



## **Deliverable D3.8**

### **“MSFD – EcAp NATIONAL MEDIUM AND LONG-TERM ACTION PLANS”**

*Analysis of National PoMs vis a vis requirements under the MSFD and the Barcelona Convention*

**Date: February 2017**



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

# **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**

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**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

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This deliverable should be referenced as:

ActionMed Deliverable 3.8: “MSFD – EcAp National Medium and Long-term Action Plans” - *Analysis of National PoM vis a vis requirements under the MSFD and the Barcelona Convention*, February 2017.

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## ABBREVIATIONS

|              |   |
|--------------|---|
| ABNJ         | Areas Beyond National Jurisdiction  |
| ARA          | Artificial Reefs Areas  |
| BAT          | Best Available Technologies   |
| BC           | Barcelona Convention  |
| BEP          | Best Environmental Practices  |
| BOD          | Biochemical Oxygen Demand   |
| CBA          | Cost-benefit analysis   |
| CEA          | Cost-effectiveness analysis   |
| CIS          | Common Implementation Strategy  |
| COP          | Conference of Parties   |
| CP           | Contracting Parties   |
| DTW          | dispersed toxic waste   |
| EcAp         | Ecosystem Approach  |
| EcAp         | Ecosystem Approach  |
| EEA          | European Environment Agency   |
| EEZ          | Economic Exclusive Zone   |
| EFA          | Ecological Focus Areas  |
| EIA          | Environmental Impact Assessment   |
| ELV          | Emission Limit Values   |
| EMS          | Environmental Management System   |
| EO           | Ecological Objective  |
| EU           | European Union  |
| FP           | Focal Points  |
| FRA          | Fisheries Restricted Areas  |
| GDP          | Gross Domestic Product  |
| GES          | Good Environmental Status   |
| IAS          | Invasive Alien Species  |
| ICZM         | Integrated Coastal Zone Management  |
| IUCN         | International Union for Conservation of Nature  |
| LBS Protocol | The Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities |
| MCA          | Multi-criteria analysis   |
| MED POL      | Mediterranean Pollution Assessment and Control Programme  |
| MMA          | Marine Managed Area   |
| MMO          | Marine Mammal Observers   |
| MPA          | Marine Protected Areas  |
| MS           | Marine subdivision  |
| MSCG         | Marine Strategy Coordination Group  |
| MSFD         | Marine Strategy Framework Directive   |
| MSP          | Maritime Spatial Planning   |
| MSSD         | Mediterranean Strategy for Sustainable Development  |
| NAP          | National Action Plans   |
| NBB          | National Baseline Budget  |
| NCFF         | Natural Capital Financing Facility  |
| NGO          | Non-Governmental Organisation   |

|                          |  |
|--------------------------|--|
| NIS                      | Non-indigenous species   |
| NMPZ                     | National Marine Park Zakynthos   |
| NPV                      | Net Present Value  |
| OECD                     | Organisation for Economic Co-operation and Development   |
| PAF                      | Prioritised Action Framework   |
| PAHs                     | Polycyclic aromatic hydrocarbons   |
| PCB                      | Polychlorinated biphenyls  |
| PoMs                     | Programmes of Measures   |
| POP                      | Persistent Organic Pollutants  |
| PoW                      | Programme of Work  |
| RBMP                     | River Basin Management Plan  |
| SAC                      | Special Areas of Conservation  |
| 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                         |
| SCI                      | Sites of Community Importance  |
| SCP                      | Sustainable Consumption and Production   |
| SIA                      | Social Impact Assessment   |
| SoER-MED                 | State of the Mediterranean Marine and Coastal Environment  |
| SPA (EU Birds Directive) | Special Protection Areas   |
| SPA (UNEP/MAP)           | Specially Protected Areas  |
| SPAMIs                   | Specially Protected Areas of Mediterranean Importance  |
| SSW                      | Special Secretariat for Water  |
| TBT                      | Tributyltin  |
| TPB                      | toxic, persistent and liable to bioaccumulation  |
| UNEP                     | United Nations Environment Programme   |
| UNEP/MAP                 | United Nations Environment Programme – Mediterranean Action Plan                                   |
| UWWTD                    | Urban Waste Water Treatment Directive  |
| WCMP                     | Water Catchment Management Plan  |
| WFD                      | Water Framework Directive  |
| WWTP                     | Waste Water Treatment Plant  |

## EXECUTIVE SUMMARY

The intensive human activities taking place on the coasts and in the sea, often coupled with a lack of proper management and coordination of these same activities are affecting and putting at risk the preservation of the Mediterranean environment. Preserving the Mediterranean Ecosystem is of fundamental importance to maintain the unique economic and social characteristics of the region.

