities, mariculture etc. A prioritization of sources, based on their significance can be found in the Figure 5 (UNEP/MAP – BP/RAC, 2009).



**Figure 3.** Sources of Marine Litter  
(Source: UNEP/MAP –BP/RAC, 2009)

The 2015 Marine Litter Assessment in the Mediterranean<sup>54</sup> suggests the division of general sources to use-categories sources including recreational, shipping, fishing, sewage-related, tourist, sanitary and medical litter, in order to facilitate the establishment of targets and reduction measures. Smoking-related activities can be a separate source, since marine litter from smoking related activities accounts for 40% of marine litter (mainly on beaches), based on data collected in the framework of the International Coastal Clean-up (ICC)

campaigns. According to different studies, recreational activities and tourism account for more than half of the marine litter in the Mediterranean.

Although the impacts of marine litter have not been clearly defined and evaluated, it is generally accepted that there are significant adverse impacts on marine ecosystems, while human health and economic activities may also be affected. Several studies have found that ingested microplastics can potentially disrupt cellular processes and degrade tissue<sup>55</sup>, while toxins are accumulating and may be transferred across the food chain, leading to a biomagnification effect<sup>56,57</sup>. The following table, listing the main impacts of marine litter, is developed according to the Marine Litter Assessment in the Mediterranean, UNEP/MAP, 2015<sup>58</sup>. However for many of those impacts there are still uncertainties that need to be further explored.

<sup>53</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>54</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>55</sup> Rochman et al. 2013

<sup>56</sup> Wright et al., 2013

<sup>57</sup> UNEP, 2016 Marine Litter Legislation: A Toolkit for Policymakers

<sup>58</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015



**Table 9.** Main impacts of marine litter (Original source: UNEP/MAP, 2015<sup>58</sup>).

Sector	Impacts	Comments
Wildlife	Entanglement	Birds (35%), fish (27%), invertebrates (20%), mammals (13%)
	Ingestion	>180 marine species documented as having absorbed plastic debris (Van Franeker <i>et al.</i> 2011) – mainly seabirds, fish and marine mammals.  Sub-lethal effects on population levels are not fully investigated.
	Impacts of ghost gear on benthic habitats	Potential damages to the benthic habitats or impacts on the distribution of benthic species
	Transport of invasive species	More than 80% of the known alien species in the Mediterranean might have been introduced or further expanded due to marine litter (CIESM, 2014)
	Biodiversity alterations as a result of increased habitat heterogeneity	
Human health	Injuries to beach users	
	Entanglement risks for swimmers and divers	
	Potential biohazards	
	Impacts of microplastics and nanoplastics	Not sufficiently assessed – uncertainties exist
	Delivery of pathogens to fish	Impacts on human health need to be further assessed
Secondary pollution	Plastic additives can leach out of the matrix over time, and exert toxic and endocrine disruptive effects on marine organisms when plastic are ingested (Oehlmann <i>et al.</i> , 2009)	
	Transfer or enhanced bioaccumulation of POPs	
	Potential leaching of phthalates	

	Increased concern for persistent, bioaccumulative and toxic (PBT) chemicals absorbed into plastics, becoming vectors for the bioaccumulation of these highly toxic pollutants in fatty tissues (Rochman <i>et al.</i> 2013)	
<b>Economic impacts*</b>	Municipalities	Health risks Disposal Beach cleaning Negative publicity
	Tourism	Negative publicity Area promotion Reduced revenue Reduces recreational opportunities Loss of aesthetic amenity
	Fishing	Repairing damage to fishing gear Replacement of lost gear Reduced and/or contaminated catch
	NGOs	Operational costs Financial assistance Volunteers' time
<b>Social impacts</b>	Loss of jobs because of the economic impacts	
	Decrease of aesthetic value	

\* only the impacts with moderate to high importance for the Mediterranean were derived from the Marine Litter Assessment in the Mediterranean, UNEP/MAP, 2015 (original information Mouat *et al.* 2010).

## 2. EXISTING MEASURES AT REGIONAL LEVEL

As already mentioned, marine litter has been an issue of high concern for UNEP/MAP since its first years. The LBS Protocol to the Barcelona Convention that was adopted in 1980 acknowledges the importance of marine litter problem, and provides a first definition of marine litter in Annex I. In 1991 UNEP/MAP published a Bibliography on marine litter, including 440 references and an assessment of the state in the Mediterranean. In 1996 the amended LBS Protocol was adopted and included marine

litter in the list of priority substances that require the development of action plans. The Strategic Action Plan on LBS pollution (SAP/MED) specifically addresses the issue of marine litter and based on this Plan, MED POL prepared Guidelines for Management of Coastal Litter for the Mediterranean Region (MAP/UNEP/MED POL, 2004). A new assessment of the status of marine litter was conducted in 2008, serving as the basis for the preparation of a Strategic Framework for the management of marine litter which was finally adopted by COP17 in 2012. Furthermore, the COP17 mandated the Secretariat to prepare a Regional Action Plan on Marine Litter, in the framework of the Article 15 of the LBS Protocol to the Barcelona Convention.

The Regional Plan on Marine Litter Management in the Mediterranean was adopted in 2013 by the COP18, making UNEP/MAP a pioneer in combating marine litter at regional level, since it was the first Regional Sea Convention to adopt legally binding measures and timelines regarding the prevention and reduction of marine litter. The main objectives of the MLRP are the prevention of generation of marine litter, the reduction to the minimum of marine litter pollution and its impacts on ecosystem services, the removal of existent marine litter, the enhancement of knowledge on marine litter, and the management of marine litter in accordance with accepted international standards. The main operational targets set out in the Regional Action Plan include the integration of marine litter measures into the National Action Plans (NAP), the adoption of appropriate legislation and/or establishment of adequate institutional arrangements for efficient marine litter prevention and reduction, the adoption of specific measures for the prevention of marine litter from land-based and sea-based sources, the removal of existing marine litter by ensuring its environmentally sound disposal, the assessment of the state of marine litter in the Mediterranean, the development of a Mediterranean Marine Litter Monitoring Programme, and the enhancement of public awareness and participation.

More specifically the MLRP sets out concrete measures in specific timelines, as presented in the table below, which also includes a column regarding the main pressure/problem addressed by each measure:

**Table 10.** Measures provided for in the Regional Plan on Marine Litter Management in the Mediterranean.

Measures	Timetable	Issue addressed
Update the existing LBS National Action Plan guidelines	2014	Implementation at national level
Update the existing LBS National Action Plans to integrate marine litter measures in accordance with the provisions of the Regional Plan	2015	Implementation at national level
Development of reporting format	2014	Implementation/reporting
National reports on the implementation of the Regional Plan	biennially	Compliance/reporting
To base urban solid waste management on reduction at source, separate collection, recycling, composting of the organic fraction and environmentally sound disposal (SAP-MED)	2025	Solid waste management and disposal Waste mitigation hierarchy
Implement adequate waste reducing/reusing/recycling measures in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration	2017 [2019]	Plastics: Packaging waste
Prevention measures related to Extended Producer Responsibility strategy by making the producers, manufacturer brand owners and first importers responsible for the entire life-cycle of the product with measures prioritizing the hierarchy of waste management in order to encourage companies to design products for reuse, recycling and materials reduction in weight and toxicity	2017	Recycling rates Polluter Pays Principle Sustainable production Prevention of generation Waste mitigation hierarchy
Prevention measures related to Sustainable Procurement Policies contributing to the promotion of the consumption of recycled plastic-made products	2017	Plastics Recycling Consumption patterns
Prevention measures related to establishment of voluntary agreements with retailers and supermarkets to set an objective of reduction of plastic bags consumption and/or establishment of plastic bag taxes	2017	Plastics: bags Consumption patterns
Prevention measures related to establishment of mandatory Deposits, Return and Restoration System for expandable polystyrene boxes in the fishing sector	2017	Plastics: polystyrene boxes Litter from sea-based sources
Prevention measures related to establishment of mandatory Deposits, Return and Restoration System for beverage packaging prioritizing when possible their reuse	2017	Recycling: beverage packaging Consumption Patterns
Take necessary measures to establish adequate urban sewer, wastewater treatment plants and waste management systems to prevent run-off and riverine inputs of litter	2020 [2025]	Waste/Wastewater management
In accordance with Article 14 of the Prevention and Emergency Protocol explore and implement to the extent possible ways and means to charge	2017	Pollution from ships Port reception

reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system and take the necessary steps to provide ships using their ports with updated information relevant to the obligation arising from Annex V of MARPOL Convention and from their legislation applicable in the field		
“Fishing for Litter” system, in consultation with the competent international and regional organizations, to facilitate clean-up of the floating litter and the seabed from marine litter caught incidentally and/or generated by fishing vessels in their regular activities including derelict fishing gears	2017	Clean up (floating and seabed) Stakeholders engagement ALDFG
“Gear marking to indicate ownership” concept and “reduced ghost catches through the use of environmentally neutral upon degradation of nets, pots and traps concept”, in consultation with the competent international and regional organizations in the fishing sector	2017	ALDFG Mitigation measures
Apply necessary measures to prevent any marine littering from dredging activities in accordance with the relevant guidelines adopted in the framework of Dumping Protocol of the Barcelona Convention	2017	Dumping: Dredging material
Take the necessary measures to close the existing illegal dump sites in the geographical area of the Regional Plan	2020	Illegal dumping Enforcement-Compliance
Sanction illegal dumping in accordance with national legislation including littering on the beach, illegal sewage disposal in the coastal zone and rivers in the area of the application of the Regional Plan in accordance with national legislation	2017	Illegal dumping Legislation gaps Enforcement-Compliance
Identify in collaboration with relevant stakeholders accumulations / hotspots of marine litter and implement compulsory national programmes on their regular removal and sound disposal	2017 [2019]	Hotspots Removal Public participation Clean-up campaigns
Implement National Marine Litter Cleanup Campaigns on regular basis	2017 [2019]	Removal
Participate in International Coastal Cleanup Campaigns and Programmes	2017 [2019]	Removal International cooperation
Apply as appropriate Adopt-a-Beach or similar practices and enhance public participation role with regards to marine litter management	2017 [2019]	Removal Public Participation Awareness raising
Apply Fishing for Litter practices, in consultation with the competent international and regional organizations and in partnership with fishermen and ensure adequate collection, sorting and environmentally sound disposal of the fished litter	2017 [2019]	Removal Stakeholder engagement
Charge reasonable costs for the use of port reception facilities or, when applicable apply No-Special-Fee system, in consultation with competent international and regional organizations when using port reception facilities for implementing the measures provided for in Article 10.	2017 [2019]	Pollution from ships Port reception facilities

Assessment of the state of marine litter in the Mediterranean	Every 6 years	Knowledge – data gaps State of marine litter
Establishment of an Expert Group on Regional Marine Litter Monitoring Programme	2014	Knowledge – data gaps Monitoring
Guidelines for the preparation of the National Marine Litter Monitoring Programmes, in collaboration with the relevant regional organizations	2014	Knowledge – data gaps Monitoring
Preparation of the Regional Marine Litter Monitoring Programme, as part of the integrated regional monitoring programme	2014 [2015]	Knowledge – data gaps Monitoring
For the purpose of the Regional Plan and in compliance with the monitoring obligations under Article 12 of the Barcelona Convention and Article 8 of the LBS Protocol design in cooperation with the Secretariat National Monitoring Programme on Marine Litter	2015 [2017]	Knowledge – data gaps Monitoring
Report, in accordance with Article 13 of the LBS Protocol, on the implementation of the National Marine Litter Monitoring Programme	Biennially	Monitoring Compliance/Reporting
Establishment of the Regional Data Bank on Marine Litter	2016	Knowledge – data gaps Marine Litter data bank
While implementing measures provided for in Articles 9 and 10 of the Regional Plan enhance knowledge and collect information on the state of the marine litter		Knowledge – data gaps State of marine litter

It is clear that very important instruments have been adopted at regional level to prevent the generation of marine litter and also to reduce the existing litter. According to the 2015 Marine Litter Assessment in the Mediterranean and other assessments and studies, significant progress has been achieved in addressing the issue of marine litter, however the situation remains critical and in some cases it is even deteriorating. The priority issues of concern on the problem of marine litter are mainly associated with the lack of knowledge and data, the need for more efficient prevention and reduction measures, the inadequate management, and weak implementation of relevant environmental principles:

**i. Knowledge and data<sup>59 60</sup>**

- Data collection has been improved across the region, however it lacks consistency and harmonization, with more data in the Northern Mediterranean<sup>59</sup>;
- For the moment, the main impacts on marine organisms for which scientific certainty exists are linked to entanglement, ingestion, colonization and rafting<sup>59</sup>. More research is needed on the sub-lethal effects of marine litter ingestion on species populations, as well as the potential for secondary pollution;

<sup>59</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>60</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

- Our knowledge is still very limited regarding microplastics and especially their potential impacts on biodiversity and human health. The gaps in knowledge are even bigger when it comes to nanoplastics, which, may have even greater impacts on marine ecosystems;
- There is insufficient knowledge on litter colonization and transport dynamics<sup>59</sup>;
- There is need for more research and improved knowledge on the degradation process of litter (especially plastics) and the leachability of pollutants<sup>59</sup>;
- The socio-economic impacts of marine litter are not fully assessed and understood, especially regarding the specific economic activities that are among the most impacted, such as tourism, fishing and aquaculture;
- There is a limited knowledge on marine litter in the deep sea environments (over 500m)<sup>59</sup>.

## ii. Prevention/reduction

- Although smoking related activities in general are one of the most important sources of marine litter in the Mediterranean, especially compared to the global average, and cigarette butts the most commonly found litter on beaches, there are no targeted measures to ensure their prevention/reduction.
- Single-use plastic bags are one of the most important marine litter items. There is only one measure in the MLRP specifically aiming at the reduction of plastic bags. The problem of single-use plastic bags is still persistent.
- Microplastics are not addressed in the MLRP.
- Taking into account that that three Mediterranean countries (France, Italy, and Spain) are in the top five European countries in cosmetics sales<sup>61</sup>, existing measures are not sufficient to prevent/reduce the use of microplastics (microbeads) in PCCP.
- Electronic waste and medical waste are not specifically addressed in the MLRP
- Tourism is not adequately addressed at regional level as one of the main sectors responsible for generation of marine litter.

## iii. Management

- The percentage of inadequately managed waste remains very high in some countries, mainly the non-EU States, even more than 60% in some cases (Jambeck *et al.* 2015)<sup>62</sup>;
- In ENP South Countries 58% of the collected municipal solid waste is disposed in open dumps, despite the existing measures<sup>63</sup>;

---

<sup>61</sup> Eunomia for European Commission DG Environment 2016, Study to support the development of measures to combat a range of marine litter sources, Chris Serrington, Chiarrina Darah, Simon Hann, George Cole, Mark Corbin

<sup>62</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>63</sup> Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.



- Port reception facilities still don't operate optimally, especially regarding small harbors and marinas;
- Less than 10% of the waste collected in the Mediterranean region is currently recycled<sup>64</sup>;
- A regional survey prepared by UNEP/MAP and MIO ECSDE in 2015, revealed some important gaps, relating to ALDFG including i. insufficient facilities for effective management of fishing gear and other marine litter collected on board, ii. Weak implementation and/or enforcement of the relevant legislation, iii. Worsening of the derelict fishing gear impacts on biodiversity;
- The circular economy concept is not fully integrated and implemented in the framework of the marine litter policies in the Mediterranean;
- Links to human health are not sufficiently addressed.

#### iv. Implementation of environmental principles

- Awareness and public participation are relatively weak with regards to solid waste management in many Contracting Parties.
- There has been a significant decrease in public participation in the cleaning campaigns (70% decrease of volunteers between 2002-2013)<sup>65</sup>.
- The polluter pays principle is not sufficiently integrated in the Mediterranean policies to combat marine litter.
- The precautionary principle is not sufficiently applied, in areas where scientific uncertainties exist, such as for nanoplastics, or human health risks.

### 3. GAPS AND PROPOSALS

The following table lists the main environmental pressures and overall issues related to marine litter for which there are not sufficient measures in the MLRP, or the existing measures provided for are not adequately implemented

**Table 11.** Gaps related to measures for marine litter

Priority Pressures	Gap related to measures
<b>Plastics</b>	<p>Better implementation and enforcement of the existing measures for prevention and reduction of plastics is required, especially regarding the reduction of packaging waste fraction that goes to landfill/incineration, reduction of plastic bag consumption, establishment of plastic bag taxes, deposit –return-restoration systems for polystyrene fishing boxes.</p> <p>In addition new specific measures should be considered to more efficiently address the problem of plastics, including :</p>

<sup>64</sup> <http://www.eea.europa.eu/soer-2015/countries/mediterranean>

<sup>65</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

	<ul style="list-style-type: none"> <li>• Consideration of single-use plastic bag ban or imposition of tax</li> <li>• Banning of plastics landfilling</li> <li>• Requirements on the thickness of plastic bags</li> <li>• Replacement of plastics by bioplastics where feasible (substance made from organic biomass sources, like vegetable oils, starches etc.)<sup>66</sup></li> <li>• Adoption of specific recycling targets for plastics</li> <li>• Development and testing of new technologies for plastic litter removal</li> <li>• Prevention of generation of single use plastics, mainly through the promotion of sustainable consumption patterns and substitution of some plastic items with more easily reusable material</li> <li>• Specific reduction targets for food and beverage packaging and obligation for minimum packaging weight and volume<sup>67</sup></li> <li>• Enhancement of separate waste collection for plastics</li> </ul>
<b>Microplastics</b>	<ul style="list-style-type: none"> <li>• Microplastics and even more nanoplastics are not adequately addressed in the MLRP. There is need for specific measures to tackle this emerging problem, including<sup>68</sup> <ul style="list-style-type: none"> <li>- Adoption of a common definition of microplastics</li> <li>- Adoption of a common sampling methodology</li> <li>- Measures aiming at reducing the number of microplastics (under specific targets), focusing on the prevention of their generation</li> <li>- Differentiated measures for primary and secondary microplastics</li> <li>- Improvement of WWTP systems to cover this issue</li> <li>- Prohibition or adoption of best management practices of nurdles (pre-production plastic)<sup>69</sup>.</li> </ul> </li> <li>• New measures should be adopted to support reduction/phasing out of microbeads in personal care and cosmetic products (PCCPs), mainly aiming at replacing microplastics with more environmentally friendly alternatives<sup>70</sup>. A prohibition of manufacture of microbeads can also be considered, as practiced by several States globally<sup>71</sup></li> </ul>
<b>Cigarette butts</b>	<p>New/additional measures are required for prevention and reduction of marine litter from smoking-related activities on beach, including</p> <ul style="list-style-type: none"> <li>• reduction targets for cigarette butts</li> <li>• cigarette bans on beaches (USA, UK, Canada)<sup>72</sup></li> <li>• adequate facilities in organized beaches</li> <li>• more clean-up activities</li> </ul>

<sup>66</sup> <http://whatis.techtarget.com/definition/bioplastic>

<sup>67</sup> UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

<sup>68</sup> Eunomia for European Commission DG Environment 2016, Study to support the development of measures to combat a range of marine litter sources, Chris Serrington, Chiarrina Darah, Simon Hann, George Cole, Mark Corbin

<sup>69</sup> UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

Cal. Water Code §13367: <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=wat&group=13001-14000&file=13367>

<sup>70</sup> UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi

<sup>71</sup> UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

<sup>72</sup> UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

	<ul style="list-style-type: none"> <li>• signs on beaches</li> <li>• awareness raising measures</li> <li>• promotion of sustainable consumption</li> </ul>
<b>E-waste</b>	<p>Electronic wastes are not specifically addressed in the Regional Plan.</p> <p>New measures are required to ensure the operation of electronic waste management system according to EMS &amp;BAT</p>
<b>Medical waste</b>	<p>They are not covered by the MLRP. New measures are required for prevention, reduction and integrated management of this type of waste</p>
<b>ALDFG</b>	<p>This type of marine litter is covered by measures under the MLRP. However, stronger implementation is needed, including</p> <ul style="list-style-type: none"> <li>• Training and awareness raising of the fishing sector</li> <li>• More Fishing for Litter projects</li> <li>• Mechanisms to minimize impacts and facilitate removal, such as use of biodegradable components, marking gear, and attaching it to structures to enable retrieval<sup>73</sup> or the repeal of the prohibition on removal carried out by persons other than the legal owner of ALDFG (Honolulu Strategy)</li> <li>• Partnerships between fishermen and business sector for the reuse/recycling of collected fishing nets</li> </ul>
<b>Pollution from ships</b>	<ul style="list-style-type: none"> <li>• This type of pollution is addressed by the MLRP but better implementation of the provided measures is required (port reception facilities, No-Special-Fee, MARPOL Annex V). The existing measures should better address: <ul style="list-style-type: none"> <li>- Port reception facilities in small harbors and marinas</li> <li>- Better enforcement of the waste discharge prohibition</li> </ul> </li> <li>• According to a recent study for the European Commission, although the legal framework for waste from ships is quite comprehensive there are some gaps that need to be addressed. New measures should be considered mainly with regards to the following issues<sup>74</sup>: <ul style="list-style-type: none"> <li>- Limitation of the existing exemptions applying to some vessel types, such as small recreational and fishing vessels</li> <li>- Establishment of an harmonized port fee system</li> <li>- Support of actions at port level to reduce waste generation at ships</li> <li>- Information requirements to facilitate the detection of potential offenders</li> <li>- Improvement of inspection framework</li> <li>- Better enforcement and stricter sanctions</li> </ul> </li> </ul>
<b>Overall issues</b>	<b>Gaps related to measures</b>

<sup>73</sup> UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

<sup>74</sup> Eunomia for European Commission DG Environment 2016, Study to support the development of measures to combat a range of marine litter sources, Chris Serrington, Chiarrina Darah, Simon Hann, George Cole, Mark Corbin

<p><b>Knowledge gaps</b></p>	<p>The existing measures aiming at addressing the issue of lack of knowledge and data, are general. New measures are required to enhance our knowledge on specific issues<sup>75</sup> including:</p> <ul style="list-style-type: none"> <li>• Microplastics (numbers, and impacts)</li> <li>• Nanoplastics (numbers and impacts)</li> <li>• ALDFG (numbers and impacts)</li> <li>• Sub-lethal effects of marine litter ingestion</li> <li>• Secondary pollution</li> <li>• Colonization of floating marine litter</li> <li>• Transport dynamics and accumulation</li> <li>• Degradation and leachability</li> <li>• Socio-economic impacts</li> <li>• State of deep seas</li> <li>• Effectiveness of new-technologies for monitoring and removal</li> </ul>
<p><b>Solid waste management</b></p>	<ul style="list-style-type: none"> <li>• Existing measures providing for adequate treatment of collected wastes and closure of illegal dump sites should be fully implemented and enforced</li> <li>• Additional measures to be considered should promote full cost recovery for solid waste management, enhance municipalities' role and capacity in waste management, ensure full restoration of contaminated sites and regular monitoring to control the environmental state of the site etc.</li> </ul>
<p><b>Monitoring</b></p>	<p>Integrated and comprehensive monitoring is required, that can be achieved through implementation of the EcAp Integrated Monitoring and Assessment Programme (IMAP)</p> <p>New technologies should be developed and used for monitoring of marine litter, including remote sensing, low-altitude visual flights, unmanned aircraft systems (UAS), drones, ROVs, gliders etc.</p>
<p><b>Pollution reduction targets</b></p>	<p>Quantifiable targets need to be included in the MLRP for priority litter items including: cigarette butts, food packaging, plastic bottles, caps, straws, grocery plastic bags, glass bottles, other bags (plastic and paper), and cans (based on results from the ICC 2014)<sup>76</sup></p> <p>According to MARLISCO project (Poitou and Poulain, 2015) the most promising measures for marine litter reduction include: deposit systems for bottles, public awareness raising, collection at processing of marine litter at sea by fishermen, development of litter collection in rain sewers, optimization of waste collection systems, tax for plastic producers etc.<sup>77</sup></p>
<p><b>Polluter-Pays Principle</b></p>	<p>There are many measures aimed to apply the polluter-pays principle, but in practice it is not fully achieved. Stronger implementation and enforcement are required, to address the costs of depollution. Measures may include:</p>

<sup>75</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>76</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

<sup>77</sup> Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

	<ul style="list-style-type: none"> <li>• enhancement of Extended Producers Responsibility</li> <li>• internalization of depollution costs</li> <li>• support of businesses' environmental responsibility, with integration of marine litter into the environmental responsibility reports</li> <li>• establishment and enforcement of dissuasive penalties for people who drop litter and strong sanctions for big polluters</li> </ul>
<b>Prevention</b>	<p>Existing measures aiming at prevention of generation of litter at source are not efficient. New/updated measures are required to ensure prevention at source, including:</p> <ul style="list-style-type: none"> <li>• shift to more sustainable production patterns (links with SCP)</li> <li>• adoption and implementation of a circular economy strategy</li> <li>• promotion of eco-design and smart production</li> <li>• extended producers responsibility measures</li> <li>• increased reuse and recycling, including strengthening the separation of waste at source, and selective collection</li> <li>• development and strengthening of Best Management Practices to eliminate abandonment of vessels and loss of cargo, solid waste and gear (Honolulu Strategy)</li> <li>• enhanced role and capacities of municipalities for waste management</li> </ul>
<b>Removal</b>	<p>Better implementation of existing measures should be achieved including:</p> <ul style="list-style-type: none"> <li>• Enhanced participation in clean up campaigns</li> <li>• More and targeted cleaning activities (e.g. along riverbanks)</li> <li>• Stronger implementation of Fishing for Litter initiatives</li> </ul>
<b>Circular Economy</b>	<p>In the MLRP there are many provisions in line with the Circular Economy concept, but it is not fully implemented in practice.</p> <ul style="list-style-type: none"> <li>• A potential new measure can be the development of a Circular Economy Strategy at regional level, integrating and further developing the provisions set out in the LBS Protocol, the SAP/MED, the pollution related Action Plans and the SCP Action Plan, in view of designing and producing durable, easily repairable, recyclable and recoverable items</li> <li>• A turn waste into resources<sup>78</sup> approach should be established in the Mediterranean, making business, and the civil society aware of the remaining value of end products, while respectively reforming the national legislations to better integrate this issue</li> </ul>
<b>Socioeconomic</b>	<ul style="list-style-type: none"> <li>• The links and impacts with economic activities (tourism, fishing etc.) and human health should be better addressed in the MLRP</li> </ul>

<sup>78</sup> European Commission Communication; COM(2014) 398 final Towards a circular economy: A zero waste programme for Europe

<b>impacts</b>	<ul style="list-style-type: none"> <li>• Also the value of degradation/cost of depollution should be better assessed, in the framework of an ecosystem services assessment process<sup>79</sup></li> </ul>
<b>Categorization of measures</b>	<p>Measures and targets should be categorized by use-categories sources, which are more specific than the traditional land/sea-based distinction. The following categories can be considered:</p> <ul style="list-style-type: none"> <li>- recreational litter (smoking related activities included)</li> <li>- shipping litter</li> <li>- fishing litter</li> <li>- sewage-related debris</li> <li>- tourist litter</li> <li>- sanitary and medical litter</li> </ul>
<b>Economic instruments</b>	<p>According to the information provided in the Marine Litter Assessment in the Mediterranean (after Oosterhuis et al., 2014) the most cost-effective measures are:</p> <ul style="list-style-type: none"> <li>• Taxes on plastic bags</li> <li>• Direct Payment awards (fishing gear, bottles (to fishermen) etc.)</li> </ul> <p>Other instruments that can be considered are the landfill tax<sup>80</sup></p>

<sup>79</sup> According to the UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers, the Asia-Pacific region is reported to lose US\$1.265 billion annually due to damage to its fishing, shipping, and marine tourism industries caused by marine litter while marine litter costs Scotland at least US\$24.3 million annually

<sup>80</sup> The Scottish Landfill Tax was introduced in April 2015 in the framework of the Scotland's Zero Waste Plan (2010)

## SPECIAL NOTE ON THE LINKS BETWEEN WFD AND MSFD MEASURES

### Analysis of gaps related to measures for the implementation of the WFD and their relevance to MSFD PoMs

The Commission SWD “Report on the progress in implementation of the Water Framework Directive Programmes of Measures”<sup>81</sup> provides Recommendations for the Member States, with the aim to assist them in identifying the areas where improvement in the implementation of the WFD is needed and the gaps that should be addressed as a priority in the second cycle of RBMPs.

It is interesting to note that there are some recommendations that are repeated for several Mediterranean countries, while some recommendations concern almost all of them.

These recommendations should be considered in the framework of the MSFD, since there are strong links between the two Directives, and the measures, and subsequently their gaps, under the WFD can support or hinder the achievement of the GES under the MSFD, regarding the pollution-related targets (mainly contaminants and eutrophication). According to the European Commission’s recommendation on the MSFD Programmes of Measures<sup>82</sup>, a certain level of coordination is required between the two PoMs to ensure that the impacts of WFD PoMs on marine waters is taken into account for the development of the MSFD PoMs. Therefore, it is important to review the gaps identified in the WFD PoMs and try to address them in the framework of MSFD PoMs, as appropriate.

The most commonly found recommendations with regards to Mediterranean countries that should be taken into consideration for the development of PoMs also in the framework of the MSFD are the following (see Figure 4 for the number of countries concerned):

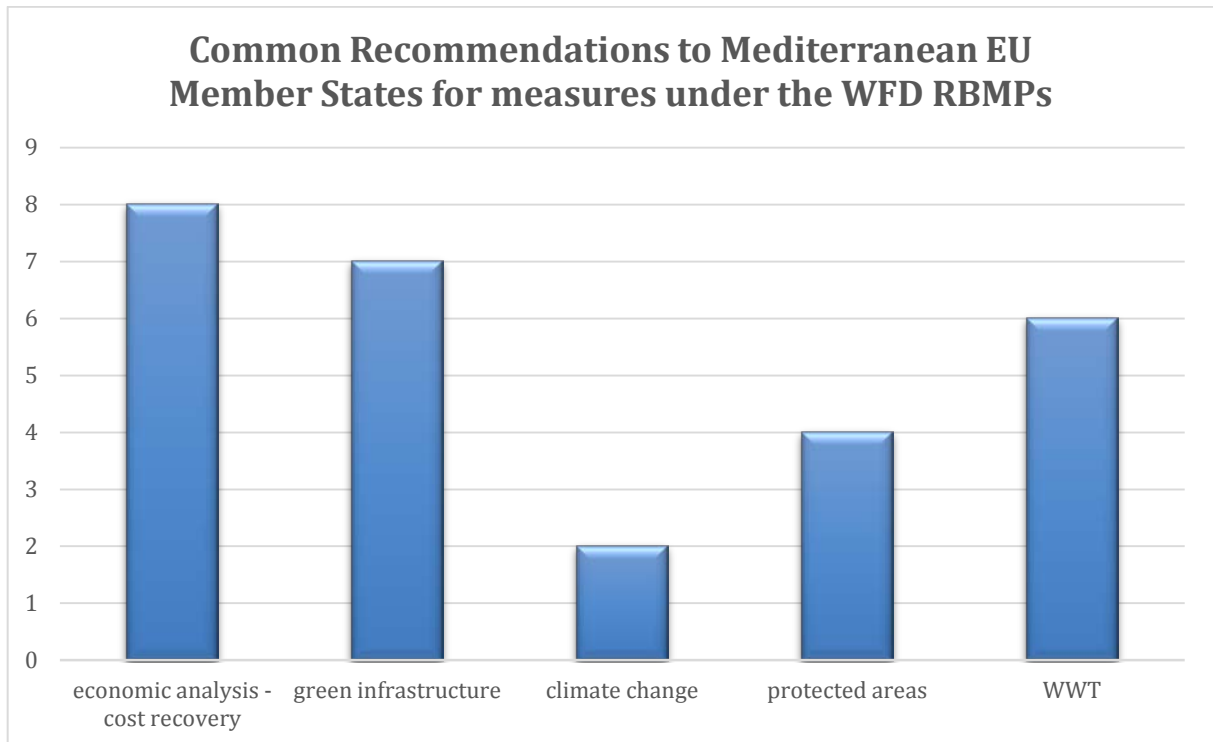
- **Green Infrastructure:** to consider and prioritize the use of Green Infrastructure and/or natural water retention measures, that provide a range of environmental social and economic benefits
- **Value of water:** To undertake an economic analysis of water use and ensure full cost recovery including the environmental costs
- **Climate Change:** climate change issues should be further considered, including pressure analysis, monitoring, climate check on measures, “climate proofing” etc.
- **Wastewater treatment:** better identification of links with UWWTD, full implementation of and compliance with the Directive and adoption of stricter measures where the measures under the WWFD are not enough to bridge the gaps
- **Protected areas:** better links between measures and the needs/objectives of protected areas should be established

---

<sup>81</sup> SWD (2015) 50 final

<sup>82</sup> European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)





**Figure 4.** Common Recommendations for WFD measures

Source: European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)

**PART II.**  
**MARINE SPECIES AND HABITATS**

## I. BIODIVERSITY

### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

The Mediterranean Sea is home to rich biodiversity of fauna and flora, recognized as one of the world's 25 top biodiversity hotspots and the European Sea hosting the highest natural biodiversity<sup>83</sup>. Although it covers less than 1% of the world's ocean surface and less than 0,3% of its volume, it hosts 10,000-12,000 species, representing 4-18% of the world's known marine species (UNEP/MAP, 2012 and Bianchi and Morri, 2000)<sup>84</sup>. An important characteristic of marine biodiversity on the Mediterranean Sea is the high level of endemism, with 20-30% of the total number of species being native only to the Mediterranean Sea<sup>85</sup> and can reach even 90% for certain groups, such as nesting sea birds (Zenetos *et al.*, 2002; Boudouresque, 2009)<sup>86</sup>. The Mediterranean Sea is also home to important habitats, including sand dunes, coastal wetlands and lagoons. The most important Mediterranean habitats are found in the coastal strip, including *Lithophyllum byssoides* (e.g. *L. lichenoides*) rims, *Posidonia oceanica* meadows and Fucal forests (biocenoses with *Cystoseira*), and the coralligenous communities (Zenetos *et al.*, 2002; Boudouresque, 2004)<sup>87</sup>.

Despite its importance for the marine ecosystems, human health and socioeconomic activities, the Mediterranean biodiversity faces multiple anthropogenic pressures that affect its ecological status and peril its conservation. Impacts have been reported on the populations of different species, including birds (audouin's gull, white pelican, Dalmatian pelican, great white heron, slenderbilled gull and others), marine mammals (such as monk seal, and dolphins), cetaceans, cartilaginous fish, marine turtles and other species<sup>88</sup>. Marine and coastal habitats are also heavily impacted by human activities, with the most severely threatened being the rims with *Lithophyllum byssoides*, the concretion with *Neogoniolithon brassica-florida*, the *Posidonia* meadows and the coralligenous (Boudouresque, 2004)<sup>89</sup>. The 2007–2012 biogeographical assessments, based on national reporting under the Habitats Directive, showed that six out of seven invertebrate species assessed in the

<sup>83</sup> State of Europe's seas, European Environment Agency, 2015

<sup>84</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>85</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>86</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>87</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>88</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>89</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

Mediterranean Sea are in 'unfavourable conservation status'<sup>90</sup>. There are many pressures on marine and coastal biodiversity, which may often act synergistically, causing cumulative effects that are even harder to assess and tackle.

One important driver causing decline of both commercial and non-commercial species is fisheries and more accurately unsustainable fishing practices that take place in the sea. Although assessments are very difficult to be made with regards to the state of fish stocks, because of the very limited level of knowledge, figures from the assessed stocks are alarming: 91% of the assessed stocks in the Mediterranean are overfished (EC, 2014a)<sup>91</sup>. Many species are listed as Endangered or Vulnerable on the IUCN's Red List<sup>92</sup>. The impacts of fishing are also important on non-commercial species, which are accidentally caught, and then discarded. Bycatch affects mainly seabirds, sea turtles and marine mammals, some of which are protected species. Unsustainable practices also adversely affect deep sea biodiversity and destroy benthic habitats.

Another important pressure is the introduction and establishment of invasive alien species. Some of the main impacts include increased competition for space and food, reduction of prey, hybridizing with indigenous species and introduction of pathogens<sup>93</sup>.

The introduction of microbial pathogens and contaminants is another significant problem for marine biodiversity. Potential pathogen vectors include inadequately treated wastewater, industrial discharges, shipping discharges agricultural runoffs, aquaculture plants, and others, with significant impacts on biodiversity and human health. New pathogens have been recorded in the Mediterranean, mainly as a result of climate change and the spread of invasive alien species<sup>94</sup>.

Finally climate change has significant impacts on marine species and habitats, especially in combination with other pressures. The main effects include warming of water bodies, tropicalisation (colonization of tropical species) and acidification which affects the life cycles of many species, especially benthic communities<sup>95</sup>.

## 2. EXISTING MEASURES AT REGIONAL LEVEL

Biodiversity conservation has been and still is a priority for UNEP/MAP and an important arsenal is in place aiming at protecting marine biodiversity at regional level.

---

<sup>90</sup> State of Europe's seas, European Environment Agency, 2015

<sup>91</sup> State of Europe's seas, European Environment Agency, 2015

<sup>92</sup> In the Mediterranean Sea, 67% of resident marine mammal species are now listed as threatened (IUCN, 2012b)

<sup>93</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>94</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages

<sup>95</sup> State of Europe's seas, European Environment Agency, 2015

One of the main objectives of the **Barcelona Convention** is 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” (article 10). The first Protocol concerning Mediterranean Specially Protected Areas was adopted in 1982 and in 1995 it was replaced by the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (**SPA and Biodiversity Protocol**) which has as its main objective to promote the conservation and sustainable management of areas having a particular natural or cultural value and the conservation of the endangered or threatened animal and plant species. Important provisions are set out in the **Annexes** to the Protocol, covering important issues of the biodiversity protection namely:

- Common criteria for the choice of protected marine and coastal areas that could be included in the SPAMI list
- List of endangered or threatened species
- List of species whose exploitation is regulated

The **Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean (SAP/BIO)** was adopted in 2003, providing a programmatic framework for implementing the SPA/BD Protocol. It sets out a list of priority actions, with related priority measures, as follows:

**Table 12.** Objectives and Priority Actions set out in the SAP/BIO.

Objective	Priority Actions
<b>Inventorying, mapping and monitoring the Mediterranean coastal and marine biodiversity</b>	Undertake a complete and integrated inventory (by sub-region) of sensitive Mediterranean coastal, wetland, and marine habitats
	Establish systems to monitor the trends of the main threats to Mediterranean biodiversity and the ecological and socio-economic impacts of changes in biodiversity
	Identify, develop, and validate adequate biological and socio-economic indicators
<b>Conservation of sensitive habitats, species and sites</b>	Harmonise, update, coordinate and enforce legislation to conserve biodiversity
	Develop actions to conserve threatened and endangered (coastal and marine) Mediterranean species
	Protect marine and coastal sites of particular interest
	Declaration and development of new coastal and marine protected areas particularly in the south and eastern Mediterranean and offshore, including the high sea
	Strengthening existing Marine and Coastal Protected Areas
	Ensure functioning of protected area networks
<b>Assessing and mitigating the impact of</b>	Assess the potential impact of global warming and rise in sea level on Mediterranean coastal and marine biodiversity
	Assess the potential impact of threats to Mediterranean coastal and

<b>threats on biodiversity</b>	marine biodiversity
	Mitigate the direct impact of the international trade in endangered species
	Control and mitigate the introduction and spread of non-indigenous species
	Control and mitigate the effects of changes in land use (including coastal urbanization and construction of infrastructure)
	Promote eco- and soft tourism, control and mitigate impact of recreational activities regulating or dissuading people from such practices)
	Assessment and elaboration of strategies to prevent the environmental impact of sources of pollution
	Special focus on the control and regulation of inappropriate aquaculture practices
	Assess, control and elaborate strategies to prevent the negative impact of fisheries on biodiversity
<b>Developing research to complete knowledge and fill in gaps on biodiversity</b>	Improve and coordinate biodiversity research
	Improve taxonomic expertise in the region, through the constitution of PEET
<b>Capacity-building to ensure coordination and technical support</b>	Achieve a ‘clearing-house’ mechanism to focus on marine and coastal conservation activities
	Coordination and development of common tools for implementing National Action Plans (NAPs)
<b>Information and participation</b>	Facilitate access to information for managers and decision-makers, as well as stakeholders and the general public
	Promote public participation, within an integrated management scheme
	Preserve traditional knowledge
<b>Awareness-raising</b>	Develop international collaboration to enhance regional public awareness
	Organise coordinated Mediterranean-level campaigns focusing on specific regional biodiversity issues

In the framework of SAP/BIO, a list of biodiversity-related **Action Plans** have been adopted at regional level in order to ensure better protection of specific species and habitats, including the:

- Mediterranean Monk Seal

- Mediterranean Marine Turtle
- Cetaceans
- Marine vegetation
- Bird species listed in Annex II of the SPA/BD Protocol
- Cartilaginous fish
- Coralligenous and other calcareous bio-concentrations
- Dark habitats

It is worth noting that the Decision IG.22/12, adopted by the Contracting Parties to the Barcelona Convention (COP19, Athens, 2016) adopted Updated Action Plans concerning “Cetaceans”, “Coralligenous and Other Calcareous Bio-concretions” (as well as species introductions and invasive species, examined in the chapter II below). Furthermore, the COP19 in its decision IG.22/12 requested the SPA/RAC to update the Action Plan for the Conservation of Bird Species listed in Annex II of the SPA/BD Protocol and to revise the Reference List of Marine and Coastal Habitat Types in the Mediterranean for consideration by COP20.

Central in the protection of marine biodiversity in the Mediterranean is the designation and management of Marine Protected Areas (MPAs) and Specially Protected Areas of Mediterranean Importance (SPAMIs).

Despite the comprehensive framework for the protection of biodiversity at regional level, there are still important gaps that are identified, mainly in the areas of knowledge, implementation and enforcement of legislation, MPA designation and management, and financing, as follows:

#### **i. Knowledge /data**

- Significant gaps in knowledge exist, mainly with regard to the population sizes of some species and their distribution, abundance and conservation status.. The gaps are more important in the biodiversity of deep sea areas.
- The knowledge is also limited regarding the impacts of pathogens on marine and coastal biodiversity, especially the new pathogens<sup>96</sup>.
- Knowledge gaps concern also the impacts of climate change on marine and coastal ecosystems, especially the impacts of acidification. The impacts of climate change are even less studied in the deep sea, even though there is a demonstration of general warming trends (about 0.12 °C in the last three decades) (Lejeusne *et al.*, 2010)<sup>97</sup>.
- Monitoring lacks harmonization, while there are significant gaps in monitoring systems for invasive alien species.