The EU adopted the MSFD in 2008, in order to provide an integrated response to the multi layered environmental issues affecting the European Seas. The Marine Directive overarching goal is to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to ensure the protection of the resources upon which marine-related economic and social activities depend. Cooperation between the Member States of one marine region and with neighbouring countries, which share the same marine waters, is already taking place through the Regional Sea Conventions. In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters.

At the wider regional level, UNEP/MAP Barcelona Convention has adopted the objective to achieve GES of the Mediterranean Sea and Coast and the Ecosystem Approach has been reaffirmed by the Contracting Parties as the overarching principle of the Barcelona Convention. In the framework of the LBS Protocol to the Barcelona Convention, all the Contracting Parties of the Barcelona Convention adopted National Action Plans (NAPs) in 2003-2005. In 2015-2016 the Contracting Parties to the Barcelona Convention updated their NAPs, based on the commitment undertaken in COP18, in order to streamline the provisions of the SAP MED and Regional Plans that had been adopted since the adoption of the first NAPs, and achieve GES on pollution and litter related Ecological Objectives.

The implementation of the MSFD (for the EU Member States) and of the Barcelona Convention needs to be led in a coordinated and coherent manner. A successful harmonization of the two will be conducive to the realisation of the GES, as well as the continued sustainable development of the region in socio-economic terms.

The aim of this report is to analyse the measures adopted by the EU Member States in the Region, to identify the discrepancies with the Barcelona Convention Framework still present in the PoMs, to highlight the priority measures to address relevant issues and to suggest potential actions to ensure cooperation among EU Member States and non EU Countries. The present report focuses on pollution and marine litter related descriptors.

Firstly, the report identifies, for each of the descriptors relevant for the undertaken work – D5- Eutrophication, D8 and D9 – Contaminants and D10 – Marine Litter – the discrepancies with the BC framework, which could be the object of the next policy



cycle, and lead to the adoption of new measures or better implementation in most of the analysed EU Member States PoMs.

Secondly, for each of the EU Member States of the Mediterranean Region, the report provides an overview of the PoMs elaboration process, the current status and the structure and composition of the Programme. For each PoMs, the main issues addressed for each of the descriptors are highlighted. Measures that would be beneficial to adopt are identified for each descriptor as well. The annexes contain fiches of measures for each PoMs examined, based on the available documents, which give a snapshot of the situation in each of the EU Member States.

Thirdly, the report provides an assessment of how and to what extent the elaboration of the PoMs by the EU Member States is expected to contribute to the implementation of the Barcelona Convention and its pollution-related Protocols. The main links between NAPs and PoMs are highlighted, as well as the differences between the documents adopted by the EU Countries and Non EU Countries.

The report also lists six common priority measures, identified by crosschecking the PoMs with the NAPs. The measures are those present in the majority of both policy instruments. A short number of actions are recommended to ensure a coordinated implementation of the priority measures and more widely, a stronger cooperation between all the Contracting Parties to the Barcelona Convention (both EU and non EU Member States): preserving the Mediterranean Sea and region's ecosystem requires information sharing, know how exchange and common capacity building.

Finally, an assessment of the degree to which the PoMs implementation timeline is in line with the timeline for the implementation of measures in the framework of the Barcelona Convention is outlined, and specific actions are recommended to further align the implementation of measures, under the MSFD and the Barcelona Convention.

## 1. INTRODUCTION AND GENERAL CONTEXT

### The Mediterranean Sea

The Mediterranean Sea presents some distinctive ecological and geographical features, which have played a widely accepted role in the socioeconomic – as well as cultural - development of the coastal areas. The numerous species and habitat which characterize the Mediterranean coastal and marine ecosystem are at the basis of the several relevant ecosystem services upon which the large population living on the coasts rely for their economic sustenance. Some of the key sectors of the Mediterranean region's economy are tourism, marine transport, fisheries, aquaculture, and the offshore industry which account for 360 billion EUR in terms of production value and 4,2 million direct jobs <sup>1</sup>.

The conservation of a healthy environment is fundamental to preserve the ecological and socioeconomic uniqueness of the Mediterranean basin. However, the intensive human activities taking place on the coasts and in the sea, often coupled with a lack of proper management and coordination of these same activities are affecting and putting at risk the preservation of the Mediterranean environment.