---

<sup>96</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>97</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages



## ii. Implementation/enforcement of existing legal and policy framework

- According to SAP/BIO analysis<sup>98</sup> regarding the objective to assess and mitigate the threats on biodiversity, no major or insufficient achievements have been made in the following areas:
  - Monitoring the impacts of global trade and economic policies on biodiversity, the effective control of coastal development, the enforcement of measures to control and combat international trade of endangered species, mainly due to lack of training for the competent agents and lack of resources.
  - Implementation of biodiversity protection legislation at national level
  - Identification of hotspots is mainly based on pollution, while for other threats the identification of those areas is limited
  - Despite the promotion of ecotourism at national level and the implementation of actions, the objective of shifting to more sustainable tourism has not been met, and further actions are required, such as the introduction of labels for sustainable tourism, incentives for the development of ecotourism facilities etc.
  - Despite the development of the aquaculture activities and the future scenarios that predict a significant increase of the sector, there are not sufficient measures in place to prevent and tackle the negative environmental impacts of aquaculture and only a few countries have integrated the setting aside of sites for fish farming into their spatial planning
  
- Some important gaps can be derived also from the “Status of implementation of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean”<sup>99</sup> as follows:
  - Only half of the assessed countries (7/14) have crafted and apply Management Plans for the Protected Areas and the same number have in place observation and monitoring programmes
  - Only five out of fourteen Parties have integrating national emergency plans and measures to respond to incidents that can cause harm or threaten SPAs
  - Only five out of fourteen Parties have created SPAMIs
  - Only four out of fourteen Parties have programmes for ex situ reproduction and reintroduction of wild fauna
  - Only five out of fourteen Parties have developed national Strategies and Action Plans for the conservation of biodiversity
  - Only five Parties indicated arrangements for banning and regulating activities involving the capture of species from SPAs
  - In general there is insufficient progress on the Action Plan on cartilaginous fish, with only five out of thirteen parties having given chondrichthyans a satisfying legal status for protection, four Parties having

<sup>98</sup> SAP/BIO Implementation: the first decade and the way forward (as reviewed by the National Correspondents of SAP/BIO in July 2013), document UNEP(DEPI)/MED WG.382/5; UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

<sup>99</sup> UNEP(DEPI)/MED WG.382/3, 2013

- established specific programmes in the context of the IPOA-Sharks FAO conservation plan, and five Parties having taken steps about fishing
- The level of implementation of the Action Plan on invasive species is relatively higher. However problems do exist also in this area, as for example, only three out of thirteen Parties have a mechanism to fight and monitor the discharge of ballast water in territorial waters, or have developed an Action Plan to combat the introduction of NIS
  - The same applies in the area of seabirds, where the implementation of the Action Plan is generally satisfying. There is however scope for improvement, especially in the development of National Action Plans for specific bird species appearing in Annex II to the Protocol.
  - Stronger efforts for the implementation of the Action Plan or the conservation of cetaceans are needed, since only two out of thirteen parties have crafted Action Plans at national level and only five Parties have designated MPAs and/or SPAMIs for the protection of cetaceans
  - The image is relatively satisfactory with regards to the Action Plan for the conservation of marine vegetation. However only two Parties have established an Action Plan in this regard.
  - The assessed Parties performed better in the implementation of the Action Plan for the conservation of the Monk Seal
  - Regarding the Action Plan on marine turtles almost of the assessed Parties have laws and regulations for their protection. However only four out of thirteen mentioned the adoption of measures to reduce by catch, and six out of thirteen have prepared Action Plans at national level.
- Important gaps exist in the enforcement and control of the biodiversity related legislation, particularly in the areas of fisheries and invasive alien species
  - There are no sufficient restoration measures and targets
  - There are important gaps in biodiversity financing to be addressed

### iii. MPA designation and management

- The designation and management of MPAs is insufficient, and the Mediterranean Sea is still far from meeting the CBD goal of 10% of the region covered by MPAs. It should be noted that at EU level, the Mediterranean region is on track in achieving the 10% target, as 9,5% of the marine region is covered by MPAs<sup>100</sup>. However big disparities exist between different sub-regions, as for example in the western Mediterranean the coverage by MPAs is of 15,6%, whereas only 1,6% of the Ionian Sea and Central Mediterranean Sea and 2% of the Adriatic Sea are covered by MPAs<sup>101</sup>. However this assessment concerns the EU waters and not the whole region. At regional level, almost 114 600 km<sup>2</sup> of the Mediterranean are covered by MPAs, making up for about 4,56% of its surface, while less

<sup>100</sup> European Commission – Report from the Commission to the European Parliament and the Council on the progress in establishing marine protected areas (as required by article 21 of the Marine Strategy Framework Directive 2008/56/EC), Brussels 01.10.2015

<sup>101</sup> European Environment Agency, 2015, Spatial Analysis of Marine Protected Area networks in Europe's Seas

than 0,1% of the Mediterranean surface is covered by a no-take zone (Gabrié *et al.*, 2012)<sup>102</sup>. In particular the main problems are the following:

- MPAs are not representative of the full range of species and habitats<sup>103</sup>. Except for rare cases, the MPAs are designated in coastal waters under national jurisdiction. In addition, the MPAs are not equally distributed across the region (the biggest part of protected areas is situated in the western Mediterranean and Aegean Sea<sup>104</sup>). This means that important habitats in other regions are not equally taken into account.
- There is a problem of connectivity and coherence<sup>105</sup>: in order for protection networks to reach the maximum potential of protection, they have to be coherent and allow exchanges of the species. Studies suggest a maximum distance of 80 km.
- Management plans are not adopted for all the MPAs, while some of the existing plans are not adequately addressing the conservation needs of the sites
- The value of the ecosystem services provided by the oceans is largely unknown. Knowledge in this area is limited also for MPAs.

### 3. GAPS AND PROPOSALS

The following table lists the main measures for biodiversity protection for which there are significant gaps, and overall issues for which better implementation of existing measures or adoption of new/updated measures should be considered:

**Table 13.** Gaps related to measures for biodiversity

Key Measures	Gaps related to measures
<b>SAP/BIO measures</b>	<p>Stronger implementation of the Plan is needed, especially with regards to the following areas:</p> <ul style="list-style-type: none"> <li>- Adoption of national biodiversity laws</li> <li>- Control of coastal development</li> <li>- International trade of endangered species</li> <li>- Promotion of sustainable tourism</li> <li>- Regulation of aquaculture</li> </ul>

<sup>102</sup> Tode Lina, Lafitte Antoine, Sauzade Didier, 2016, Socio-economic assessment of selected potential new measures to achieve good environmental status of the Mediterranean waters. ActionMed Deliverable 3.2.

<sup>103</sup> Gabrié C., Lagabrielle E., Bissery C., Crochelet E., Meola B., Webster C., Claudet J., Chassanite A., Marinesque S., Robert P., Goutx M., Quod C. 2012. The Status of Marine Protected Areas in the Mediterranean Sea. MedPAN & RAC/SPA. Ed: MedPAN Collection. 256 pp

<sup>104</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>105</sup> Gabrié C., Lagabrielle E., Bissery C., Crochelet E., Meola B., Webster C., Claudet J., Chassanite A., Marinesque S., Robert P., Goutx M., Quod C. 2012. The Status of Marine Protected Areas in the Mediterranean Sea. MedPAN & RAC/SPA. Ed: MedPAN Collection. 256 pp

	<ul style="list-style-type: none"> <li>- Banning of or restrictions in harmful activities</li> <li>- Prevention and control of introduction and spread of invasive alien species</li> </ul>
<b>MPAs</b>	<p>Despite the adoption of measures at regional level, the Aichi target of 10% has not been met.</p> <ul style="list-style-type: none"> <li>• Stronger implementation efforts are required to ensure the following goals: <ul style="list-style-type: none"> <li>- Expansion of the MPA network in the whole region to achieve the 10% coverage target</li> <li>- Representation of the full range of species and habitats and equal distribution across the region</li> <li>- Better connectivity and coherence. A potential additional measure should be to set a maximum distance requirement (i.e. 80 or 100 km)</li> <li>- More efficient management of MPAs</li> <li>- Consideration of nursery, spawning, breeding and feeding needs for the development of MPA network</li> <li>- Better regulation of recreational fishing activities</li> </ul> </li> <li>• The management of MPAs is in some cases insufficient. Measures should be adopted that require the definition of conservation objectives for all the MPAs and the establishment of management plans in line with these objectives</li> <li>• The structure of MPAs should consist of core areas, buffer zones and corridors. The establishment of zoning schemes with stricter levels of protection (such as reserves or no-take areas) in existing MPAs should be considered<sup>106</sup></li> </ul>
<b>Spatial measures other than MPAs</b>	<p>According to the DG Environment Recommendation on the PoMs (2014)<sup>107</sup>, the protection through MPAs can be complemented by other spatial measures, aiming at managing harmful activities in line with biodiversity conservation objectives. Those measures may include:</p> <ul style="list-style-type: none"> <li>- Protection of essential fish habitats or stock recovery areas</li> <li>- Real time closure areas to combat bycatch</li> <li>- Special fishing licenses in sensible/vulnerable areas based on fishing impact assessments</li> <li>- Banning of gravel extraction or fisheries inside wind farms or shipping lane</li> </ul>
<b>Measures for aquaculture activities</b>	<p>This sector is not adequately addressed at regional level. Stricter technical guidelines and management standards, or even Regional Plans are required to tackle the impacts of aquaculture on biodiversity (for more information see Chapter II).</p>
<b>Measures for fishing activities</b>	<p>Adoption of new measures and better enforcement and control of the existing measures are needed. (For more information see Chapter III)</p>

<sup>106</sup> European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)

<sup>107</sup> European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)

<b>Measures for prevention/control of NIS</b>	New measures and better implementation and enforcement of existing measures are required. (For more information see Chapter II)
<b>Restoration</b>	<p>New measures are needed aiming at restoring degraded ecosystems, including :</p> <ul style="list-style-type: none"> <li>- Establishment of a restoration target (i.e. of 15% of all marine degraded ecosystems), in line with the objectives set out in the EU Biodiversity Strategy.</li> <li>- Evaluation of the cost of degradation, in the framework of an ecosystem services assessment programme</li> </ul>
<b>Overall issues</b>	<b>Gaps related to measures</b>
<b>Lack of Knowledge</b>	<p>The existing measures providing for enhanced research and information on biodiversity should be further implemented to fill the knowledge gaps in particular in the following areas:</p> <ul style="list-style-type: none"> <li>- Population size, distribution, abundance and conservation status of some species</li> <li>- Deep sea ecosystems</li> <li>- Impacts of pathogens, especially new pathogens</li> <li>- Impacts of marine litter</li> <li>- Impacts of climate change</li> <li>- Invasive alien species</li> <li>- Value of ecosystem services from MPAs</li> </ul>
<b>Implementation of Biodiversity Action Plans</b>	There are significant gaps in the implementation of Action Plans in the framework of the SPA/BD Protocol. Enhanced implementation is required in the areas identified in the list above, based on the “Status of implementation of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean”
<b>Financing</b>	Enhanced financing needs to be foreseen for biodiversity protection. A funding mechanism that can be considered at regional scale is the “Integrated LIFE projects” : <i>projects implementing on a large territorial scale (regional, multi-regional, national or trans-national scale) environmental plans or strategies required by specific Union environmental legislation, developed pursuant to other Union acts or developed by Member States' authorities, primarily in the areas of nature (including Natura 2000 network management), water, waste and air, while ensuring involvement of stakeholders and promoting the coordination with and mobilisation of at least one other relevant Union, national or private funding source.</i> <sup>108</sup>

<sup>108</sup> <http://ec.europa.eu/environment/life/projects/ip.htm>

## II. NON-INDIGENOUS SPECIES

### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

The introduction and spread of invasive alien species is one of the main reasons for biodiversity loss, and it is a problem that is often too difficult to tackle, if not detected and handled in an early stage. The Mediterranean Sea is severely affected by introductions of non-indigenous species that have been increasing in recent years with an estimated number of around 1,000<sup>109</sup>, of which more than half is considered established<sup>110</sup>. According to the State of Europe's Sea<sup>111</sup>, the Mediterranean is the European sea with the largest number of non-indigenous species. The Aegean-Levantine Sea is the most affected region, with over 160 new species recorded from 2000 to 2010<sup>112</sup>. The majority of non-indigenous species in the Mediterranean are mollusks, fishes, benthic plants and crustaceans (UNEP/MAP - Plan Bleu, 2009). The following table extracted from the UNEP-MAP RAC/SPA 2010 Report "The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities"<sup>113</sup> shows the main pressures and impacts related to invasive alien species.

**Table 14.** Main pressures and impacts of invasive alien species <sup>113</sup>

Pressures	Impacts
Competition for space and/or food	Reduction and niche contraction of native species; replacement of native species; other indirect ecosystem effects including negative impact on structures and functioning of the ecosystems
Predation (or grazing)	Reduction of prey (or vegetation) mainly because native prey species may not have evolved defenses against the novel predators; other indirect ecosystem effects including negative impact on structures and functioning of the ecosystems
Hybridizing with native species	The invaders genes "flood" the native species, such that no individuals contain the entire genotype of the native species, thus effectively driving the indigenous species to extinction
Introduction of pathogens	Reduction of indigenous species devoid of defenses against new pathogens; other indirect ecosystem effects

Source: UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities.

The impacts of invasive alien species may be of a level to change the structure and functioning of the ecosystem, as in the case of the clam *Ruditapes philippinarum*

<sup>109</sup> <http://www.medit-mar-sc.net/index.php/marine/article/view/327>

<sup>110</sup> UNEP/MAP Decision IG.22/12 Annex III

<sup>111</sup> State of Europe's seas, European Environment Agency, 2015

<sup>112</sup> <http://www.eea.europa.eu/data-and-maps/indicators/trends-in-marine-alien-species-mas-2/assessment>

<sup>113</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages



(Occhipinti Ambrogi, 2002)<sup>114</sup>. The socioeconomic impacts of invasive alien species are also significant, as they affect adversely many different human activities that depend on healthy and productive ecosystems, such as fishing, aquaculture, and tourism, while also threatening public health. Examples from the Mediterranean include the spread of *Lagocephalus sceleratus* in Israel, the invasion of cornetfish *Fistularia commersonii*, blooms of jellyfish species and others<sup>115</sup>.

The establishment and proliferation of non-indigenous species is linked to the state of the environment they invade. Degraded ecosystems that face significant pressures are more vulnerable to the establishment and spread of alien species than healthy ecosystems. The increase of the anthropogenic pressures on the Mediterranean environment in the recent years may therefore be one of the reasons for the expansion of invasive alien species. This can also be a key element to combat the problem, by restoring and preserving key ecosystems, in order to reinforce their resilience to introductions of invasive species.

Although there are important gaps in our knowledge about invasive alien species, we know that the main vectors of introduction are shipping (fouling on ship hulls, ballast water etc.), aquaculture and natural corridors (Suez canal/Straits of Gibraltar)<sup>116</sup>. The importance of each pathway varies even in the same regional sea, from a sub-regional zone to another (see figure 5). Climate change is also expected to play an important role in future introduction and spread patterns of alien species. According to recent studies increased sea temperatures will enhance the spread of non-indigenous species.<sup>117</sup>

---

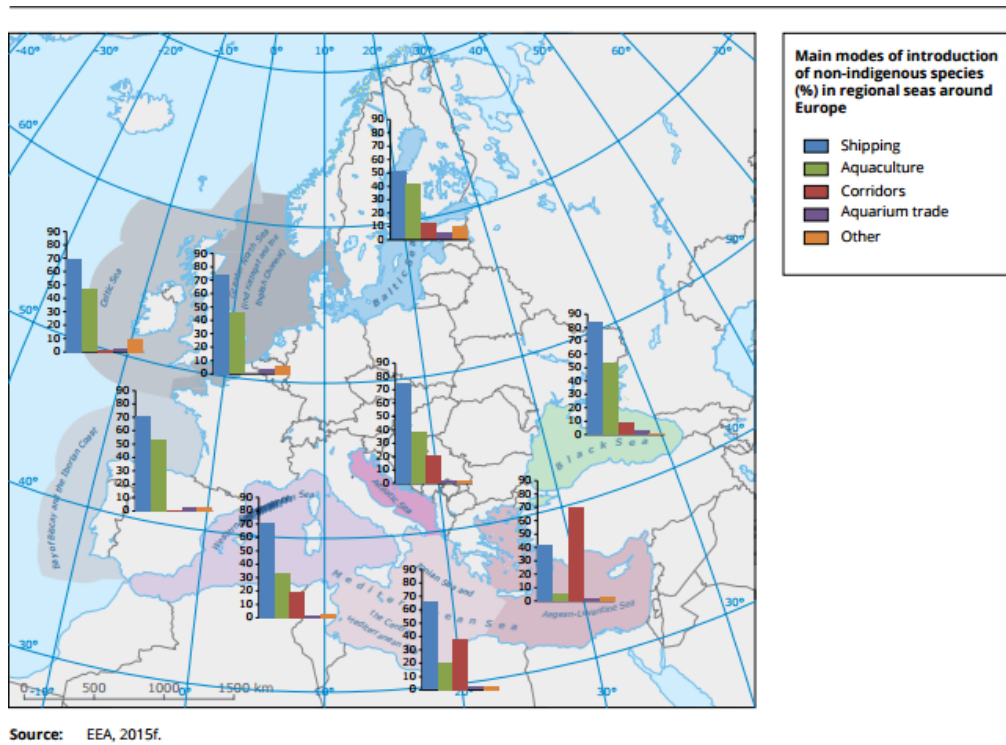
<sup>114</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages

<sup>115</sup> Marine Alien Invasive Species Strategy for the MedPAN Network, 2012

<sup>116</sup> State of Europe's seas, European Environment Agency, 2015

<sup>117</sup> Otero, M., Cebrian, E., Francour, P., Galil, B., Savini, D. 2013. Monitoring Marine Invasive Species in Mediterranean Marine Protected Areas (MPAs): A strategy and practical guide for managers. Malaga, Spain: IUCN. 136 pages.





**Figure 5:** Main pathways of NIS introduction per regional sea (source: EEA, 2015f)

## 2. EXISTING MEASURES AT REGIONAL LEVEL

The problem of Invasive Alien Species is of particular importance for the Mediterranean Sea and has long been known at studied in the framework of the Barcelona Convention. In the framework of the Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol), the Action Plan on introductions of Species and Invasive Species was adopted by the Contracting Parties to the Barcelona Convention in 2003 in order to serve as a Mediterranean Strategy to face up to the problems posed by the introduction of non-native marine species. The 19<sup>th</sup> Meeting of the Contracting Parties to the Barcelona Convention adopted in 2016 an **updated Action Plan concerning Species Introductions and Invasive Species in the Mediterranean Sea**. The Action Plan has as its main objective to promote the development of coordinated efforts and management measures throughout the Mediterranean region in order to prevent as appropriate, minimize and limit, monitor and control marine biological invasions and their impacts on biodiversity, human health, and ecosystem services focusing among others on strengthening capacities, supporting information networks, further developing MAMIAS (the regional platform for collection, exploitation and dissemination of information on marine biological invasions in the Mediterranean), strengthening institutional and legislative frameworks, conducting baseline studies and establishing monitoring programmes, setting up cooperation and information exchange mechanisms, and elaborating guidelines and technical documentation.

Thirteen priorities (at national and regional levels) are set out in the updated Action Plan, focusing mainly on data collection, knowledge improvement, impact assessment, measures implementation for prevention and control, training, awareness raising and cooperation.

A series of concrete actions for the achievement of the provided objectives, together with implementation timetable, are found in the Annex to the Action Plan.