The Second State of the Mediterranean Marine and Coastal Environment Report, SoER-MED2, identifies 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, as the main impacts on the Mediterranean waters and coasts induced by human activities. Some of the most relevant drivers to be taken into account are: mass tourism, industrial activities, fisheries and aquaculture, agriculture, poor waste management and maritime and offshore activities. The overall deterioration of the environment linked to climate change has an amplifying effect on the aforementioned issues.

### Marine Strategy Framework Directive (MSFD)

The EU adopted the MSFD in 2008, in order to provide an integrated response to the multi layered environmental issues affecting the European Seas. The Marine Directive overarching goal is to achieve Good Environmental Status (GES) of the EU's marine waters by 2020 and to ensure the protection of the resources upon which marine-related economic and social activities depend. The Directive gives legal value to the ecosystem approach to the management of human activities impacting on the marine environment, integrating the concepts of environmental protection and sustainable use.

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<sup>1</sup> Tode L., Lafitte A., Sauzade D., 2016. Socio-economic assessment of selected potential new measures to achieve good environmental status of the Mediterranean waters. ActionMed Deliverable 3.2.

<sup>2</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

The Directive lists four European marine regions – the Baltic Sea, the North-East Atlantic Ocean, the Mediterranean Sea and the Black Sea – located within the geographical boundaries of the existing Regional Sea Conventions. Cooperation between the Member States of one marine region and with neighbouring countries, which share the same marine waters, is already taking place through these Regional Sea Conventions.

In order to achieve GES by 2020, each Member State is required to develop a strategy for its marine waters (or Marine Strategy). The Directive adopts an adaptive management approach according to which the Marine Strategies need to be kept up-to-date and reviewed every 6 years. This approach allows Member States to identify the weaknesses and gaps of their Marine Strategies and to address them along the way.

The Directive's Annex I, contains a list of descriptors covering all the different aspects of marine and coastal ecosystems, which have to be included in the Marine Strategies in order to achieve the GES. The descriptors are the following:

- ✓ biodiversity
- ✓ non-indigenous species
- ✓ populations of commercial fish species
- ✓ food webs
- ✓ eutrophication
- ✓ sea floor integrity
- ✓ hydrographical conditions
- ✓ contaminants
- ✓ contaminants in seafood
- ✓ marine litter
- ✓ energy
- ✓ underwater noise.

According to the provisions of the MSFD, the Member States have to develop their Marine Strategies, by following five main steps (Table.1)<sup>3</sup>:

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<sup>3</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)

**Table 1:** The MSFD Cycle.



The Common Implementation Strategy (CIS) has been established at the EU level as a coordination programme for the implementation of the MSFD. It includes three working levels. Three Working Groups, composed of experts, provide information regarding 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 Marine Strategy Coordination Group (MSCG) has the role of steering and coordinating the working groups; it answers to the Marine Directors Meetings, the high-level political group of the CIS, which supervises the overall implementation of the MSFD.

### UNEP/MAP – Barcelona Convention

In 1975, in order to answer to environmental concerns in the region, and more specifically at the time pollution, 16 Mediterranean Countries, together with the European Commission adopted the Mediterranean Action Plan, the first regional Action Plan to be put in place under the auspices of UNEP. A year later, the Convention for the Protection of the Mediterranean Sea Against Pollution, was concluded providing a legal basis for the cooperation in the region regarding environmental protection. A new Plan was adopted (MAP Phase II) in 1995, with the aim to widen the scope of the cooperation, 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. Since then, seven Protocols have been adopted, addressing different aspects of marine environmental protection: Dumping Protocol, Prevention and Emergency Protocol,

LBS Protocol, SPA & Biodiversity Protocol, Offshore Protocol, Hazardous Wastes Protocol, ICZM Protocol. Two Strategic Action Programmes, on pollution from land-based activities and on protection of the biodiversity in the Mediterranean region (SAP/MED and SAP/BIO), several Regional Plans on pollution, biodiversity, and Integrated Coastal Zone Management as well as the Mediterranean Strategy on Sustainable Development (MSSD) are also part of the Barcelona Convention Framework. The revised Mediterranean Strategy for Sustainable Development (2016-2025) was adopted by the COP19 in 20164.

UNEP/MAP acts according to the Ecosystem Approach (EcAp), to define and achieve the GES of the Mediterranean Sea. It was first adopted by the Contracting Parties in COP15 and recognized as the overarching principle of the BC Framework by COP17. The Ecosystem Approach has the goal of managing all the different activities in an integrated manner and to address the cumulative impacts in order to reach GES.