**Table 15.** Measures provided for by the Action Plan on introductions of Species and Invasive Species.

Action	Deadline	Level
<b>1. Preparation of national reports, on issues listed in the Action Plan (including inventorying of alien marine species, trends in abundance, temporal occurrence and spatial distribution, ratio between invasive alien and native species, impacts, steps taken for introduction prevention and control, institutional framework for the control of species introduction, horizon scanning for future threats, and participation at pertinent international initiatives)</b>	2016	National
<b>2. Set up a mechanism to promote and coordinate the actions listed in paragraph 22 of the Action Plan</b>	2016	National
<b>3. Launch MAMIAS (referring to paragraph 24 of the Action Plan)</b>	2016	Regional
<b>4. Preparation of forms for reporting to MAMIAS (referring to paragraph 19 of the Action Plan)</b>	2016	Regional
<b>5. Baseline study with information for MAMIAS (referring to paragraph 19 of the Action Plan)</b>	2017	National
<b>6. Develop programmes for data collection and monitoring (referring to paragraph 18 of the Action Plan)</b>	2017	National
<b>7. Launch the procedures for enacting or strengthening national legislation governing the control of alien species introduction (Referring to paragraph 21 of the Action Plan)</b>	2017	National
<b>8. Establish/update a directory of relevant specialists and organisations (Referring to paragraph 22 of the Action Plan)</b>	2017	National, Regional
<b>9. Develop programmes to raise the awareness of the general public and target groups, including decision-makers, concerning the risks associated with species introduction (Referring to paragraph 22 of the Action Plan)</b>	2017	National
<b>10. Develop online tools and web services for searching the database and extracting data (Referring to paragraph 24 of the Action Plan)</b>	2017	Regional
<b>11. Annual updates of national data for MAMIAS (Referring to paragraph 20 of the Action Plan)</b>	2017-2019 (annually)	National
<b>12. Develop and implement risk-assessment techniques (Referring to paragraph 22 of the Action Plan)</b>	2018	National
<b>13. Develop online mapping tools (Referring to paragraph</b>	2018	Regional

<b>24 of the Action Plan)</b>		
<b>14. Organise the regional training session (Referring to paragraph 26 of the Action Plan)</b>	2018	Regional
<b>15. Elaborate the National Plans (Referring to paragraph 23 of the Action Plan)</b>	2019	National
<b>16. Develop an early warning system in the framework of MAMIAS (Referring to paragraph 24 of the Action Plan)</b>	2019	Regional
<b>17. Establish collaborations and links between MAMIAS and other international systems and organizations (Referring to paragraph 25 of the Action Plan)</b>	2019	Regional
<b>18. Preparation of material for public education and awareness (Referring to paragraph 27 of the Action Plan)</b>	2020	National, Regional
<b>19. Develop online tools in MAMIAS for statistics and indicators, especially to support EcAp (Referring to paragraph 24 of the Action Plan)</b>	2020	Regional

To follow up on the 2003 Action Plan, RAC/SPA developed a **Guide for Risk Analysis assessing the impacts of the introduction of non-indigenous species**, and **Guidelines for controlling the vectors of introduction into the Mediterranean of non-indigenous species and invasive marine species**<sup>118</sup>. The Guide for Risk Analysis assessing the impacts of the introduction of non-indigenous species analyses different approaches doe risk assessment related to NIS, including species level, vector-based and pathway, while giving definitions of relevant terms. The Guidelines for controlling the vectors of introduction into the Mediterranean of non-indigenous species and invasive marine species aim at preventing further loss of biological diversity due to the deleterious effects of the intentional and unintentional introductions of alien invasive species, while encouraging environmentally-sound and responsible use of the Mediterranean marine environment. The Guidelines provide recommendations for the main vectors of introduction, namely ballast waters, hull fouling, and aquaculture. Specific issues are addressed with regards to each pathway, as follows:

- Ballast Waters: Ballast Water Convention, ballast water exchange in the Mediterranean region, inter-Mediterranean voyages, regional early-warning systems;
- Hull fouling: International, EU and National framework, goals and objectives, knowledge and research, awareness, prevention and control, RAC/SPA role;
- Aquaculture: background, goals and objectives, knowledge and research, awareness, prevention, eradication and control, RAC/SPA role.

In addition, the **Strategy on ship's Ballast Water Management (BWM)** was adopted by the COP17, with the objective to develop a regional harmonized approach in the Mediterranean on ship's ballast water control and management, in line with the International Ballast Water Convention (BWM Convention). It sets eight Strategic

<sup>118</sup> [http://www.rac-spa.org/sites/default/files/doc\\_alien/ld\\_analyse.pdf](http://www.rac-spa.org/sites/default/files/doc_alien/ld_analyse.pdf)  
[http://www.rac-spa.org/sites/default/files/doc\\_alien/ld\\_controle.pdf](http://www.rac-spa.org/sites/default/files/doc_alien/ld_controle.pdf)

Priorities, an Action Plan and timetable for its implementation and specific action points. The Strategic Priorities are the following:

- Support international instruments developed to minimize the introduction of invasive alien species in the Mediterranean
- Maintain capacity building activities and initiatives in the Mediterranean region
- Develop advanced knowledge on environmental conditions of the Mediterranean and ship's mediated introduction of invasive alien species
- Use of risk assessment as a reliable tool to assist in ballast water management decision-making and in compliance, monitoring and enforcement procedures
- Decide upon voluntary regional arrangements in the Mediterranean and ensure that sub-regional and national strategies are in line with these
- Consider other regional seas strategies and initiatives
- Keep the Strategy and Action Plan under review and assess the implementation progress
- Work on the identification of adequate resources to implement activities under the Strategy and Action Plan

Finally the **GloBallast Partnerships Project in the Mediterranean Region** operated from 2008 to 2012, focusing on vulnerable developing States, with a view to assist them in implementing sustainable, risk-based mechanisms for the management and control of ships' ballast water and sediments and subsequently minimize the adverse impacts of aquatic invasive species transferred by ships.

Following are the problems related to non-indigenous species that have not been adequately tackled so far. It must be noted that the updated Action Plan addresses many of those problems, however it is still early to assess its level of effectiveness and implementation, as it was only adopted in 2016:

**i. Lack of implementation/enforcement of Regional measures**

- According to the Status of implementation of the Protocol concerning the SPA/BD Protocol<sup>119</sup> progress has been achieved in the implementation of the 2003 Action Plan, but there are still significant gaps mainly in the following areas:
  - Not all the Parties have adopted legislation to check the introduction of non-indigenous marine species.
  - Only three out of thirteen assessed Parties reported that they have a mechanism to fight and monitor ballast water discharges.
  - Only three out of thirteen Parties have Action Plans to combat the introduction of non-native marine species, and mitigate their harmful impacts, while three have made progress.
  - Only two out of thirteen Parties have established a training and awareness programme on the risks related to NIS introduction and on ways to handle the problem.
- There is a lack of harmonization of the national legislations for NIS
- Controls on imports/exports are not adequate and there is a lack of training for controllers at check points.

<sup>119</sup> UNEP(DEPI)/MED WG.382/3, 2013

- Aquaculture is not efficiently regulated.
- The IMO Ballast Water Convention is still not in force, since the target of ratification by States representing 35% of world merchant shipping tonnage has not been met yet<sup>120</sup>.

**ii. Knowledge/data gaps**

- There are significant knowledge gaps on NIS, especially regarding the ways of introduction, the conditions that enable or support their reproduction and spread, the impacts on native species, the socioeconomic impacts, the cumulative and synergistic effects on biodiversity etc.
- There is lack of adequate, harmonized and long term monitoring programmes at regional level.

### 3. GAPS AND PROPOSALS

The following table lists the main sectors related to the introduction of non-indigenous species and overall issues for which there are not efficient measures, or the measures adopted at regional level are not adequately implemented.

**Table 16.** Gaps related to measures for non-indigenous species

Introduction vectors	Gaps related to measures
<b>Ballast Waters</b>	Action in this area is insufficient. Stronger ratification efforts are required in order to facilitate the entry into force of the Ballast Water Convention, as also provided for by the BWM Strategy
<b>Aquaculture</b>	<p>This important vector is not adequately addressed at regional level. Stricter technical guidelines and management standards, or regional plans on aquaculture should be considered.</p> <p>New measures that need to be adopted in order to ensure that aquaculture activities are not contributing to the introduction and spread of non-indigenous species include:</p> <ul style="list-style-type: none"> <li>- establishment of stricter and better inspected permit system for aquaculture,</li> <li>- restrictions of aquaculture in open system plants,</li> <li>- contingency plans developed by aquaculture operators for the control, early warning and recovery of escapes, and</li> <li>- preventive maintenance actions</li> </ul> <p>According to a Commission Staff Working Document<sup>121</sup>, the following measures should be envisaged:</p>

<sup>120</sup> <http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx>

<sup>121</sup> SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture

	<ul style="list-style-type: none"> <li>- The impact assessment for aquaculture plants should take into account the spatial scale at which environmental impacts from aquaculture are likely to occur and the cumulative impacts</li> <li>- Aquaculture activities need to be adequately integrated into Marine Spatial Planning</li> <li>- Development of Technical standards for pen design, mooring systems and nets, especially for open net-pen aquaculture plants is required</li> <li>- Creation of gene banks of wild species needs to be considered</li> </ul>
<b>Overall issues</b>	<b>Gaps related to measures</b>
<b>Implementation of the IAS Action Plan</b>	<p>The updated Action Plan must be fully implemented, especially in areas where the implementation of the 2003 Action Plan was found insufficient, such as :</p> <ul style="list-style-type: none"> <li>- Adoption of legislation to control introductions</li> <li>- Development of mechanisms to fight and monitor the ballast water discharges</li> <li>- Establishment of training and awareness programmes</li> </ul>
<b>Control</b>	<p>Full implementation of actions set out in the updated Action Plan aiming at enhancing control of the introduction and spread of invasive alien species must be achieved, including through training and awareness raising.</p>
<b>Knowledge</b>	<p>Better implementation of measures aiming at enhancing knowledge is required, with an emphasis on the following areas:</p> <ul style="list-style-type: none"> <li>- vectors of introduction</li> <li>- conditions enabling or supporting their reproduction and spread, including climate change impacts</li> <li>- impacts on native species and on critical habitats</li> <li>- socioeconomic impacts</li> <li>- cumulative and synergistic effects on biodiversity</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>• A commonly agreed Mediterranean List of Priority Invasive Alien Species should be adopted by the Contracting Parties, on the basis of the existing Black List for Mediterranean MPAs, and be subject to regular revisions<sup>122</sup></li> <li>• Links of IAS introduction and spread with climate change should be established and further reflected in the Regional Action Plan</li> </ul>

<sup>122</sup> Otero, M., Cebrian, E., Francour, P., Galil, B., Savini, D. 2013. Monitoring Marine Invasive Species in Mediterranean Marine Protected Areas (MPAs): A strategy and practical guide for managers. Malaga, Spain: IUCN. 136 pages.



### III. FISH STOCKS

#### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

Fishing is one of the most important economic sectors for the Mediterranean region, providing jobs for thousands of people and supporting the socioeconomic development of the region, especially in the coastal areas. However, unsustainable fishing practices cause serious impacts on marine and coastal biodiversity, threatening the good environmental status of the sea and jeopardizing the future development of the sector itself.

The most important impacts of fishing activities include the depletion of commercial fish stocks, due to overfishing, the incidental catches of non-target species (bycatch) and the damage on important habitats due to unsustainable fishing practices.

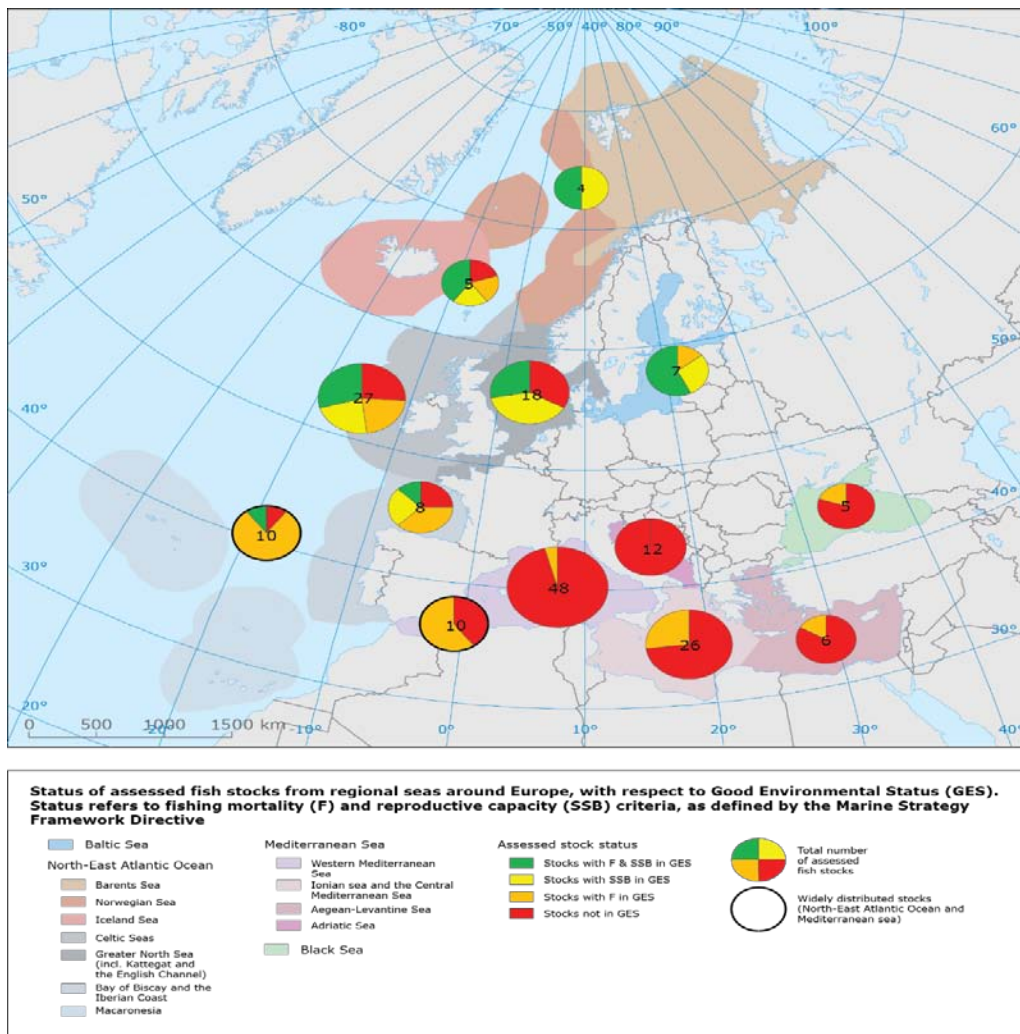


Figure 6. Status of assessed stocks in Europe.

(Source: <http://www.eea.europa.eu/data-and-maps/figures/status-of-fish-stocks-in-1> )



According to the GFCM's Report "the State of the Mediterranean and Black Sea Fisheries 2016"<sup>123</sup> 85 percent of stocks (in both Seas) for which a validated assessment exist are fished outside biologically sustainable limits, while the State of Europe's Seas 2015 states that 91% of the assessed stocks in the Mediterranean are overfished (EC, 2014a)<sup>124</sup>. The overall fishing mortality for all the species assessed by GFCM is 2.5 times higher than the reference point, with hake having the highest fishing mortality rate across the Mediterranean (5 times higher than the target level), and only two assessed species in the Mediterranean and Black Sea (sprat and picarel) having fishing mortality rates lower than the target<sup>125</sup>. The impacts of overfishing are reflected in the composition of certain stocks which are dominated by juveniles. Particular attention needs to be paid upon this issue, as besides the indication of high fishing pressure, the overfishing of juveniles can cause population changes, with long term effects on the sustainability of stocks (UNEP/MAP 2012)<sup>126</sup>. The recovery of stocks becomes even more challenging when overfishing is combined with other stressors, such as pollution, invasive alien species, climate change effects etc.

The fishing practices with the highest bycatch impacts are beam trawls (discard volume of 69.4-90.4% of the total catch), the bottom trawls (discard volume of more than 40 percent of the total catch) and dredges (discard volume of around 50 percent of the total catch)<sup>127</sup> while loglines and driftnets are also responsible for significant numbers of bycatch. The most affected species are marine mammals (trawls, purse seines, static nets, longlines), sea turtles (trawls, longlines), seabirds (trawls, static nets, longlines), sharks and rays (trawls, longlines)<sup>128</sup>. Recent studies estimate that in the Mediterranean Sea there are over 132,000 turtle captures per year, with pelagic long lines estimated to capture 57,000 turtles per year (Casale, 2011). These captures result in an estimated 44,000 turtle deaths per year (Casale, 2011)<sup>129</sup>.

One special characteristic of the fishing sector in the Mediterranean is that small-scale fisheries represent an important part of the sector. In both the Mediterranean and the Black Sea, small-scale fisheries represent around 80% of the fleet and 20% of the total value of landings (FAO, 2016) .

ALDFG represents another important threat for marine biodiversity as they continue to catch fish and other species. This problem is addressed more in detail in a previous chapter (marine litter).

---

<sup>123</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>124</sup> State of Europe's seas, European Environment Agency, 2015

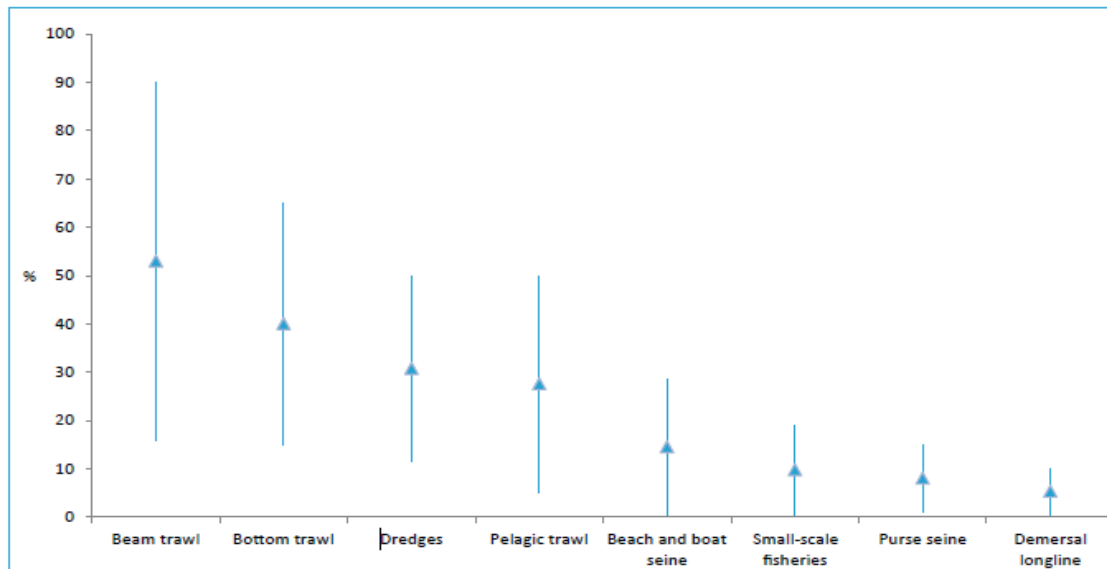
<sup>125</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>126</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>127</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>128</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>129</sup> State of Europe's seas, European Environment Agency, 2015



**Figure 7.** Range of discard behaviour by fishing activity.

Source: The State of Mediterranean and Black Sea Fisheries, FAO 2016

Sustainable aquaculture can support the conservation of marine environment, by alleviating the pressures for some key target species, and its role is highly valued by the European Commission, that has set aquaculture development as one of the core objectives of the Blue Growth Strategy<sup>130</sup>. However, if not adequately regulated and well planned, aquaculture can cause significant pressures to marine and coastal ecosystems, contributing to the degradation of marine environment, as examined in the previous chapters. The main environmental impacts of aquaculture include the introduction of invasive alien species, nutrients and other organic matter, contaminants, diseases, and disturbance in the functioning of the natural ecosystem with possible escapes of farmed fish<sup>131</sup>. Therefore, it was considered relevant to address in the present chapter the gaps related to measures for the aquaculture sector.

## 2. EXISTING MEASURES AT REGIONAL LEVEL

Fisheries in the Mediterranean are mainly managed by the General Fisheries Commission for the Mediterranean (GFCM) which is a regional fisheries management organization (RFMO) established under the FAO umbrella<sup>132</sup>. UNEP/MAP and mainly SPA/RAC are also involved in fisheries issues, mainly by ensuring the protection of endangered species and habitats, in the framework of the SPA/BD Protocol to the Barcelona Convention.

Besides the measures that have been adopted at regional level for the protection of marine and coastal biodiversity (see chapter I. Species and Habitats), GFCM has

<sup>130</sup> [http://ec.europa.eu/maritimeaffairs/policy/blue\\_growth/index\\_en.htm](http://ec.europa.eu/maritimeaffairs/policy/blue_growth/index_en.htm)

<sup>131</sup> SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture

<sup>132</sup> <http://www.fao.org/gfcm/background/about/en/>

adopted a series of measures with the aim to promote sustainable management of natural resources.

With regards to **bycatch data**, where significant gaps exist, the GFCM is preparing a Strategy with a view to establish a regional database for collection and compilation of data and a regional sampling programme with observers on board. In addition, a project was jointly launched by GFCM and ACCOBAMS in 2015 to test mitigation measures aiming at reducing bycatch of vulnerable species in specific areas<sup>133</sup>.

Furthermore, sixteen **management and conservation measures** have been adopted over the years by GFCM, with the objective to maintain sustainable levels of fishing and protect priority habitats and species from the adverse impacts of fishing activities. The measures, as presented in the State of Mediterranean and Black Sea Fisheries (FAO 2016)<sup>134</sup> are related to three general categories as follows:

- **Spatial management measures**<sup>135</sup>

They consist of fisheries restrictions in defined areas, aiming at reserving the natural resources and minimizing the impacts of fisheries, including closures to fishing or prohibition of some fishing gear with significant effects on ecologically important species and habitats. Under this tool, four fisheries restricted areas (FRA) have been designed so far, including the deep sea FRA Lophelia reef off Capo Santa Maria di Leuca, the deep sea FRA Nile Delta area cold hydrocarbon seeps, the deep sea FRA Eratosthenes Seamount and the FRA within the Gulf of Lion, covering a total area of 17.678 km<sup>2</sup> (around 0.7% of the total surface area). In addition, the use of bottom trawling has been prohibited in depths beyond 1,000 m in the Mediterranean and the Black Sea (1,731,097 km<sup>2</sup>)<sup>136</sup>.