### The ActionMed Project

The implementation of the MSFD (for the EU Member States) and of the EcAp under the Barcelona Convention needs to be led in a coordinated and coherent manner. A successful harmonization of the two will be conducive to the realisation of the GES, as well as the continued sustainable development of the region in socio-economic terms. The EU funded ActionMed Project, is directed at providing support and facilitating the implementation of the MSFD cycle step by step, in collaboration with the Regional Sea Convention in the Mediterranean (UNEP/MAP) and its Ecosystem Approach. The project proposes integrated and coordinated and financially sustainable regional Action Plans, tests the implementation of the Programmes of Measures and finally supports the establishment of an information Management System to fill data gaps for Mediterranean marine waters. While the Project had been designed to provide support to EU Member States, in the process of preparation and elaboration of their PoMs under the MSFD, in effect the timing of the beginning of the Project made this aim not possible to fulfil, and even superfluous, as the large majority of the Countries were already at different stages of the elaboration process, and in some cases had already produced their PoMs. The only case in which support was provided to a Country under the ActionMed Project for the elaboration of MSFD PoMs, is the one of Greece, which received assistance in elaborating a list of measures and in conducting the socio – economic assessment (through overall advices and a pilot assessment for selected measure).

### 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,

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<sup>4</sup> Decision IG.22/2

both in line with the EU MSFD and the Barcelona Convention's Ecosystem Approach process. Accordingly, and as part of Activity 3, this Report aims at analysing the measures adopted by the EU Member States in the Region, identifying the discrepancies in the Programmes of Measures prepared in respect to the Barcelona Convention Framework and suggesting potential measures to address relevant issues and bridge these inconsistencies.

The report will address pollution related issues, notably eutrophication, contaminants and marine litter, which were identified as the most relevant pressures. Consequently, it will address measures adopted by Member States in regard to the Descriptors 5, 8, 9 and 10, as described in Annex I of the MSFD.

It must be noted that the analysis has faced a lack of extensive information in English regarding some of the EU Countries. The fact that the Member States were at different stages of the PoMs adoption process has also affected the uniformity of the National Analysis to a certain extent.

## The Measures

According to the Article 13 of the MSFD: *Member States shall, in respect of each marine region or sub-region concerned, identify the measures which need to be taken in order to achieve or maintain good environmental status, as determined pursuant to Article 9(1), in their marine waters*<sup>5</sup>. This provision is complemented by Annex VI, according to which 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>6</sup>.

To achieve the GES according to the MSFD provisions, each Member State is to develop a Programme of Measures, which needs to take into account the regional conditions and specific issues. The Member States will have the task to implement the PoM in a coherent way and taking into consideration the environmental targets they are built to meet. Almost all the EU countries have prepared or are currently in the process of elaborating their Programmes of Measures.

The measures contained in the PoMs can be either new or existing measures that have already been adopted in the framework of other relevant policies. The existing measures are evaluated according to their level of implementation, as well as according to their effectiveness in bridging the gap between GES and the current situation. Those measures which appear to be not sufficient or only partially effective need to be supplemented by new/updated measures.

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<sup>5</sup> Marine Strategy Framework Directive 2008/56/EC <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0056&from=EN>

<sup>6</sup> Directive 2008/56/EC, Annex VI

It is important to highlight that at the national level, with regards to pollution issues, the Contracting Parties of the Barcelona Convention are required to adopt a National Action Plan (NAP) 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; their update was carried out in 2015-2016 when they were adapted to the most recent developments of UNEP/MAP Barcelona Convention. Measures relevant to the Ecological Objectives 5, 9 and 10 (eutrophication, contaminants and marine litter) are foreseen in the NAPs and, as synergies exist between the two types of instruments, it is now necessary to ensure a streamlined implementation in regard to descriptors 5, 8, 9, and 10 –eutrophication, contaminants, contaminants in seafood, marine litter.

In the framework of UNEP/MAP, measures have also been adopted at regional level with regards to different ecological objectives and in line the MSFD descriptors. Those measures regard 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 at national level and implemented by the Contracting Parties.

### Methodology

As already mentioned, this report focuses on the analysis of PoMs adopted by EU Member States, in accordance with their obligation descending from the MSFD, specifically in regard to pollution, including measures addressing eutrophication, contaminants and marine litter.