- **Mitigation of incidental catch of vulnerable species**<sup>137</sup>

GFCM has adopted several binding decisions aiming at protecting key species, including:

- Sharks and rays : ban of fishing activities below 1000m, prohibition of the retention, transshipment, storage, landing and sale of bigeye thresher shark and partial ban of the retention, transshipment, storage, landing and sale of most hammerhead sharks, measures for data collection improvement, other specific measures, including banning of finning practices and the capture and trade of species listed in Annex II of the SPA/BD Protocol;
- Sea turtles, seabirds and cetaceans: commitment for the Contracting Parties to monitor, record, and reduce as far as possible seabird bycatch, especially for species listed SPA/BD Protocol Annex II, implementation of management measures to mitigate and eliminate sea turtles bycatch risk, prohibition of retention, transshipment and landing of sea turtles, prohibition

<sup>133</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>134</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>135</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>136</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>137</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

of using gillnet fisheries with monofilament with a diameter greater than 0.5mm, mitigation measures for the impact of bottom-set gillnet fisheries on cetaceans and others;

- Monk seals: prohibition of taking onboard, transshipping and landing, requirement for adoption of fisheries management measures reduce bycatch of monk seals etc.

- **Other technical measures**<sup>138</sup>

Those measures concern minimum legal size, gear restrictions and temporal closures for different types of fisheries, including dolphinfish fisheries using FAD, demersal trawling fisheries, measures for the exploitation of red coral etc.

A full list of GFCM binding recommendations on conservation and management measures can be found in Annex II.

GFCM has recognized the importance of **Multiannual Management Plans (MMP)** for efficient and adaptive fisheries management, specifying the objectives, the applicable rules and regulations and other relevant information for specific fisheries. The General Guidelines for the development of multiannual management plans was adopted by the 36<sup>th</sup> session of the GFCM and the MMP for small pelagic fisheries in the Adriatic Sea was adopted in 2013, while steps have been made in view of adoption of similar plans for other fisheries (Strait of Sicily, Red coral, European eel).<sup>139</sup>

An important milestone for the sustainable management of fisheries in the Mediterranean and the Black Sea was the adoption by the 40<sup>th</sup> session of GFCM of the Resolution GFCM/40/2016/2 for a **mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries**<sup>140</sup>.

**Table 17.** Targets, Outputs and Actions provided for by the GFCM Mid-term Strategy

Outputs	Actions
<b>Target 1. Reverse the declining trend of fish stocks through strengthened scientific advice in support of management</b>	
<b>Enhanced knowledge and expertise on Mediterranean and Black Sea fisheries</b>	<ul style="list-style-type: none"> <li>- Creation of a GFCM Forum on Fisheries Science (GFCM FishForum)</li> <li>- Realization of regional surveys at sea including acoustic surveys for pelagic species as well as trawl surveys for demersal fisheries</li> <li>- Compilation of catalogues of fishing activities by GFCM subarea</li> </ul>
<b>Socio-economic information and</b>	<ul style="list-style-type: none"> <li>- Comprehensive regional survey on the socio-</li> </ul>

<sup>138</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>139</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>140</sup> <http://www.fao.org/gfcm/reports/statutory-meetings/detail/en/c/423828/>

<b>analysis incorporated into scientific and management advice</b>	<p>economic impact of fisheries in the Mediterranean and the Black Sea</p> <ul style="list-style-type: none"> <li>- Development of bioeconomic models for the incorporation of socio-economic information into the assessment of the state of main commercial fisheries</li> </ul>
Enhanced science-based GFCM regulations on fisheries management	<ul style="list-style-type: none"> <li>- Implementation of a dedicated approach for the provision of advice to the Commission by its subsidiary bodies</li> <li>- Operationalization of the Review Panel to review the scientific advice formulated by the subsidiary bodies and provide conclusions to support the decision-making process of the Commission</li> <li>- Revision of existing management plans / development of new management plans</li> </ul>
<b>Target 2. Support livelihoods for coastal communities through sustainable small-scale fisheries</b>	
<b>Robust and timely information on the impact of small-scale and recreational fisheries on coastal communities</b>	<ul style="list-style-type: none"> <li>- Implementation of a regional survey on small-scale fisheries</li> <li>- Establishment of a permanent Working Group on Small-Scale Fisheries</li> </ul>
<b>FAO Small-Scale Fisheries Guidelines tailored to the specificities of the GFCM area of application</b>	<ul style="list-style-type: none"> <li>- Development of national plans of action for the implementation of the SSF Guidelines</li> <li>- Establishment of a regional platform to engage and promote dialogue among small-scale fishing associations</li> <li>- Endorsement of the principle of decent work</li> <li>- Organization of a high-level meeting among GFCM CPCs</li> </ul>
<b>Target 3. Curb illegal unreported and unregulated (IUU) fishing, through a regional plan of action</b>	
<b>Regular quantification of IUU fishing in the Mediterranean and the Black Sea</b>	<ul style="list-style-type: none"> <li>- Assessment of the quantity, magnitude and characteristics of IUU fishing in the GFCM area of application</li> </ul>
<b>Reinforced inspection procedures in the framework of port State control</b>	<ul style="list-style-type: none"> <li>- Trainings of national inspectors and, as appropriate, relevant officers</li> <li>- Establishment of a regional information system to exchange port State measures related data</li> </ul>
<b>Enhanced monitoring, control and surveillance (MCS) at the regional level</b>	<ul style="list-style-type: none"> <li>- Finalization and operationalization of a regional VMS and control system</li> </ul>
<b>Target 4. Minimize and mitigate unwanted interactions between fisheries and marine</b>	

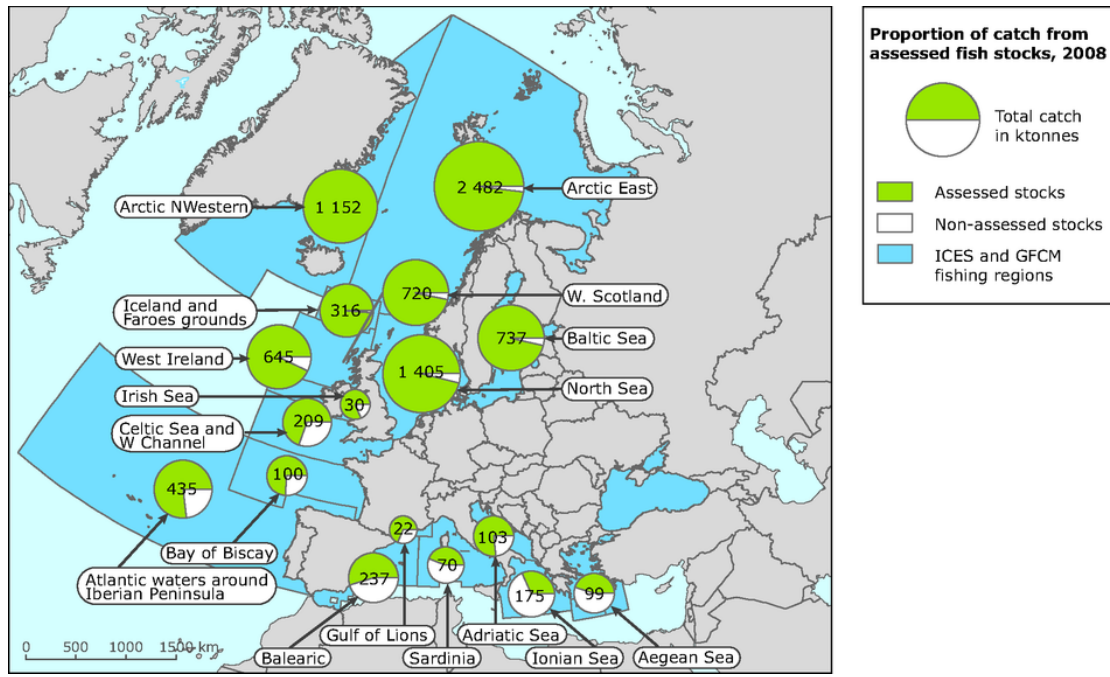
<b>ecosystems and environment</b>	
<b>Reduced bycatch rates in Mediterranean and Black Sea fisheries</b>	<ul style="list-style-type: none"> <li>- Implementation of a bycatch monitoring programme, including through the use of observers onboard commercial fishing vessels.</li> <li>- Development and launch of awareness campaigns at the GFCM level to educate fishers on the negative impacts of bycatch on fisheries productivity and on marine ecosystems</li> </ul>
<b>Healthier marine ecosystems and more productive fisheries</b>	<ul style="list-style-type: none"> <li>- Promotion of the identification and establishment of new FRAs</li> <li>- Adoption of a comprehensive regional management plan for red coral</li> <li>- Creation of an adaptation strategy to cope with potential effects of invasive species and climate change on fisheries</li> </ul>
<b>Target 5. Enhance capacity-building and cooperation</b>	
<b>Improved national capacity for the management of fisheries resources</b>	<ul style="list-style-type: none"> <li>- Provision of capacity building for CPCs, Implementation of a technical assistance mechanism to support CPCs in bridging existing gaps.</li> <li>- Launch of a regional programme for education and training to lay down the foundation for a new generation of fisheries experts</li> </ul>
<b>Strengthened fisheries governance in the Black Sea</b>	<ul style="list-style-type: none"> <li>- Organization of a high-level conference on fisheries governance</li> <li>- Launch of the start-up phase of a regional, scientific and technical cooperation project for the Black Sea, the BlackSea4Fish project, carried out in the remit of the WGBS</li> </ul>
<b>Increased cooperation with relevant actors</b>	<ul style="list-style-type: none"> <li>- Operationalization of existing MoU</li> <li>- Strengthened coordination with the FAO Fisheries and Aquaculture Department and FAO regional projects</li> </ul>

Although important measures have already been adopted to ensure the sustainable management of fish stocks and limit any adverse impacts of fishing activities, significant problems continue to exist, mainly in the areas of knowledge, regulation of unsustainable practices and enforcement and control of existing measures:

**i. Lack of knowledge/data**

- In general, the knowledge about fisheries, including the state of stocks, impacts of fishing practices etc. is extremely limited in the Mediterranean (see figure 8 below regarding the assessed stocks on European Seas).





**Figure 8.** Total catch in ICES and GFCM fishing regions of Europe.

(Source: <http://www.eea.europa.eu/data-and-maps/figures/total-catch-in-ices-and-gfcm-fishing-regions-of-europe-in>)

*Note:* The map shows the total catch in ICES and GFCM fishing regions of Europe. Status of fish stocks was assessed in 2009 (ICES) and from 2002-2009 (GFCM), although data refers to 2008 in the ICES regions and 2005 in the GFCM regions. Catch is divided into proportions of catch of assessed stocks (green) and catch of unassessed stocks (white).

- Our knowledge is even more limited, with regards to bycatch rates and impacts.
- The method of conducting stock assessments by management units based on GSAs doesn't ensure that the whole stock is assessed<sup>141</sup>.
- Stocks assessments across the region lack homogeneity, since currently there are big differences between sub-regions<sup>142</sup>.
- Significant knowledge gaps exist with regards to the effects of aquaculture on marine ecosystems.

## ii. Insufficient regulation of some unsustainable practices

- The issue of discards has not been adequately tackled
- Existing measures have not been able to maintain stock biomass and fishing mortality at sustainable levels for all the commercially exploited fish and shellfish stocks
- The impacts of recreational fisheries are not fully estimated and sufficiently regulated because of a lack of catch control<sup>143</sup>.

<sup>141</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>142</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016



- Bycatch is not sufficiently addressed, and there is a lack of mitigation measures developed and tested to minimize bycatch.
- Fisheries Restriction Aras is an important measure but it has not been fully exploited, since only 4 FRAs exist for the moment.
- Despite the recognized importance of Multiannual Management Plans, there is still a reluctance of the Parties to support the management of fisheries through a common subregional plan, mainly due to uncertainties about stock units<sup>144</sup>.
- Fisheries management is mainly species-targeted and the application of the ecosystem approach is limited. The full integration of the Ecosystem Approach is essential to support the conservation of non-target species and critical habitats, which are impacted by unsustainable fishing practices.
- Some harmful fishing practices are still being used.
- The aquaculture sector is not sufficiently regulated at regional level.

### iii. Lack of enforcement/control

- There is general lack of control and enforcement of fishing-related measures and regulations, with variations among different Contracting Parties. The lack of efficient monitoring and control is particularly important in the High Seas, where coordinated efforts are required on regional level.
- Some particularly harmful fishing practices have been banned or restricted in the Mediterranean, such as driftnets, trawls and the using of dynamite and poison. However, according to SoER-MED<sup>145</sup>, some of those practices are still used illegally in certain areas, causing significant damage to marine biodiversity.

## 3. GAPS AND PROPOSALS

The following table lists the main environmental pressures and overall issues for which there are not efficient measures, or the measures adopted at regional level are not adequately implemented:

---

<sup>143</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

<sup>144</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

<sup>145</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

**Table 18.** Gaps related to measures for fish stock depletion.

Environmental pressures	Gaps related to measures
<b>Overfishing</b>	<p>The assessments show that the existing measures are not sufficient to reverse the fish stocks depletion trend.</p> <ul style="list-style-type: none"> <li>• Existing measures need to be fully implemented</li> <li>• New measures should provide for maintenance/restoration of fish stock populations above biomass levels capable of producing maximum sustainable yield (<math>B_{MSY}</math>) and below mortality levels capable of producing maximum sustainable yield (<math>F_{MSY}</math>)</li> <li>• New measures should be adopted to ensure that the fleet capacity is adapted to the fishing opportunities for sustainable stock levels</li> <li>• Support for harmonization of national laws and regulations for IUU fishing is needed</li> <li>• An early warning and quick reaction system needs to be established enabling the adoption of exceptional emergency measures</li> <li>• Stricter measures and enhanced catch control should be adopted for recreational fishing</li> </ul>
<b>Discards</b>	<p>New measures are needed to combat discards of incidentally caught species.</p> <p>The reformed EU CFP has adopted an interesting measure, the <b>landing obligation</b> that will be gradually introduced by 2019 for all commercial fisheries. Under the landing obligation all catches have to be kept on board, landed and counted against the quotas (with exemptions for fish that may survive after returning them to the sea, and a specific <i>de minimis</i> discard allowance under certain conditions). This change can serve as a driver for more selectivity, and more reliable catch data<sup>146</sup>. Equivalent measures can be considered in the Mediterranean.</p>
<b>Unsustainable fishing techniques</b>	<ul style="list-style-type: none"> <li>• There is need for better enforcement and control for the prohibited or restricted practices, that are illegally used (driftnets, trawls, dynamite, poison)</li> <li>• Stricter measures need to be adopted for seabed destructive fishing, e.g. general requirement for selective trawling gear</li> <li>• The creation of a network of marine reserves where bottom trawling is totally banned should be considered</li> </ul> <p>Other measures provided for by the Mediterranean Sea Biodiversity Report<sup>147</sup> include:</p> <ul style="list-style-type: none"> <li>• Increased research on new technologies to mitigate unsustainable practices and minimize bycatch, discards,</li> </ul>

<sup>146</sup> [http://ec.europa.eu/fisheries/cfp/fishing\\_rules/discards/index\\_en.htm](http://ec.europa.eu/fisheries/cfp/fishing_rules/discards/index_en.htm)

<sup>147</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages

	ghost fishing seabed destruction etc.
	<ul style="list-style-type: none"> <li>• Adoption of a requirement for more selective trawling gear, (higher mesh sizes, special excluding devices etc.)</li> <li>• Assessment of a total exploitation ban for some particularly impacted species</li> </ul>
<b>Bycatch</b>	<ul style="list-style-type: none"> <li>• Existing mitigation measures need to be better implemented and enforced</li> <li>• The Strategy prepared by GFCM for collection and compiling of available data needs to be adopted and fully implemented</li> <li>• More projects to test mitigation measures need to be developed</li> <li>• Additional funding should be provided for prevention and mitigation measures</li> <li>• Stricter measures should be adopted for high bycatch-rate fishing practices</li> <li>• Examples of technological modifications provided by the Untangled symposium, December 2012; WSPA 2013<sup>148</sup> include :             <ul style="list-style-type: none"> <li>- mandatory lights on gillnets</li> <li>- technology that makes the net sink or drift at a depth where its impact on animals is likely to be low</li> <li>- labelling of nets etc.</li> </ul> </li> </ul>
<b>Aquaculture impacts</b>	<p>Stricter technical guidelines and management standards, or, if need be, regional plans on aquaculture should be considered. New measures need to be adopted to ensure that aquaculture activities are adequately planned and developed sustainably and that the environmental impacts are minimized.</p> <p>A European Commission Staff Working Document<sup>149</sup> provides for interesting measures that should be considered for adoption at regional level for prevention/mitigation of impacts of nutrient inputs, prevention and mitigation of disease and parasites releases into the marine environment, minimisation of chemical discharges, prevention and minimization of escapes, and others.</p>
<b>Overall issues</b>	<b>Gaps related to measures</b>
<b>Knowledge gaps</b>	<p>Stronger efforts and additional measures are required in order to establish more robust and harmonised monitoring and data collection systems, with a focus on the following areas:</p> <ul style="list-style-type: none"> <li>- State of fish stocks</li> <li>- Bycatch (extent and mitigation measures)</li> <li>- Information for shared stocks</li> <li>- Agreed biomass reference points for all fish stocks</li> </ul>

<sup>148</sup> UNEP (2016). Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi

<sup>149</sup> European Commission; SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture; Brussels 2016

	<ul style="list-style-type: none"> <li>- Impacts of small-scale/recreational fishing activities</li> <li>- Socio economic impacts of fisheries</li> <li>- Joint stock assessments</li> <li>- Impacts of aquaculture on marine environment (nutrient inputs, contaminants and diseases, introduction of non-indigenous species)</li> </ul>
<b>Spatial protection measures</b>	FRA is a very efficient measure but the number of existing FRAs is very limited. The implementation of this measure needs to be upscaled, with the creation of more FRA, in line with the GFCM mid-term strategy (2017–2020)
<b>Management</b>	<p>Multiannual Management Plans are not widely used as a measure. The implementation of this measure needs to be upscaled, with the adoption of MMP for new areas, primarily the Straits of Sicily, red corals and European eel and the development of MMP for other fisheries, in line with the GFCM mid-term strategy (2017–2020)</p> <p>Funding opportunities from the European Maritime and Fisheries Fund (EMFF) for EU and non-EU countries with regards to fisheries management measures should be further explored.</p>
<b>Ecosystem Approach</b>	<p>Stronger efforts are required to ensure full integration of the ecosystem approach into fisheries management. This requires:</p> <ul style="list-style-type: none"> <li>- Taking into full consideration fisheries impacts on the whole ecosystem, (non-target fish species, seabirds, marine mammals etc., as well as on marine and coastal habitats)</li> <li>- Full coherence of fisheries management measures with environmental legislation</li> <li>- Involvement and engagement of relevant stakeholders in the whole management cycle (from decision making to implementation)</li> </ul>

## IV. SEE-FLOOR INTEGRITY

### 1. DESCRIPTION OF PRESSURES, IMPACTS AND DRIVERS

Deep sea habitats, including hydrothermal vents, the seamounts and the deep sea coral reefs (IUCN-WWF, 2004; IUCN, 2010) present particular interest for the marine environment in the Mediterranean, although deep waters remain largely unexplored, and data, particularly below 1000m are scarce and fragmented<sup>150</sup>.

Different human activities may cause adverse impacts on sea floor integrity and significantly affect deep-sea ecosystems, with the most important among them being bottom fishing, but also by dredging and offshore installations.

<sup>150</sup> UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages

Bottom fishing and dredging can cause changes in the structure of benthic communities. Offshore installations induce direct physical impacts on the sea floor, however the full range of impacts of offshore facilities in the Mediterranean, have not been fully assessed.<sup>151</sup>

With regards to deep-sea fishing activities which cause the most damage to sea-floor, the most vulnerable species include deep-water coral ecosystems, the feather star, the sea pen, and bamboo coral beds (UNEP/ MAP 2012)<sup>152</sup>. It is estimated that a time period between 7,5 and 15 years is required for the recovery of seabed communities after one single pass of a beam trawl<sup>153</sup>.

According to the SoER MED report<sup>154</sup>, bottom gear used in fishing (mainly trawlers, and dredges) can damage the seafloor in a variety of ways, including resuspension of sediments, stirring up of contaminants, removal of large benthic species, and structural changes in benthic communities.

## 2. EXISTING MEASURES AT REGIONAL LEVEL

There are several measures aiming at addressing the damages on sea-floor integrity that have been adopted at regional level both in the framework of UNEP/MAP and the GFCM.

Under UNEP/MAP Barcelona Convention system, the most relevant instruments for the conservation of sea-floor integrity and deep-sea habitats are the **SPA/BD Protocol, the SAP/BIO, and the Action Plan for Marine Vegetation**, with regards to the protection of critical habitats on the sea floor with the establishment of SPA and SPAMIs as well as the **Offshore Protocol and the Action Plan** for its implementation with regards to the impacts of offshore installations on sea-floor. Furthermore, some **GFCM measures** have been adopted with the specific aim to protect deep-sea habitats from destructive fishing practices. The most important measures are:

- The prohibition of bottom towed gear fisheries in areas deeper than 1,000 m in the Mediterranean and the Black Sea, that was endorsed in 2005 at the twenty-ninth session of the Commission, concerning an area of 1,731,097 km<sup>2</sup>, (around 58% of the total Mediterranean and the Black Sea surface area)<sup>155</sup>.
- The establishment of four fisheries restricted areas (FRAs), located both in high seas and national waters in the Mediterranean Sea, to protect deep sea sensitive habitats and fish spawning areas in Cyprus, Egypt, Italy and France,

<sup>151</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>152</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>153</sup> EEA 2014, Marine messages; Our seas, our future – moving towards a new understanding

<sup>154</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>155</sup> Recommendation GFCM/29/2005/1

covering a total area of 17,678 km<sup>2</sup> (around 0.7% of the Mediterranean Sea surface area)<sup>156</sup>.

It should be finally noted that the maintenance of sea-floor integrity, especially in priority benthic habitats, is one of the Ecological Objectives under the Core theme 2 (biodiversity and ecosystems) set out in the UNEP/MAP Mid-term Strategy 2016-2021.

### 3. GAPS AND PROPOSALS

Despite the measures that have been adopted to protect sea floor from damaging human activities, there are still important gaps that should be bridged, as follows:

**Table 19.** Gaps related to measures for sea-floor integrity.

Sources of pressures	Gaps related to measures
<b>Offshore Installations</b>	<p>The existing regional instruments (Offshore Protocol and Offshore Action Plan) only address the pollution risks deriving from the operation of offshore installations, and they don't sufficiently cover the physical impacts caused by offshore installations on sea floor.</p> <ul style="list-style-type: none"> <li>• New measures need be adopted aiming at preventing any significant adverse impacts on sea floor integrity. This requirement for prevention or minimization of any adverse impacts on sea floor integrity can be included in the Offshore Protocol or Action Plan as a prerequisite for the issue of permits.</li> <li>• Our knowledge on the impacts of offshore construction on seafloor integrity in the Mediterranean needs to be improved, through better research and monitoring systems.</li> </ul>
<b>Fisheries</b>	<ul style="list-style-type: none"> <li>• New, stricter measures should be considered to minimize seabed destructive fishing practices, including development and support of new technologies to mitigate unsustainable techniques, the adoption of a general requirement for selective trawling gear etc.</li> <li>• The establishment of a network of marine reserves where bottom trawling is totally banned should be envisaged</li> <li>• Better enforcement and control of existing measures mainly the prohibition of bottom trawling below 1,000m</li> </ul>

<sup>156</sup> Deep sea FRA Lophelia reef off Capo Santa Maria di Leuca (976 429 km<sup>2</sup>, GSA 19, Italy).  
 Deep sea FRA Nile Delta area cold hydrocarbon seeps (4 377.5 km<sup>2</sup>, GSA 26, Egypt).  
 Deep sea FRA Eratosthenes Seamount (10 306.2 km<sup>2</sup>, GSA 25, Cyprus).  
 FRA within the Gulf of Lion (2 018 4 km<sup>2</sup>, GSA 07, France).

**Dredging activities**

- Expansion of the Fisheries Restricted Areas (FRA) measure to other sites
- Enhanced research on the impacts of dredging on sea-floor integrity
- Adoption of new measures to minimise impacts from dredging activities on the sea-floor



**PART III.**  
**CROSS-CUTTING ISSUES**

## I. CLIMATE CHANGE

Due to its geomorphological, hydrological and demographical characteristics, the Mediterranean region is particularly vulnerable to climate change, which is already considered as one of the main pressures for its marine and coastal ecosystems. Actually, the Mediterranean region has been identified as one of the main climate change hotspots (i.e. one of the most responsive areas to climate change)<sup>157</sup>. Climate change may impact marine species, especially in synergy with other pressures, such as pollution, overfishing etc. Special risks for marine organisms that need to be efficiently addressed at regional level include oxygen depletion, ocean acidification and rising temperature. It is estimated that a temperature increase of 2°C compared to the levels of the past 20 years can cause an increased risk of extinction for approximately 20-30% of identified plant and animal species<sup>158</sup>. There are also significant socioeconomic impacts linked to environmental degradation due to climate change, including losses in tourism, decrease of fish productivity and catch potential, more severe natural risks etc.

The following Figure 9, extracted from the IPCC, 2014: “Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability”<sup>159</sup> shows clearly that climate change impacts are expected to worsen until the end of the century, even under the most optimistic scenarios, putting additional pressures on the already suffering marine and coastal ecosystems. It is also estimated that the climate change impacts on sea will continue for centuries beyond 2100.

With regards to acidification, it is an additional pressure on Mediterranean Sea ecosystems, on top of the other stressors, such as overfishing, increasing sea surface temperatures, and invasions of alien species. The combined effects of those pressures, may be larger in the Mediterranean than in other European regions. It is estimated that if continued those cumulative pressures may affect the productivity, diversity and even the behavior of marine species.<sup>160</sup>

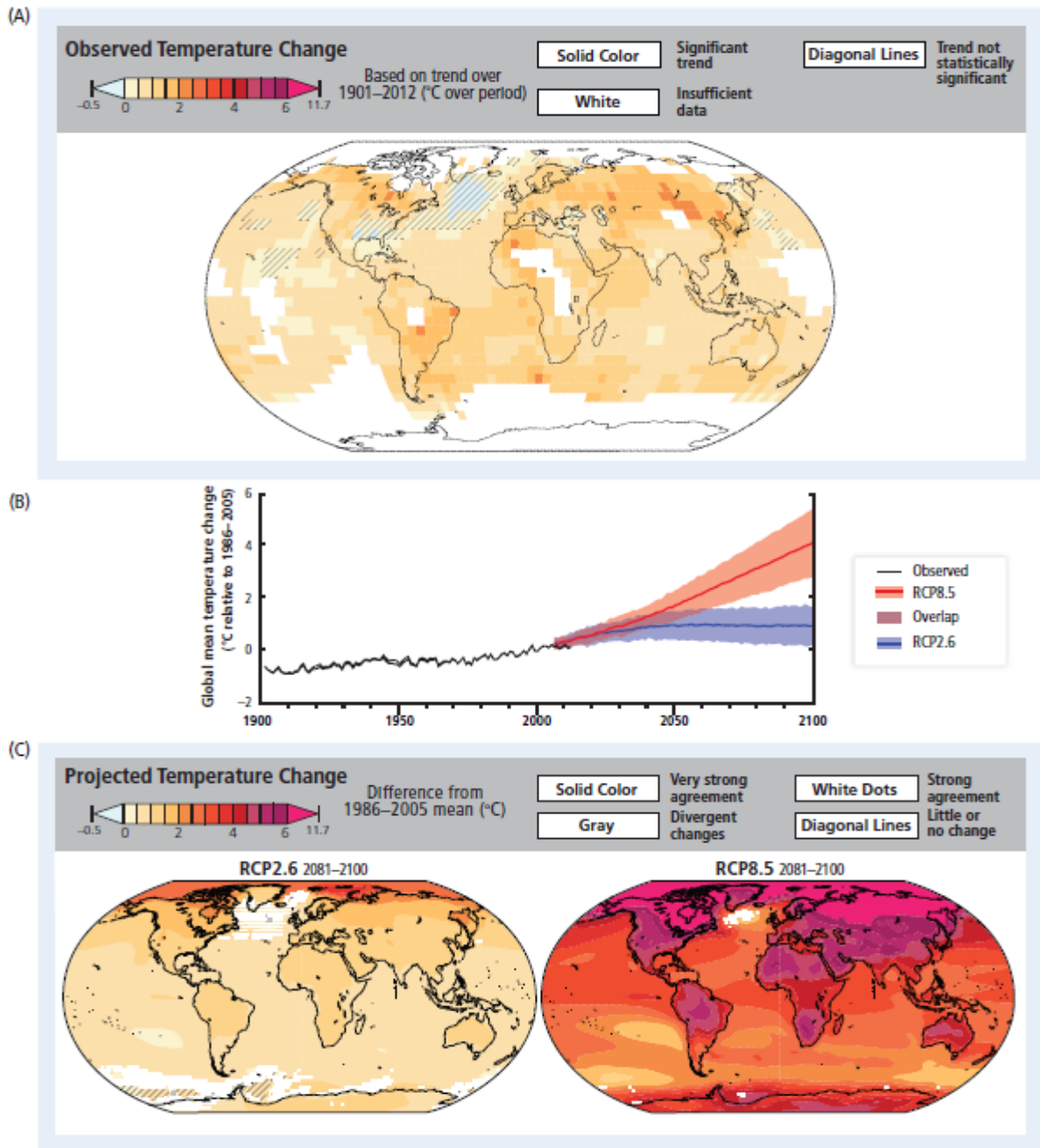
---

<sup>157</sup> <http://www.eea.europa.eu/soer-2015/countries/mediterranean>

<sup>158</sup> Plan Bleu 2008, Climate Change and Energy in the Mediterranean

<sup>159</sup> IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

<sup>160</sup> <http://medsea-project.eu/med-sea-acidification/>



**Figure 9.** Observed and projected changes in annual average surface temperature. This figure informs understanding of climate-related risks in the WGII AR5. It illustrates temperature change observed to date and projected warming under continued high emissions and under ambitious mitigation. (Source IPCC, 2014)

In view of the significant threats posed by climate change on Mediterranean environment and economy, and following the Paris Agreement, ambitious targets and measures need to be adopted at regional level. In this regard, UNEP/MAP Mid-Term

Strategy 2016-2021, acknowledged climate change adaptation a cross-cutting theme and the COP19 adopted in the Regional Climate Adaptation Framework for the Mediterranean Marine and Coastal Areas, providing for the following vision: *“By 2025 the Marine and Coastal Areas of the Mediterranean countries and their communities have increased their resilience to the adverse impacts of climate variability and change, in the context of Sustainable Development. This is achieved through common objectives, cooperation, solidarity, equity and participatory governance”*. The Framework also sets out the following Strategic objectives and Directions:

**A.** Appropriate institutional and policy frameworks, increased awareness and stakeholder engagement, and enhanced capacity building and cooperation:

- Enhancing awareness and engagement of key stakeholders on climate adaptation
- Promoting adequate institutional and policy frameworks
- Promoting a regional approach on Disaster Risk Management
- Improving implementation and effectiveness of adaptation policies through monitoring and reviewing progress
- Integrating climate adaptation into local plans for the protection and management of areas of special interest

**B.** Development of best practices (including low regret measures) for effective and sustainable adaptation to climate change impacts:

- Identifying adaptation needs and best practices
- Mainstreaming, exchanging and adopting best practices

**C.** Access to existing and emerging finance mechanisms relevant to climate change adaptation, including international and domestic instruments:

- Prioritizing public spending relative to climate adaptation and mobilizing national sources of climate finance
- Accessing international financing
- Building alliances with the banking and insurance sectors

**D.** Better informed decision-making through research and scientific cooperation and availability and use of reliable data, information and tools:

- Understanding of the vulnerability of natural and socioeconomic systems and sectors and of possible impacts
- Building capacities for and promoting the use of vulnerability and risk assessment at regional to local levels
- Strengthening Science-policy interface and accessibility of related knowledge
- Developing Regional climate information at a resolution suitable for adaptation planning

Despite the importance attributed to climate change at regional level, there are still important gaps that need to be further addressed.

A main gap is the lack of data and knowledge on the impacts of climate change on the Mediterranean environment and especially coastal areas. More research is required to fill those gaps.

Another area that needs to be better explored at regional level is the understanding and management of synergies and trade-offs between climate action and other policy areas, especially water, biodiversity and energy. Based on this knowledge, more integrated policies can be developed, linking adaptation and mitigation with other socio-economic and environmental objectives, including in areas of energy efficiency and clean energy, decarbonisation of transport, nature-based solutions for water management, green cities, sustainable agriculture and forestry etc.<sup>161</sup>

In order to effectively implement climate change adaptation strategies, it is important to promote and invest more on green infrastructure and nature-based solutions, which have multiple benefits, including environmental and socioeconomic. The adoption of a Regional Plan on Green Infrastructure should be considered at Mediterranean level, in line with the Green Infrastructure Strategy adopted by the EU. In that framework, there are also important funding opportunities that need to be better envisaged, such as the EU Natural Capital Financing Facility (NCFF), LIFE projects etc.

Furthermore, climate action should be linked to the shift towards sustainable production and consumption patterns, including reduced footprint of certain sectors, investments and incentives for cleaner technologies, change of lifestyle, social co-responsibility, which requires full implementation of the SCP Action Plan.

In addition, the IPCC Report sets out a list of approaches for managing the risks of climate change through adaptation. They should be considered overlapping rather than discrete, and be often pursued simultaneously<sup>162</sup>.

**Table 20.** Relevant environmentally friendly measures extracted from the IPCC Report<sup>162</sup>

Ecosystem management measures	Spatial and land-use planning	Structural/physical (ecosystem-based measures)
Maintaining wetlands & urban green spaces	Protected areas	Ecological restoration
Coastal afforestation	Managing development in flood prone & other high risk areas	Soil conservation

<sup>161</sup> IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

<sup>162</sup> IPCC 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp., table 4.2

Watershed & reservoir management	Managing development in flood prone & other high risk areas	Afforestation & reforestation
Reduction of other stressors on ecosystems & of habitat fragmentation	Urban planning & upgrading programs	Mangrove conservation & replanting
Maintenance of genetic diversity	Land zoning laws	Green infrastructure (e.g., shade trees, green roofs)
Manipulation of disturbance regimes	Provisioning of adequate housing, infrastructure & services	Controlling overfishing
Community-based natural resource management		Fisheries co-management
		Assisted species migration & dispersal
		Ecological corridors
		Seed banks, gene banks & other ex situ conservation

With regards to acidification there is need for more research to have a better understanding of the issue, especially the impacts on marine organisms, such as reefs, crustaceans, and other species.

The climate change and the measures to combat its impacts should be envisaged by taking into account the aggravation of the situation in the next years as well as the additional pressures on environment that can act synergistically with climate change, including population growth, coastal erosion, pollution, biodiversity decline, overfishing, invasive alien species etc. Studies show that a healthy ecosystem may withstand better the climate change effects, so a response to climate change could be to tackle more effectively some of the other stressors.

Further action is needed to ensure public information, about the situation, and the impacts and main sources.



## II. SUSTAINABLE CONSUMPTION AND PRODUCTION

Taking into account the multiple pressures on the marine environment, the cumulative impacts and especially the projections for the future population growth and increased needs in resources, it is obvious that under a business as usual scenario in production and consumption, the ecosystems will collapse as they will not be able to meet the future needs. Therefore, it is crucial to change as from now the production and consumption patterns by developing and adopting more sustainable methods of production and environmentally friendlier lifestyles.

The importance of sustainable consumption and production for sustainable development has been largely recognized by UNEP/MAP since its first years and significant efforts have been made to achieve its integration in the regional strategic framework. Important milestones toward this objective have been the assignment of a SCP mandate by the Contracting Parties to one of the Regional Activity Centres, the Regional Activity Centre for Sustainable Consumption and Production, and the establishment of SCP as a thematic pillar of the Strategic Action Programme of the UNEP/MAP and as an overarching objective and a cross-cutting theme of the Mediterranean Strategy for Sustainable Development (MSSD)<sup>163</sup>. The Contracting Parties, at their 18th Ordinary Meeting in 2013 gave the mandate to develop the **Mediterranean SCP Action Plan**, *including the corresponding Roadmap, addressing the Region's common priorities for sustainable development, including pollution reduction; and identifying SCP actions and tools to effectively implement the obligations under the Barcelona Convention and its Protocols, integrating the potential of the different policy instruments and measures addressing targeted human activities which have a particular impact on the marine and coastal environment and related transversal/cross-cutting issues, and ensuring that the Action Plan proposes a set of actions to work in synergy with and complement existing regional and national policy frameworks addressing the shift to sustainable patterns of consumption and production and in particular the Mediterranean Strategy for Sustainable Development.*

The SCP Action Plan was finally adopted in 2016 by the COP19 setting a new solid basis for the promotion of sustainable consumption and production in the Mediterranean, in line with the international framework. The Action Plan identifies **four priority areas** for the Mediterranean region, namely: 1. Food, fisheries and agriculture; 2. Goods manufacturing; 3. Tourism and 4. Housing and construction. It sets out a **common vision** that translates into **strategic objectives** supported by **operational objectives and specific actions** for each of the four consumption and production priority areas. In addition it identifies **cross-cutting actions** relevant to all the priority areas.

The common vision of the SCP Action Plan is that “By 2027 a prosperous Mediterranean region is established, with non-pollutant, circular, socially inclusive economies based on sustainable consumption and production patterns, preserving

---

<sup>163</sup> UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

natural resources and energy, ensuring the well-being of societies and contributing to clean environment and healthy ecosystems that provide goods and services for present and future generations”.

This vision translates into three Strategic Objectives regarding the need for a framework ensuring coherence, coordination and implementation of the required activities, the promotion and strengthening of circular and green economy through implementation of the operational objectives and the engagement of key stakeholders.

The main operational objectives set for each of the SCP priority areas are the following:

- **Food, Fisheries and Agriculture (FFA)** : Promotion of Innovation and Knowledge in the implementation of Best Environmental Practices and Technologies, promotion of sustainable agriculture, fisheries and food production and consumption, with special focus on the “Mediterranean Diet”, education and awareness raising of food producers, retailers and consumers.
- **Goods Manufacturing:** Promotion of sustainability-driven innovation and knowledge and the integration of BATs and BEPs through the entire value chain of goods production, Development of integrated policy making and the legal framework that will support the move towards a circular economy, education and awareness raising of consumers and other stakeholders.
- **Tourism:** Efficient use of natural resources and reduced environmental impacts of tourism, Promotion of adequate regulatory, legislative and financial measures to mainstream SCP in the tourism sector, awareness raising, technical skills and communication tools to support sustainable destinations and green tourism services, and ensure a competitive sustainable Mediterranean Tourism.
- **Housing and Construction:** promotion of innovation and knowledge and the integration of BATs and BEPs to enhance resource efficiency, Develop and strengthen the regulatory and legal framework for the sustainable development of the sector, awareness raising of all relevant stakeholders

Furthermore, a list of concrete actions is provided for each of the operational objectives as well as cross-cutting actions applicable to all the priority areas. The Roadmap sets out a timetable and other important information for all the different actions, to support their implementation (See table in Annex III for the provided actions and their relevance to the Regional PoM).

The SCP Action Plan establishes a very comprehensive framework providing for actions that cover all the main issues of consumption and production, and is in line with the targets under the SDG 12 aiming at ensuring sustainable consumption and production patterns (See Annex III). Since the Action Plan was only adopted in 2016, it would be premature to assess the effectiveness of the adopted measures to ensure sustainable consumption and production. What can be done is the identification of areas, which are not fully addressed by the Action Plan:

- Unsustainable fishing is not fully addressed in the Action Plan. Therefore additional measures should be examined to ensure sustainable fishing practices, including end of overfishing (stocks above BMSY), minimization of bycatch, reduction of discards, restrictions to habitat destructive practices etc.
- With regards to sustainable agriculture, additional measures may be considered to ensure the greening of the agricultural sector, including restoration and maintenance of permanent grasslands and other ecologically important habitats, prevention of intensification, restrictions in the use of pesticides, minimization of indirect land use change (ILUC) etc.
- Measures should be adopted for the sustainable management of waste agricultural biomass and residues<sup>164</sup>, i.e. by using it for sustainable bioenergy production.
- Full coherence of agriculture and fisheries with environmental legislation (especially protected areas networks) should be ensured, in line with the ecosystem approach
- Additional measures should be considered to promote green infrastructure and nature-based solutions

As already mentioned, the SCP Action Plan is an excellent tool that can trigger big changes in production and consumption patterns in the Mediterranean. If the provided actions are implemented properly, the identified objectives can be achieved at regional level. Thus, the Contracting Parties have to intensify their efforts in order to ensure full implementation of the Action Plan. The first results, success stories and gaps will be identified in the mid-term evaluation foreseen in 2021.

---

<sup>164</sup> <http://www.unep.org/gpwm/FocalAreas/WasteAgriculturalBiomass/tabid/56456/Default.aspx>

### III. INTEGRATED COASTAL ZONE MANAGEMENT

The Mediterranean region is characterized by large concentration of population and economic activities (tourism, fishing, aquaculture, agriculture, industries, energy production etc) on its coastal areas. According to SoER-MED more than a third of the total population live in coastal administrative entities, with a highly increasing trend. Currently, more than 150 million people live in coastal regions (more than 50% increase from 1979) and it is expected to surpass 170 million by 2025<sup>165</sup>. The population reaches even higher numbers during the summer periods, due to tourism which represents one of the main economic sectors for the Mediterranean countries. This high concentration of people together with the different human activities and climate change cause significant pressures to the coastal environment, including pollution, biodiversity loss, habitats destruction and coastal erosion, making coastal areas even more vulnerable to natural risks, such as flooding, sea level rise, extreme weather events etc.

In order to ensure the well-being of the populations, the viability of economic activities and the conservation and sustainable management of natural resources there is an urgent need for the implementation of an integrated management, aiming at coordinating the different policies in place and managing the different activities in a sustainable way. To respond to this need, the Contracting Parties to the Barcelona Convention adopted the **ICZM Protocol** in 2008, which entered into force three years later, having as its main objectives the adaptation of coast-related sectoral policies and regulation of activities, the enhancement of governance processes, including institutional coordination, public participation and access to justice, the development of spatial planning and the improvement of regional cooperation.

To support the implementation of the ICZM Protocol, the Contracting Parties adopted the **ICZM Action Plan** (2012-2019), aiming to support the effective implementation of the ICZM Protocol. In Annex IV there is a list of the measures provided for in the Action Plan, and their relevance for the development of regional PoM.

With regards to the implementation of the ICZM Protocol and its Action Plan, there are two main assessments on which the present study will be based to identify the existing gaps: the analysis of the legislative, policy and financial framework for ICZM governance (Final global results of the ICZM stock-taking), undertaken by PEGASO project in 2013<sup>166</sup> and the Mid-term Evaluation of the Action Plan for the Implementation of the ICZM Protocol for the Mediterranean (2012-2019), decision IG.22/11, adopted by the COP19<sup>167</sup>.