It is important to notice that Member States are at different stages in the process of preparing and adopting the aforementioned Programmes of Measures. The level of information available regarding the respective PoM, consequently, varies significantly. The present report is based on this information and consequently addresses the situation of different Member States at different level of analysis, depending on the amount of information available for each of them.

## 2. NATIONAL GAPS. GENERAL OVERVIEW

### Eutrophication

Despite being for the largest part oligotrophic, the Mediterranean Sea eutrophication hotspots are still present, and are mainly caused by nutrient over-enrichment from human activities (nitrogen and phosphorus). The sectors mainly responsible for this kind of pollution of the sea waters are agriculture, the wastewater treatment and the chemical and fertilizer industry. Eutrophication has a significant impact on water transparency of the sea and biodiversity preservation; it causes the development of alga blooms, which in high density can lead to human health problems as well as socioeconomic problems, in the fisheries and touristic sectors.

After analysing the PoMs or the available documents concerning them, a number of issues which would be beneficial to address in the future policy cycles and that will require further action in that context, were identified. While not all of them are applicable to each country examined, they highlight the thematic areas that in the future will require attention and action by the majority of EU Member States in the Mediterranean region. The following Table 2 contains these issues, which should be addressed by the EU Member States at the national level, either by introducing new measures or by better implementing the existing ones in their PoMs:

**Table 2:** Future issues to be considered related to measures for eutrophication

| Source of Pressure                 | Issues to be addressed   |
|------------------------------------|--|
| Waste Water Management             | <ul style="list-style-type: none"> <li>✓ <b>Strict implementation of measures targeting WWT</b></li> <li>✓ <b>Impact assessment of possible future scenarios of demographic expansions and increase of human activities on the coasts</b></li> <li>✓ <b>Modelling on the mesoscale to answer monitoring needs<sup>7</sup></b></li> </ul>   |
| Agricultural and industrial runoff | <ul style="list-style-type: none"> <li>✓ <b>Improvement in management programmes</b></li> <li>✓ <b>Restriction of fertilisers</b></li> <li>✓ <b>Shift towards sustainable and organic farming</b></li> <li>✓ <b>Better use of nutrients</b></li> <li>✓ <b>Promotion of EFAs use to address eutrophication</b></li> <li>✓ <b>Increase in transnational cooperation</b></li> </ul> |
| Aquaculture                        | <ul style="list-style-type: none"> <li>✓ <b>Adoption of standards and guidelines for aquaculture sector.</b></li> </ul>  |
| Coastal engineering                | <ul style="list-style-type: none"> <li>✓ <b>Harmonization of information to improve data sharing</b></li> </ul>  |

<sup>7</sup> The results of the Action Med Second Regional Workshop in the Adriatic Region showed the need to introduced measures of this kind.



## Contaminants

Contaminants affecting the Mediterranean Sea include organic matter, heavy metals, Persistent Organic Pollutants (POPs) and Polycyclic Aromatic Hydrocarbons (PAH). The sources of this kind of pollution are mainly land-based, and can be either point-sources (including discharge points, dumping grounds etc.) or nonpoint sources (including fluvial and stormwater run-offs and sewage discharges). Other potential causes of contaminants can be the atmospheric deposition, or sea-based activities (fishing, shipping, offshore activities etc.).<sup>8</sup> All the aforementioned contaminants affecting the Mediterranean marine waters can have significant effects on human health as well as affecting several animal species.

After analysing the PoMs or the available documents concerning them, a number of general issues which would be beneficial to address in the future policy cycles and that will require further action in that context, were identified. While not all of them are applicable to each country examined, they highlight the thematic areas that in the future will require attention and action by the majority of EU Member States in the Mediterranean region. The following Table 3 contains these issues, which should be addressed by the EU Member States at the national level, either by introducing new measures or by better implementing existing ones in their PoMs:

**Table 3:** Future issues to be considered related to measures for contaminants.

| Source of Pressure   |       | Issues to be addressed  |
|--|-------|---|
| Waste Management   | Water | <ul style="list-style-type: none"> <li>✓ <b>Secondary and tertiary treatment of WW promotion and increase</b></li> <li><b>Promotion of efficient WWT in all major coastal cities</b></li> </ul>                                       |
| Solid Management   | Waste | <ul style="list-style-type: none"> <li>✓ <b>Improvement in management programmes</b></li> </ul>   |
| Better implementation an reporting on existing measures regarding contaminants |       | <ul style="list-style-type: none"> <li>✓ <b>Stricter application of existing measures to ensure their realisation</b></li> <li>✓ <b>More frequent and efficient reporting system</b></li> </ul>                                       |
| Stormwater   |       | <ul style="list-style-type: none"> <li>✓ <b>Improve management and separation system and infrastructures</b></li> </ul>   |
| New contaminants   |       | <ul style="list-style-type: none"> <li>✓ <b>Update and review of the list of priority contaminants</b></li> <li>✓ <b>Harmonisation at international level and better cooperation in monitoring and information sharing</b></li> </ul> |