According to the ICZM stock-taking exercise, the areas where limited progress has been achieved and additional efforts are required concern mainly the following issues: adoption of restrictions to urban development, establishment of awareness raising, education and training programmes, adoption of national coastal strategies, use of

---

<sup>165</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

<sup>166</sup> [http://www.pap-thecoastcentre.org/pdfs/D2.2A\\_Final%20global%20results%20of%20the%20stock-taking.pdf](http://www.pap-thecoastcentre.org/pdfs/D2.2A_Final%20global%20results%20of%20the%20stock-taking.pdf)

<sup>167</sup> UNEP(DEPI)/MED IG.22/28

economic instrument to support implementation of ICZM, use of indicators to assess economic impacts on coast, reporting on the use and management of coastal zones, and undertaking of risk assessments, especially regarding climate change impacts.

Based on the Summarised Conclusions of the stock-taking exercise, the following table 21 presents the progress made under each article of the Protocol in a scale from 1 to 5.

**Table 21.** Progress achieved on each article of the ICZM Protocol (Source: PAP/RAC. 2014)

1	2	3	4	5
Art.9 Economic Activities	Art. 27 Exchange of Information and Activities of Common Interest	Art.7 Coordination	Art.3 Geographical Coverage	Art.10 Specific Coastal Ecosystems
Art.16 Monitoring & Review		Art.8 Protection and Sustainable Use of the Coastal Zone	Art.15 Awareness Raising, Training, Education and Research	Art.19 Environmental Assessment
Art.21 Economic, Financial & Fiscal Instruments		Art.13 Cultural Heritage	Art.29 Transboundary Environmental Assessment	
Art.22 Natural Hazards		Art.14 Participation		
Art.27 Exchange of Information and Activities of Common Interest		Art.18 National Coastal Strategies, Plans & Programmes, Transboundary Cooperation		
		Art.20 Land Policy		

According to the Mid-term Evaluation of the Action Plan for the Implementation of the ICZM Protocol for the Mediterranean (2012-2019):

- Although the ICZM Protocol rapidly entered into force, the number of ratifications is low.
- There are for the moment two national ICZM Strategies and a third is under preparation. Efforts should be scaled up in view of having national ICZM strategies adopted by all countries, based on the Guidelines for National ICZM Strategies.
- The outcomes of the Pilot Project on Marine Spatial Planning should be followed up by the Parties in order to address the links between ICZM and MSP.

- The adoption of National Strategies and Action Plans and Programmes is the Action where less progress has been achieved.
- Additional financial resources should be identified since the main difficulty encountered is lack of resources.
- CAMP have been an overall effective tool. However there are some important gaps identified:
  - Weak follow-up in most of the projects;
  - Some limitations in their sustainability and contribution to the dissemination of ICZM at national/regional/international levels
  - Not strong linkages with institutional initiatives (such as changes in legislation and management strategies)
  - Limited impact of dissemination for projects that did not result in mainstreaming ICZM into policies or strategies
- Future CAMP and other ICZM projects need to establish a stronger sea-use planning component and explore land and sea interactions

In summary following are some actions to be considered with regards to the ICZM implementation:

**Table 22.** Gaps related to measures for ICZM.

Priority issues	Gaps related to measures
<b>Ratification of the Protocol</b>	Stronger efforts are required to achieve ratification by all Contracting Parties
<b>National Action Plans</b>	National Strategies and Action Plans should be developed and adopted by all Contracting Parties
<b>Marine Spatial Planning</b>	MSP should be better integrated and reflected into ICZM policies at national and sub regional levels
<b>Use and management of the coast</b>	<ul style="list-style-type: none"> <li>• Adoption of common methodology and harmonised assessment</li> <li>• Adoption of common indicators to evaluate economic impacts</li> </ul>
<b>CAMP</b>	Better integration of CAMP into wider strategies and plans should be achieved in the future
<b>Lack of resources</b>	Additional funding for ICZM should be ensured at national level
<b>Climate Change</b>	<ul style="list-style-type: none"> <li>• More research and new adaptation and mitigation measures are needed</li> <li>• Comprehensive risk assessments regarding climate change impacts should be ensured</li> </ul>
<b>Urban development</b>	There is need for adoption of harmonised legislation and restrictions at national level



## CONCLUSION

The Mediterranean Sea, with its unique characteristics, rich fauna and flora and important habitats represents an important part of world's biodiversity and largely supports the socioeconomic development of the region. In order to provide a full range of ecosystem services and continue supporting different human activities, it has to be maintained in a good environmental status. However, multiple and often cumulative pressures resulting from human activities, have since long caused significant degradation of the Mediterranean marine and coastal ecosystems, threatening their resilience and putting in danger major socioeconomic activities in the region. In response, the Barcelona Convention UNEP/MAP and its Protocols, the Strategic Action Programmes and a number of Regional Plans have been progressively adopted by the riparian countries, to provide a comprehensive legal framework, aiming to address efficiently the different pressures and ensure the conservation of marine ecosystems. Furthermore, under the ecosystem approach introduced in both the EU MSFD and the Barcelona Convention, the different policy and legal instruments need to be coordinated in an integrated manner, in order to reach the objective of Good Environmental Status (GES) for the coastal and marine Mediterranean ecosystems.

In this context, it has been decided to develop a Regional Programme of Measures, consisting of measures able to bridge the gap between the GES and the current situation and ensure the achievement of GES, including existing and new measures. The objective of this study, undertaken in the framework of the EU ActionMed project with the support of UNEP/MAP, was to review the measures that have already been adopted, to assess their level of implementation and their capacity to bridge the gaps and finally examine the need to adopt additional measures, in order to establish an efficient Regional PoM, and avoid any duplications, gaps or overlapping. Therefore, the present study is supporting the development of Regional PoM by addressing the main environmental pressures, including pollution (eutrophication, contaminants, and marine litter), biodiversity loss, spread of non-indigenous species, depletion of fish stocks, and damage on sea-floor integrity, climate change and deterioration of coastal zones. For each of these pressures, the analysis has been conducted following a homogenous methodology and systematic approach.

The results of this study will be presented at national and regional workshops gathering stakeholders in charge to develop coastal and marine policies in the Mediterranean. These workshops will be organised both in the frameworks of the ActionMed project and UNEP/MAP, in order to elaborate in a participatory way a Regional Programme of Measures that could be adopted by the Mediterranean countries in order to achieve the GES of the coastal and marine Mediterranean ecosystems.

## REFERENCES

Alien species in the Mediterranean Sea by 2012. A contribution to the application of European Union's Marine Strategy Framework Directive (MSFD). Part 2. Introduction trends and pathways; A. Zenetos, S. Gofas, C. Morri, A. Rosso, D. Violanti, J.E. Garcia Raso, M.E. Cinar, A. Almogi-Labin, A.S. Ates, E. Azzuro, E. Ballesteros, C.N. Bianchi, M. Bilecenoglu, M.C. Gambi, A. Giangrande, C. Gravili, O. Hyams-Kaphzan, P.K. Karachle, S. Katsanevakis, L. Lipej, F. Mastrototaro, F. Mineur, M.A. Pancucci-Papadopoulou, A. Ramos Espla, C. Salas, G. San Martin, A. Sfriso, N. Streftaris, M. Verlaque; *Mediterranean Marine Science*, 13/2, 2012, 328-252

Eunomia for European Commission DG Environment 2016. Study to support the development of measures to combat a range of marine litter sources, Chris Serrington, Chiarrina Darah, Simon Hann, George Cole, Mark Corbin

European Commission COM(2014) 97 final, Report from the Commission to the Council and the European Parliament – The first phase of implementation of the Marine Strategy Framework Directive (2008/56/EC), Brussels 20.2.2014

European Commission COM(2014) 398 final Towards a circular economy: A zero waste programme for Europe

European Commission DG Environment 2014, Recommendation on Programmes of Measures (Annex to doc MD 2014-1/1)

European Commission – Report from the Commission to the European Parliament and the Council on the progress in establishing marine protected areas (as required by article 21 of the Marine Strategy Framework Directive 2008/56/EC), Brussels 01.10.2015

European Commission; SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture; Brussels 2016

European Commission SWD (2015) 50 final, Commission Staff Working Document Report on the progress in implementation of the Water Framework Directive Programmes of Measures

European Environment Agency, 2015, Spatial Analysis of Marine Protected Area networks in Europe's Seas

European Environment Agency 2014, Marine messages; Our seas, our future – moving towards a new understanding

FAO, 2016. Report of the fortieth session of the General Fisheries Commission for the Mediterranean (GFCM), St. Julian's, Malta, 30 May – 3 June 2016. GFCM Report No. 40. Rome, Italy

Gabrié C., Lagabrielle E., Bissery C., Crochelet E., Meola B., Webster C., Claudet J., Chassanite A., Marinesque S., Robert P., Goutx M., Quod C., 2012. The Status of

Marine Protected Areas in the Mediterranean Sea. MedPAN & RAC/SPA. Ed: MedPAN Collection. 256 pp

Green Infrastructure Guide for Water Management: Ecosystem-based management approaches for water-related infrastructure projects, UNEP, 2014

Guidance on Monitoring of Marine Litter in European Seas. European Commission, JRC, European Union, 2013

Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp

IPCC 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

IPCC, 2014: Climate Change 2014 Synthesis Report Summary for Policymakers

IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC

Otero, M., Cebrian, E., Francour, P., Galil, B., Savini, D. 2013. Monitoring Marine Invasive Species in Mediterranean Marine Protected Areas (MPAs): A strategy and practical guide for managers. Malaga, Spain: IUCN. 136 pages.

PAP/RAC. 2014. Final global results of the ICZM stock-taking. Brian Shipman, Sylvain Petit. 52 pp.

Plan Bleu 2008, Climate Change and Energy in the Mediterranean

Priorities for MSFD programmes of measures. Joint NGO paper – updated with additional chapter. Seas at Risk, MCS, CCB, BUND, Swedish Society for Nature Conservation, Oceana, WWF, BirdLife Europe, MIO-ECSDE, FISH, BSNN, FNE, North Sea Foundation, Surfrider Foundation Europe, Coastwatch Europe, SWAN, MEDSOS, OceanCare. October 2014

RAC/SPA, 2014. Guidelines to improve the implementation of the Mediterranean Specially Protected Areas network and connectivity between Specially Protected Areas. By Dan LAFFOLEY. Ed. RAC/SPA, Tunis. 32pp.

State of Europe's seas, European Environment Agency, 2015

The State of Mediterranean and Black Sea Fisheries, FAO 2016

Tode Lina, Lafitte Antoine, Sauzade Didier, 2016, Socio-economic assessment of selected potential new measures to achieve good environmental status of the Mediterranean waters. ActionMed Deliverable 3.2.

UNEP(DEPI)/MED IG.22/28. Mid-term Evaluation of the Action Plan for the Implementation of the ICZM protocol for the Mediterranean (2012-2019)

UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

UNEP/MAP-RAC/SPA. 2008. Guide for Risk Analysis assessing the Impacts of the Introduction of Non-indigenous Species. Ed. RAC/SPA, Tunis. 30 pp.

UNEP/MAP-RAC/SPA. 2008. Guidelines for Controlling the Vectors of Introduction into the Mediterranean of Non-indigenous Species and Invasive Marine Species. Ed. RAC/SPA, Tunis. 18 pp.

UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Leonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

UNEP (2015) Plastic in Cosmetics

UNEP (2016). Marine plastic debris and microplastics - Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi

UNEP (2016) Marine Litter Legislation: A Toolkit for Policymakers

Update of priority investment projects for the de-pollution of the Mediterranean Sea from pollution; Horizon 2020 –UFMS/NP/0102/2012; LDK, iME

## ANNEX I.

### OUTPUTS SET OUT IN THE OFFSHORE ACTION PLAN AND THEIR RELEVANCE TO THE REGIONAL POMs

Actions	Level	Relevance to PoMs
<b>SO1. To ratify the Offshore Protocol</b>		
Ratification by all Contracting Parties of the Offshore Protocol, transposition of the Offshore Protocol into national law, and cooperation through the Secretariat to ensure compliance with its provisions	National	
Review of the effectiveness of the Offshore Protocol	National	
Provision of advice and technical assistance to Contracting Parties to the Barcelona Convention, which so request	Regional	++
Assistance in reviewing the effectiveness of the Offshore Protocol	Regional	+++
<b>SO2. To designate Contracting Parties' Representatives to participate to the regional governing bodies</b>		
Nomination of the National Offshore Focal Point designated by all MAP Focal Points to coordinate at national level activities carried out in the framework of the Action Plan and actively participate in the OFOG Group	National	
Designation, upon request by the Secretariat, through their National Offshore Focal Point, of the appropriate national entities and/or officials as contact points for each OFOG Sub-Group	National	
Leadership, on a voluntary basis, of the established Sub-Groups to coordinate with the support of the Secretariat the work assigned to the Sub-Groups	National	
Participation of the industry and their representatives as observers to the OFOG Sub-Groups	Regional	+
Enhancement of public awareness through the contribution of IGOs and NGOs with a relevant mandate to the topics discussed in the various OFOG Sub-Groups, through their participation as observers, ensuring an open and transparent process through public consultations	Regional	++
Establishment of institutional cooperation with various relevant regional and global institutions, initiatives and agreements and, at an operational level, identification and use of possible synergies with	Regional	++

ongoing activities of bodies such as the European Maritime Safety Agency		
Publication and update of the composition of the OFOG Group and Sub-Groups on a dedicated website	Regional	+
Updated list of the National Offshore Focal Points and OFOG Sub-Group Focal Points	Regional	+
Definition, in consultation with MAP Focal Points, of the roles and responsibilities of UNEP/MAP Components to facilitate the implementation of the Action Plan	Regional	+++
Identification of the required means including human resources to ensure the implementation of the Action Plan and the support of the relevant UNEP/MAP Components. A draft estimation of the required means is found in Appendix 1	Regional	+
<b>SO3. To establish a technical cooperation and capacity building programme</b>		
Technical cooperation and capacity building programme endorsed as set in Appendix 2	National	
Integration of the technical cooperation and capacity building programme in the six year programme of activities of UNEP/MAP and its relevant Components and in their biennium programme of work	Regional	+
Preparation of the corresponding budget for consideration by the Ordinary Meeting of the Contracting Parties to the Barcelona Convention	Regional	+
Identification of donors to secure funds required for the implementation of the technical cooperation and capacity building programme	Regional	+
<b>SO4. To mobilise resources for the implementation of the Action Plan</b>		
Financial and human resources mobilised to support the implementation of the Action Plan, in particular its provisions related to the OFOG Group, technical cooperation, capacity building and monitoring activities	National	
Identification of additional donors to secure funds for the implementation of the Action Plan	Regional	+
<b>SO5. To promote access to information and public participation in decision-making</b>		
Template for public information in line with national and regional rules on access to information	National	



Report to the Secretariat every two years relevant information on the offshore installations within their jurisdiction including, when appropriate, information on their disposal for inclusion in the inventory to be maintained by the Secretariat	National	
Report to the Secretariat every two years discharges, spills and emissions from offshore oil and gas installations data in accordance with the monitoring programme to be defined by the relevant OFOG Sub-Group	National	
Support the preparation of the template for public information in line with existing Decisions of the Contracting Parties addressing public access to information and with UNEP's Access to Information Policy	Regional	++
Development of an online regional system to be maintained for the purpose of public information sharing	Regional	++
Publication every two years on a dedicated website of the inventory of installations as well as the discharges, spills and emissions from offshore oil and gas installations data submitted by the Contracting Parties	Regional	+++
Consolidated report every two years on the discharges, spills and emissions from offshore oil and gas installations data submitted by the Contracting Parties	Regional	+++
<b>SO6. To enhance the regional transfer of technology</b>		
Active participation of the respective scientific and technical institutions, as well as the industry, in R&D activities and programmes related to prevention, response and monitoring of pollution from offshore activities	National	
Presentation of the results of R&D activities and programmes by their respective national institutions and industry in international fora	National	
Information on ongoing R&D activities and research needs provided to the Secretariat	National	
Support in the identification of fields of research in which there is a need for enhancement of the state-of-the-art of offshore pollution prevention, response and monitoring technologies and techniques	Regional	++
Dissemination and exchange of results of national R&D activities and programmes within and outside the Mediterranean region	Regional	+
Participation of national and regional research institutions and industry in the relevant international fora facilitated with a view to making better known the results of R&D activities undertaken in the Mediterranean region	Regional	+

<b>SO7. To develop and adopt regional offshore standards</b>		
Environmental impact assessment regional standards developed based on existing EIA regional standards taking into consideration requirements referred in Annex IV and other best practices	National	+++
Common standards, on the use and discharge of harmful or noxious substances and material, in line with relevant international standards and conventions defining inter alia limits and prohibitions at regional level formulated and adopted	National	+++
Identification of the required modifications of Annex I, II and III and definition of which chemicals should be covered and not covered by such standards and under which conditions	National	+++
Common standards on the disposal of oil and oily mixtures and on the use and disposal of drilling fluids and cutting formulated and adopted, and revision of the limits set in Article 10 and the prescriptions referred in Annex V of the Protocol	National	+++
The method to be used to analyse the oil content is commonly agreed and adopted	National	++
Procedures for contingency planning, notification of accidental spills and transboundary pollution established in accordance with the Protocol concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea	National	++
Special restrictions or conditions for SPAs defined and adopted	National	+++
Common criteria, rules and procedures for the removal of installations and the related financial aspects adopted	National	++
Common criteria, rules and procedures for safety measures including health and safety requirements adopted	National	+
Common minimum standards of qualification for professionals and crews adopted	National	+
Support the specific OFOG Sub-Groups for the development of the above common standards	Regional	++
<b>SO8. To develop and adopt regional offshore guidelines</b>		
Regional Guidelines on Environmental Impact Assessment	National	+++

Regional Guidelines on the use and discharge of harmful or noxious substances and material	National	+++
Regional Guidelines on the disposal of oil and oily mixtures and the use and disposal drilling fluids and cutting and analytical measurement	National	+++
Regional Guidelines on removal of installations and the related financial aspects	National	++
Regional Guidelines on installation safety measures including health and safety requirements	National	+
Regional Guidelines on minimum standards of qualification for professionals and crews	National	+
Regional Guidelines on authorisation requirements based on the above mentioned Standards	National	++
A report assessing national, regional and international rules, procedures and practices regarding liability and compensation for loss and damage resulting from the activities dealt with in the Offshore Protocol. The report is to be presented to the Contracting Parties at CoP 20 to form the basis of a proposal to facilitate implementing Article 27 of that Protocol	National	+++
Contribution through their OPRC Focal Points to the revision of the Section II of the Manual on Oil Pollution – Contingency Planning by the IMO Sub-Committee on Pollution Prevention and Response (PPR) which will include new information related to contingency planning for offshore units, sea ports and oil handling facilities	National	++
Support the specific OFOG Sub-Groups for the development of the above common guidelines	Regional	++
<b>SO9. To establish regional offshore monitoring procedures and programmes</b>		
A regional monitoring programme for offshore activities building, inter alia, on the Integrated Monitoring and Assessment Programme	National	+++
Results of the national offshore monitoring programme and the related agreed data are reported to the Secretariat every two years	National	++
The development/adoption of Mediterranean Monitoring Procedures and Programmes for the above, in consultation with relevant stakeholders, building on the relevant work undertaken in the Monitoring Correspondence Groups in the EcAp process in line with Decision 21/3	Regional	+++
Development of the Mediterranean Offshore Reporting and Monitoring System (e.g. Regional Data Bank on Offshore activities)	Regional	+++

through the Barcelona Convention Reporting System or other systems defined by the Contracting Parties)		
Production, dissemination and publication every two years of a report on Discharges, Spills and Emissions from Offshore Oil and Gas Installations, based on data submitted by countries which should be used as a base for the State of Environment Report regarding the impacts of the offshore oil and gas industry	Regional	++
<b>SO10. To report on the implementation of the Action Plan</b>		
Report on the implementation of this Action Plan, in particular on the effectiveness of the measures defined in this Action Plan and difficulties encountered every two years	National	
Biennial review of the status of implementation of the Action Plan on the basis of the regional report prepared by the Secretariat.	National	
Guidelines on the structure and content of the national report on the implementation of this Action Plan considering existing reporting procedures (e.g. Reporting under the Compliance Committee) to avoid duplication of reporting procedures, as well as a set of indicators	Regional	+
Meetings of the Parties to the Offshore Protocol	Regional	+
Consolidated report on the implementation of the Action Plan every two years for its submission to the Meetings of the Parties to the Offshore Protocol and the Meetings of the Contracting Parties to the Barcelona Convention	Regional	++

Note

+++	<b>High relevance</b>
++	<b>Medium relevance</b>
+	<b>Low relevance</b>

## ANNEX II.

### GFCM RECOMMENDATIONS ON CONSERVATION AND MANAGEMENT MEASURES AS APPEARED IN THE FAO 2016 REPORT <sup>168</sup>

Type of measure	Recommendation	Details	Scope		
			Fishery	Species / habitats	Areas / countries
Spatial management	GFCM/29/2005/1	Prohibits the use of towed dredge and trawler fisheries at depths greater than 1 000 m	Towed dredges and bottom trawl	Deep water benthic habitats and species.	Mediterranean and Black Sea
	GFCM/30/2006/3	Establishes three FRAs in order to protect deep sea sensitive habitats from bottom fisheries	Towed dredges and bottom trawl	Deep water corals and other invertebrate communities	Lophelia reef off Capo Santa Maria di Leuca (GSA 19, Italy); the Nile Delta area cold hydrocarbon seeps (GSA 26, Egypt); the Eratosthenes Seamount (GSA 25, Cyprus)
	GFCM/33/2009/1	Freezes the fishing effort applied to demersal stocks in the FRA, which shall not exceed the level of fishing effort applied in 2008, and makes other provisions	Towed nets, bottom and mid-water longlines, bottom-set nets	Demersal species	Gulf of Lion (GSA 07, France)
	GFCM/36/3012/3	Prohibits fishing activities with trawl nets within 3 nautical miles of the coast	Bottom and pelagic trawling	Coastal sharks and rays	Mediterranean and Black Sea