<sup>8</sup> UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

## Marine litter

Marine litter in the Mediterranean is widely considered as a critical issue, which needs swift and effective actions from Member States, as well as at the regional level. UNEP/MAP was the first ever Regional Sea Programme to adopt a Regional Plan. Significant progress has been achieved in controlling, preventing and reducing marine litter; there are still gaps that need to be addressed. The sources of marine litter in the Mediterranean Sea are mainly land-based, with the high density of population on the coasts and intensive touristic exploitation of the coastal areas during summer impacting in a very relevant way. Cigarette butts and shopping (single-use plastic) bags are among the main problems. A lack of awareness among the general public is widely considered as the main issue to be addressed in this field. As for the consequences of marine litter, while they are yet not clearly defined from a scientific standpoint, it is clear that it adversely affects the marine and coastal ecosystems, while it is also impacting in a negative way different socioeconomic activities and the human health.

After analysing the PoMs or the available documents concerning them, a number of general issues which would be beneficial to address in the future policy cycles and that will require further action in that context, were identified. While not all of them are applicable to each country examined, they highlight the thematic areas that in the future will require attention and action by the majority of EU Member States in the Mediterranean region. The following Table 4 presents these issues, which should be addressed by the EU Member States at the national level either by introducing new measures or by better implementing existing ones in their PoM:

**Table 4:** Future issues to be considered related to measures for marine litter.

| Source of Pressure                          | Issues to be addressed  |
|---|---|
| Solid waste                                 | <ul style="list-style-type: none"> <li>✓ <b>Better implementation and enforcement of existing measures and adoption of new measures to reduce plastics</b></li> <li>✓ <b>Adoption of new measures to address the issues of microplastics and nanoplastics</b></li> <li>✓ <b>Adoption of targeted measures specifically addressing the issue of cigarette butts</b></li> <li>✓ <b>Better implementation and integration of measures addressing ship waste</b></li> </ul> |
| Prevention                                  | <ul style="list-style-type: none"> <li>✓ <b>Increase in prevention through awareness raising among the general public (campaigns and initiatives) and among fisheries professional categories</b></li> </ul>  |
| Better knowledge of the marine litter issue | <ul style="list-style-type: none"> <li>✓ <b>Research and monitoring of the impact of marine litter on ecosystem and health (especially microplastic)</b></li> <li>✓ <b>Research and data collection on sources and ways of transportation of marine litter</b></li> </ul>   |

### 3. ANALYSIS OF NATIONAL PLANS OF MEASURES

#### Croatia

The draft PoMs under the MSFD were prepared by Croatia and should be adopted by the end of the year (2016). The public consultation phase was completed in August 2016. The requirement to develop PoMs for the MSFD implementation was combined with the requirement to develop PoMs related to the implementation of the Protocol on Integrated Coastal Zone Management in the Mediterranean (ICZM Protocol). The two PoMs have been developed simultaneously, interactively, and they comprise three groups of measures: common (governance) measures, MSFD measures and ICZM measures. Currently an indicative list of measures is available in English, on which the following short analysis is based.

The MCZMS PoMs is structured around three strategic priorities: 1) improving the operational framework for coordinated management of marine environment and coastal zone; 2) strengthening of capacities to implement management and protection of marine environment and coastal zone; and 3) improving implementation of instruments to achieve good state of marine environment and coastal zone.

Under the first priority, strategic objectives refer to establishment of a system for coordinated and participatory decision making, and improvement of the regulatory framework. Strategic objectives set under the second strategic priority include the establishment of a system to monitor the state of coastal and marine ecosystems and processes, effective information management, identification of priority areas for preservation of marine and coastal biodiversity, improvements in the quality of spatial planning and of environmental and nature impact assessments, and increase in the effectiveness of relevant institutions/ their capacities. Finally, under the third strategic priority, specific objectives refer to implementing instruments for spatial planning documents, maritime domain management, marine litter, fisheries, aquaculture, alien/ invasive species, underwater noise, biodiversity protection, and adaptation to climate change. Significant number of measures deals with data and knowledge gaps and the need for improved governance.

The MCZMS PoMs also lists existing measures relevant for the achievement of GES. NAPs' update for Croatia was performed in parallel to the MCZMS PoMs development, incorporating the new measures developed in line with the requirements of the MSFD and related technical documents, as well as the most relevant existing measures. In addition, NAPs Croatia provide an overview of other measures addressing land-based pollution of the Mediterranean Sea, which are planned or implemented under the following plans/ strategies:

- Strategy of Maritime Development and Integrated Maritime Policy of the Republic of Croatia 2014-2020;
- Water Areas Management Plans 2016-2021;
- Waste Management Plan 2015-2021 (final draft, June 2016).

In regards to the implementation timeline, Croatia's NAPs indicate as a timeline for most measures created within the PoMs of the MCZMS the period 2016-2020. The timeline is in line with the measures timeline set out in the Regional Action Plans of the Barcelona Convention.

- *Crosscutting*: 1 measure is to be implanted by the end of 2016 and 2 measures implemented on a continuous base.
- *Eutrophication*: all measures are to be implemented in the period 2016 -2020
- *Contaminants*: all measures are to be implemented in the period 2016 -2020
- *Marine Litter*: all measures are to be implemented in the period 2016 -2020

Measures which were contained in the Water Areas Management Plans and the Waste Management Plan will respect the timeline foreseen in the relevant plans, as indicated above.

The following Table 5 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report:

**Table 5:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of Croatia.

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | 9                 | 14           |
| D8 and D9 Contaminants | 6                 | 3            |
| D10 Marine Litter      | 11                | 9            |

*Eutrophication*: The issue might be addressed in a more effective way if in addition to the current general measures, some more specific ones regarding wastewater management were adopted, addressing the need of secondary and tertiary treatment, agricultural and industrial run off should be addressed as well through ad hoc measures aiming at reducing use of fertiliser and chemicals, promote organic farming and increase the use of EFAs.

*Contaminants*: Measures addressing wastewater management, promotion of secondary and tertiary treatment are needed to integrate the general measures addressing D5. Stormwater separation could also be addressed through specific measures in the PoMs. Measures directly addressing Solid Waste Management would be advisable. Measures regarding the issue of the definition and assessment of the effects of new contaminants would be a valuable addition to the PoMs.

*Marine litter*: The adoption of a National Plan on Marine Litter management is included among the new measures presented in the PoMs, as well as measures introducing a

collection of marine litter system and an assessment of the impact of marine litter in terms of health and ecological preservation. While an extensive and effective implementation of these measures might be sufficient to address the problem, some measures designed to address specific problems, such as reduction of plastic bags or cigarettes butts are recommendable as well. Measures directed at controlling ship induced solid pollution would also be advisable.

## Cyprus

Cyprus has prepared its PoMs for the period 2016-2020 following the cycle established by the MSFD. The following assessment is based on the recommended PoMs available to the public as of November 2016 and takes into account the measures it contains.

The MSFD PoMs were prepared by the Department of Fisheries and Marine Research following public consultation procedures. The process was finalised by the end of 2015/beginning of 2016. The PoMs contains 68 measures (existing and new) structured around 11 MSFD descriptors, as well as those relevant for cross-cutting issues (such as environmental assessments, ICZM). The main causes of pressures targeted by new measures included in the PoMs are aquaculture, fisheries, non-indigenous species, desalination, gas and oil platforms, and waste/ marine litter. For marine litter, a number of measures agreed upon during Coordination and Alignment Meetings (CAMs) of the ARCADIS MSFD Support Project are included.

For the purpose of NAPs' update, National Baseline Budget (NBB) has been developed to assess total quantities of pollutants released into the Mediterranean Sea from land-based sources and activities in 2013. Municipal wastewater, municipal solid waste, marine litter, urban and industrial pollution, substances that are toxic, persistent and liable to bioaccumulation (TPB), POPs from industrial installations, PCBs, dioxins/furans, heavy metals, organohalogenes, radioactive substances, nutrients and suspended solids, and hazardous wastes have been identified and assessed as sectors/ substances relevant for the NBB and the NAPs.

Hotspots and sensitive areas analysis (2013) has been undertaken in order to detect areas with high levels of pollution loads originating from municipal or industrial sources and to define coastal areas and marine environment that are subject to pollution from one or more point or diffused sources on the coast of the Mediterranean with potentially significant adverse impacts on human health, ecosystems, sustainability or economy.