<sup>168</sup> The State of Mediterranean and Black Sea Fisheries, FAO 2016

Mitigation measures for the incidental catch of vulnerable species	GFCM/2005/3(A) [3]	Prohibits the use of driftnets larger than 2.5 km in the GFCM area	Driftnet	Large marine vertebrates, including pelagic sharks, cetaceans, sea turtles and seabirds.	Mediterranean and Black Sea
	GFCM34/2010/4 (C)	Prohibits retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of bigeye thresher sharks ( <i>Alopias superciliosus</i> ) in any fishery	Any tuna fisheries regulated by ICCAT (including longline and purse seine)	Bigeye thresher sharks ( <i>Alopias superciliosus</i> )	Mediterranean Sea
	GFCM/35/2011/7 (C)	Prohibits retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of hammerhead sharks (except for <i>S. tiburo</i> ), except for developing countries under certain circumstances	Any tuna fisheries regulated by ICCAT (including longline and purse seine)	Hammerhead sharks, with exception of <i>S. tiburo</i> .	Mediterranean Sea
	GFCM/36/2012/3	Prohibits finning, fishing of species listed in Annex II of SPA/BD Protocol as well as trawl fishing in coastal areas	All types of fisheries.	Sharks and rays	Mediterranean and Black Sea
	GFCM/35/2011/3	Requires the implementation of measures to ensure that incidental taking of seabirds is monitored, recorded and kept to the lowest level possible	All types of fisheries	Seabirds	Mediterranean and Black Sea
	GFCM/35/2011/4	Requires the implementation of measures to ensure that incidental taking of sea turtles is monitored, recorded and kept to the lowest level possible	All types of fisheries. Specific provisions for purse seine, surrounding nets, longline and bottom-set nets	Sea turtles	Mediterranean and Black Sea
	GFCM/35/2011/5	Requires the implementation of measures to monitor and mitigate the risk of incidental taking of monk seals during fishing operations	All types of fisheries	Monk seal	Mediterranean Sea
	GFCM/36/2012/2	Requires the implementation of actions to study, monitor, prevent, mitigate and, to the extent possible, eliminate incidental taking of cetaceans during fishing operations	All types of fisheries. Specific provisions for gillnet fisheries	Cetaceans	Mediterranean and Black Sea



Type of measure	Recommendation	Details	Scope		
			Fishery	Species / habitats	Areas / countries
	GFCM/37/2013/2	Requires the implementation of actions to study, monitor, prevent, mitigate and, to the extent possible, eliminate incidental taking of cetaceans during fishing operations. Other provisions regarding management measures for turbot	Bottom gillnet fisheries	Cetaceans, turbot	Black Sea
Other technical conservation measures	GFCM/30/2006/2	Establishes closed season for dolphin fish fisheries with FAD from 1 January to 14 August	Dolphin fish fisheries using FAD	Dolphin fish	Mediterranean and Black Sea
	GFCM/33/2009/2	Requires the adoption of a minimum 40 mm square mesh codend or a diamond mesh size of at least 50 mm	Demersal trawling	Demersal species	Mediterranean and Black Sea
	GFCM/35/2011/2	Prohibits the use of towed gear and ROV for red coral harvesting. Prohibits harvesting of coral below 50 m depth	Red coral harvesting	Red coral	Mediterranean Sea
	GFCM/36/2012/1	Prohibits harvesting red coral colonies whose basal diameter is less than 7 mm	Red coral harvesting	Red coral	Mediterranean Sea

### ANNEX III.

#### ACTIONS SUGGESTED BY THE SCP ACTION PLAN ROADMAP AND THEIR RELEVANCE TO THE REGIONAL POM

Actions	Relevance to PoM
<b>Food, Fisheries and Agriculture</b>	
Adopt Good Agricultural Practices (GAP) schemes for optimizing the use of different resources needed (water, land, energy, fertilisers, pesticides and Plant Protection Products) in agricultural areas; and in line with the EcAp ecological objectives and ICZM guidelines	+++
Adopt “Sustainable Fishing Practices”, including in the Industrial/semi-Industrial Fisheries sector and reduce the conflict between coastal resources users; such as over-regulated small-scale fisheries versus non-regulated recreational fisheries and in line with the EcAp ecological objectives and ICZM guidelines.	+++
Adopt new and innovative technologies based on the Life Cycle Approach, including control of flows of material, extended producer responsibility and eco-design in the food and fisheries processing and packaging.	+++
Prevent and minimize resource waste and food wastage in all the life cycle of the food; promote the production and use of energy and compost from food waste coming from the selectively collected fraction of the municipal waste and agricultural organic waste.	++
Adopt rural development policies including the development of sustainable value chains with high market potential to maximize employment and income generation, address rural migration and respond to Food Security challenges (e.g. National Organic Strategy, Sustainable Farming Strategy).	+
Promote “Green Financing” for the food, agriculture and fisheries consumption and production areas by facilitating access to loans and grants for farmers and fishermen to start sustainable agriculture and fishing activities, introducing fiscal instruments favouring sustainable agriculture and fisheries practices, like elimination or reduction of deemed “harmful” subsidies on water and energy consumption, and providing incentives for good environmental practices like Integrated Pest Management (IPM) and organic farming”.	+++
Establish quality control, traceability, standards harmonization and certification schemes that confirm the sustainable production of food and fisheries products.	++
Promote Sustainable Public Procurement (SPP) schemes for food and fisheries products and promoting the “Mediterranean Diet” as a basis for sustainable and healthy consumption patterns.	+

Support the development of regional value chains integrating SCP principles in the Food, Fisheries and Agriculture priority area, and with high market potential, ensuring the transition towards a more sustainable production while maximizing the employment and income generation gains for local producers.	+
Promote the labelling and branding of the sustainable locally produced food (including organic food and zero-kilometre products) and fair trade products and provide needed support for market access of the “Mediterranean Diet”.	+++
Improve the knowledge base and build a shared Mediterranean Knowledge System on the “Mediterranean Diet” for concerned research organizations, producers, certification bodies and governments and increase visibility and impact.	+
Implement information and education campaigns to promote the concept of the “Mediterranean Diet” and ensure public engagement in the production and consumption of sustainable food and local agriculture and fisheries products, along with reduction of food waste.	++
<b>Goods Manufacturing</b>	
Promote innovation and use BATs and BEPs including (but not limited to) environmental performance; human protection (toxic free products and manufacturing processes), resource efficiency, renewable energy, in the manufacturing of goods and the provision of alternative services.	+++
Promote innovation and use BATs and BEPs to implement the waste management hierarchy and encourage closed loop material cycles. This should consider toxics elimination, product durability, reparability and dematerialization and should include the encouragement of green sector value chains by the establishment of industrial recycling and remanufacturing networks connecting companies generating wastes with those recycling it.	+++
Promote, use and develop tools such as eco-design, Life Cycle Management, risk assessment of chemicals, substitution of hazardous chemicals, and Cradle to Cradle to facilitate the sustainable design and production of manufactured goods. This should include the formulation and promotion of a related research and development agenda and the compilation of best practice cases.	+++
Create green businesses and jobs in sustainable goods manufacturing and recycling/refurbishment and alternative services such as switching from a product ownership to a Service Systems and lease based economy ("servicizing") and other innovative business approaches.	+
Develop an institutional framework to encourage integrated national and local decision making through the involvement, collaboration and coordination of relevant stakeholders including governmental bodies, industries and civil society for improved integrated policy making (national and local) using life cycle thinking and forward looking decision making for the sustainable production, consumption and recovery of manufactured goods including an enforcement and assessment system.	++

Create at regional level an effective policy and regulatory framework for the reuse, repair, recycling and recovery of manufactured goods (waste management hierarchy) based on life cycle techniques and the promotion of extended producer responsibility at national and local levels. This should include the set-up of a frame for decent jobs in repair, refurbishment, recycling and waste management considering the role of the formal and informal sectors along with their respective needs for training, health and safety and livelihood.	+++
Promote full cost accounting and market base instruments (MBI) which favour sustainable goods and alternative services taking account of renewable energy use; eco-innovation; and support of green entrepreneurs and green jobs. This would also include financial and tax based mechanisms to encourage relative sustainable goods production and practices, and discourage unsustainable goods consumption.	+++
Promote and adopt Sustainable Public Procurement (SPP) schemes for manufactured goods based on agreed standards.	++
Assist enterprises to implement Environment Management Systems (EMS) and Ecolabels, facilitate hazardous chemicals substitution, sustainability reports, and support the creation of the necessary accreditation and certification bodies.	+++
Establish and promote certification schemes (eco-labels), for manufactured goods and alternatives services in the country; promote related activities like voluntary agreements between retailers and public authorities to promote sustainable products.	+++
Educate and inform stakeholders (consumers, policy and decision makers, producers, retailers, academia) about sustainable production and consumption of manufactured goods and alternative services including information relating to ecolabels, local/regional products, waste hierarchy, ecological footprint accounting, Life Cycle Assessment, external cost, corporate sustainability reporting and other approaches.	+++
Demonstrate and publicize the economic, environmental and social benefits of sustainably manufactured goods and alternative services using appropriate media outlets. Particular emphasis should be given to promoting the economic and business case for individual categories of manufactured goods (or alternative service provision), emphasizing the benefits to consumers, the private sector and the environment.	++
Improve education on sustainable production and consumption of manufactured goods and alternative services by reviewing and updating primary, secondary and tertiary educational curricula in relation to issues such as engineering processes, design, marketing, advertising, economy (including business schools), chemistry, health, education, social and environmental impacts of products and services.	++
<b>Tourism</b>	
Promote the sharing of relevant knowledge on SCP applied to tourism (e.g.	+++

best environmental practice (BEP) and best available techniques (BAT) to optimise the eco-efficiency of tourism activities and the use of environmental management systems (e.g. ISO 14001).	
Develop a destination management model to promote sustainable tourism and create a network of sustainable destinations.	++
Promote local sustainable tourism training to enhance local capacities and upgrade the existing ones.	+
Promote the diversification of the tourism offer from mass tourism to alternative forms of tourism (e.g. ecotourism, cultural tourism, rural tourism, off-season tourism) to reduce the impacts of seasonality and to reduce environmental pressures on coastal areas.	+++
Revise current tourism legislation at the national level to facilitate the integration of SCP principles and measures in the tourism sector.	++
Create eco-taxes, eco-charges or fees as an effective instrument to internalize externalities (e.g. tax relief of tourism activities during the low season) creating a fund exclusively earmarked for the improvement of the environmental quality of the destination and for the creation of green jobs.	+++
Promote the Tourism Carrying Capacity Assessment (TCCA) approach as a mandatory analysis for the preparation of national and local tourism planning and for the approval of new tourism investment.	++
Develop policies and actions to minimize the physical impact of tourist activity.	+++
Promote tourism eco-labels, environmental certification and rating schemes with robust environmental criteria based on a standard scheme verified by an independent organization (e.g. EU Ecolabel, Green Key, Nordic Swan, etc.).	+++
Develop and implement capacity building activities for tourism private operators to improve capacities and awareness on the importance of adopting sustainable consumption and production strategies.	+
Encourage marketing and communication activities focused on promoting the Mediterranean sustainable destinations and enhancing the visibility of Mediterranean sustainable tourism service providers in the international and national markets (e.g. flagship events; participation to international fairs, exhibitions and major public events; agreements with online tour operators and other intermediaries; web-marketing and thematic publishing).	+
<b>Housing and construction</b>	
Promote knowledge and innovative approaches that support the adoption of a holistic and integrated approach (integrating social, environmental, and economic dimensions) in city planning, urban renewal and housing design and construction, as well as in the surrounding built environment, and the implementation of sustainable urban development policies in cities that drive economic activities and revitalize the economy by opening new opportunities	+

for economic activities and businesses, investments, and employment.	
Promote innovation and knowledge through the integration of Best Available Techniques (BATs) and Best Environmental Practices (BEPs) that promote eco-design and the planning and construction of sustainable and affordable housing and high quality of urban environment that caters for the needs of the all social income groups, particularly medium and low income families, and introduce sustainable solutions for slums and downgraded neighborhoods.	++
Develop, in collaboration with planning, engineering and construction professional bodies, building and urban development codes for the provision of mix uses, compact urban development, space for pedestrians and cyclers, green roofs, as well as public space and green areas in residential areas for communal use, as means to promote social integration and cohesion, while at the same contributing to a clean, healthy, and productive environment.	+
Promote innovative planning and construction models leading to smart cities that secure sustainable housing easily accessible from and to work place, commercial, social, recreation and cultural services in order to reduce commuting, congestion, emissions, and air and noise pollution as well as to reduce and separate waste from households and public administration buildings, retail buildings in order to develop model for PP buildings.	++
Develop and encourage regulatory and incentive policies and measures that support: - Sustainable coastal urban development and green construction throughout the entire planning and construction process and the life cycle of buildings, for the achievement of a more efficient use of natural resources and energy, and the protection of coastal and marine ecosystems; - Sustainable practices in housing and construction through the use of local building materials, traditional knowledge, environmental friendly technologies and materials, sustainable and conscious purchasing practices, and sustainable waste management practices such as the recycling, recovery and reuse of construction-related waste, including demolition waste; and - Proper maintenance and operational efficiency of the existing housing stock. - Develop specific tools/guidelines for assessment of buildings prior to demolition and renovation with a view to optimal use of Construction and Demolition Waste.	++
Promote sustainable public procurement (SPP) in the public housing and construction sector, including subcontracting and services.	+
Introduce efficient monitoring, enforcement and assessment systems that ensure compliance with and adherence to sustainability principles in physical and urban planning and development; green and sustainable building regulations; codes of practice and standards; and the contribution of housing and construction to resource and energy efficiency, SCP, economic development, job creation, improved environment and human welfare.	+
Provide an institutional set up that ensures public participation, involvement of relevant stakeholders (including the private sector and civil society), transparency, accountability, collaboration and coordination between various	+

government entities and between the public and private sector - through Public-Private-Partnership (PPP) -, exchange of information on BATs and BPs on sustainable physical and urban development, and green housing design and construction.	
Prepare communication packages specifically targeting relevant stakeholders, including policy and decision makers, the general public, academia, Civil Society Organisations, businesses, builders and contractors, clearly identifying the benefits of adopting SCP patterns in green and sustainable housing design, construction, energy efficiency and sustainable urban planning.	++
Build capacities, educate and sensitize professionals, consumers, policy makers, and the public on concepts and tools that support the transition towards sustainable planning, housing and construction, such as integrated assessment, life cycle assessment, green economy, and circular economy.	++
<b>Cross-cutting actions</b>	
Enable the policy and regulatory conditions for mainstreaming SCP in national development policies.	+++
Establish financial mechanisms facilitating the implementation of SCP solutions.	+
Ensure the exchange of knowledge and information on SCP and the upscaling of successful SCP solutions.	++
Create and develop new business models integrating SCP approach as business strategy.	+
Promote the generation and upscaling of civil society led initiatives promoting SCP.	++

Note

+++	<b>High relevance</b>
++	<b>Medium relevance</b>
+	<b>Low relevance</b>



#### ANNEX IV.

### OUTPUTS SET OUT IN THE ICZM ACTION PLAN AND THEIR RELEVANCE TO THE REGIONAL POM

Output	Level	Relevance to PoM
<b>Support the effective implementation of the ICZM Protocol at regional, national and local levels including through a Common Regional Framework for ICZM</b>		
Ratification by all Contracting Parties of the Protocol	National	+++
Transposition by all Contracting Parties into legislation or guidance, and adoption of legally binding mechanisms	National	
Support for countries to adopt legally binding measures and transpose the Protocol into national legislation through for example comparative and gap analyses, or the dissemination of good practice	Regional	
Cross-sectoral and institutional governance mechanisms, such as interministerial committees, coastal commissions and fora, established for the implementation of the ICZM Protocol at and between national and local levels	National	++
Assistance to the Contracting Parties as required in the development of governance structures, including for example the carrying out of gap analyses of legal and institutional arrangements, and the improvement of human and technical capacities	Regional	
Develop and continuously improve the ICZM Governance Platform to support the implementation of ICZM through the provision of information and expert tools, including its continued maintenance and refinement throughout the whole Action Plan period	Regional	
Common Regional Framework for ICZM developed (under revised MSSD)	National	+++
Based on progress and learning from national and local strategies, assessment of gaps and needs to be included in Common Regional Framework for ICZM	Regional	
Coordination of the preparation of the Common Regional Framework (under revised MSDD)	Regional	
Transboundary strategies for ICZM allowing for coordination of national coastal strategies, plans and programmes related to contiguous coastal zones, in accordance with the Common	National	+++

Regional Framework developed under revised MSSD)		
National strategies for ICZM countries by all countries	National	
Support development of national strategies for ICZM based on regionally relevant examples	Regional	+++
Periodically assess progress and lessons learned through the region as well as provide analyses of comparative practices and experiences	Regional	+
A reporting format for use by the Contracting Parties and coordination of the reports	Regional	++
Report on the stocktaking currently underway on the state of implementation of the Protocol to identify gaps and progress at regional and Contracting Party level	Regional	++
Regular reports on the progress of implementation according to a reporting format provided by MAP Secretariat in the context of MAP reporting system	National	+
Report on Protocol implementation and Compliance as part of the biennium Report on Treaty Implementation	Regional	
Gathering data and monitoring ICZM Indicators for the Mediterranean starting with those related to coastal management in the context of the application of the Ecosystems Approach	Regional	+++
Regular reports to periodic monitoring at agreed frequency and reference format on the state and evolution of coastal zones at national level	National	
Periodic assessment of the State of the Mediterranean Coasts as part of the periodic UNEP/MAP Assessment on the State of the Environment and reflected in the State of the Environment Report as well as the Environment & Development Report.	Regional	++
<b>Strengthen the capacities of Contracting Parties to implement the Protocol and use in an effective manner ICZM policies, instruments, tools and processes</b>		
Thematic methodologies and technical capacities reviewed in order to assure that ICZM is delivered effectively and practically at national and local levels	National	+++
Technical assistance to ensure that ICZM is delivered effectively and practically at the national level consistently across the region	Regional	
ICZM Guidelines prepared and tested at national and local level	Regional	++
Implementation or support for practical projects at the local and	National	++

transboundary level		
Protocol implementation projects to strengthen governance at all levels	National	
Pilot initiatives targeting and involving key actors in coastal zone, particularly those from the business sector	National	
Support for ICZM Protocol implementation projects at local and transboundary level – prototype interventions to assist countries to implement the Protocol - subject to their clear link to the preparation of over-arching national strategies and policies. Projects to be based on the recognised model developed in the Mediterranean, Coastal Area Management Programme (CAMPs). These include: <ul style="list-style-type: none"> <li>• CAMPs already underway or approved by the Contracting Parties in Spain, Montenegro, France and Italy.</li> <li>• A further programme - CAMP IIIs - to build in country capacity and to implement the Protocol at country level - along with thematic demonstration programmes to be agreed and delivered in partnership with donor or sectoral funding</li> </ul>	Regional	
Organisation of national education programmes on ICZM	National	
Programme of high-level seminars, round tables and workshops at regional, subregional and national levels to promote the implementation of the ICZM Protocol	Regional	+
Further development and annual delivery of the MedOpen training course	Regional	
<b>Promote the ICZM Protocol and its implementation within the region, and promote it globally by developing synergies with relevant Conventions and Agreements</b>		
Process reviewed to ensure the participation of civil society and individual citizens in ICZM	National	++
Support for the annual Mediterranean Coast Day through the promotion of appropriate activities and publicity	National	
Support for region-wide ICZM awareness raising activities	National	
Develop an ICZM Awareness Raising and Communication Program	Regional	+
Implement and support the annual celebration of the Mediterranean Coast Day	Regional	
Development or support for research programmes for ICZM in accordance with article 15 of the Protocol	National	

Support for and participation in research programmes for ICZM that support the implementation of the Protocol	Regional	
Support for the promotion of the Protocol and its implementation	National	++
Promotion of the ICZM Protocol and good practice in its implementation across the Mediterranean	Regional	
Promotion of the ICZM Protocol and its implementation internationally through publications, published papers, networks and conferences	Regional	
Collaboration with appropriate networks to assist in the implementation of the Protocol	National	++
Participation in a Mediterranean coastal zone network to promote the establishment and exchange of scientific experience, data and good practices (e.g. BATs and BEPs)	National	
Establishment of a network of coastal agencies or other relevant institutions	National	
Identification and development of synergies and partnerships with appropriate networks to assist in the implementation of the Protocol	Regional	
Proposal for the establishment of a Mediterranean coastal network to promote the exchange of scientific experience, data and good practices (BATs and BEPs)	Regional	

Note

+++	<b>High relevance</b>
++	<b>Medium relevance</b>
+	<b>Low relevance</b>