NAPs' measures were selected from the PoMs to achieve GES for EOs 5, 9 and 10 and in line with the findings of the NBB and hotspots assessment.

In regards to the implementation timeline, the measures should be implemented by 2018-2020. There is no other specific timetable for implementation.

The following Table 6 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report:

**Table 6:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of Cyprus.

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | <b>6</b>          | <b>1</b>     |
| D8 and D9 Contaminants | <b>7</b>          | <b>0</b>     |
| D10 Marine Litter      | <b>1</b>          | <b>5</b>     |

*Eutrophication:* Cyprus waters are considered in GES in regard to eutrophication. Existing and new measures cover the different aspects of this issue extensively and just require a complete and effective implementation to guarantee the preservation of the current situation.

*Contaminants:* The marine waters of Cyprus appear to be in GES regarding contaminants. Full implementation of the measures already existing in the field is advisable to ensure an effective monitoring of the situation and possible response in case of accidents. Measures aimed at researching and defining new kind of contaminants, which would allow a better preparation in the event of negative evolutions in this sense in the future could be taken into consideration.

*Marine Litter:* The issue of Marine Litter has been addressed through the measure adopting a National Plan, an existing measure which will need a stronger implementation and follow up effort. New measures have been adopted, specifically addressing the problem of lacking public awareness regarding this problematic. Measures directed at the organisation of collection and cleaning initiative are also present. It might be advisable to develop measures targeting a specific kind of marine litter, such as cigarettes butts and plastic bags, as well as the adoption of measures focusing on researching the major sources and transportation methods of marine litter, in order to address the lack of data on the incidence of marine litter pollution in Cyprus waters.

## France

France has developed its PoMs for the Mediterranean sub-region according to the MSFD cycle steps and in the foreseen timeline. The MSFD has been transposed into law in the Environment Code. It applies to waters around the French mainland, which are subdivided into four marine sub-regions: the English Channel – North Sea, Celtic Seas, Bay of Biscay, and Western Mediterranean Sea. The Programme of Measures was prepared in 2015 and approved in 2016.

As a part of the PoMs, 63 additional measures have been proposed to achieve environmental targets for the Western Mediterranean marine sub-region, encompassing various modes of action (legislative, technical, economic, policy). Out of this number, 32 measures are proposed to achieve environmental targets related to environmental status and they refer to protection of sea floor ecosystems, deep sea habitats of submarine canyons, fisheries resources in the Gulf of Lion and coastal zones, marine mammals and seabirds. The PoMs also includes 19 measures aiming to achieve environmental targets related to pressures and impacts. These primarily refer to reduction of chemical contamination and waste/ litter in marine waters and include the following main groups of measures:

- continuation and reinforcement of measures for storm water management and wastewater treatment in coastal towns and built-up areas;
- assessments and technical measures to reduce discharges from ports (hull cleaning and ship repair areas, toxic waste);
- assessment followed by an action programme on contaminants input from the main watercourses;
- complementing waste management plans, developing best practices guides for managing and disposing of waste in the coastal zone;
- developing special fisheries operations to collect waste;
- installing recovery and recycling systems in ports adapted to the litter collected by fishermen;
- research on toxicity and impacts of microplastics;
- other measures to strengthen/ expand existing measures (e.g. facilities to collect hydrocarbon residues and hazardous substances, town protection plans in the framework of marine pollution contingency plan, etc.).

As regards invasive non-indigenous species, regulatory measures (e.g. establishing a list of marine species whose introduction into the marine environment should be prohibited) and improvements in ballast water management are envisaged.

Finally, 12 measures are proposed to achieve cross-cutting environmental targets, addressing research and development/ knowledge gaps, strengthening of legal instruments to regulate and supervise maritime activities, international cooperation, and information and raising awareness.

During the NAPs Meeting held in October 2016 in Marseille, the relevant content of the PoMs, a number of measures titled “NAPs Measures” was presented. This section of the French PoMs encompasses 8 national and four regional (of relevance for the Mediterranean) EO9 and EO10 measures, derived from the PoMs. Regional measures refer to development of master plans for sanitation/ rainwater management (as an existing measure that needs strengthened implementation), as well as assessment of inputs of contaminants and litter through the five main watercourses (to be followed with appropriate action programmes), municipal plans to protect from sea-based pollution, and research on the impacts of micro-plastics. The NAPs also highlights the need to strengthen prevention and management of waste based on the principles of circular economy.

The following Table 7 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report:

**Table 7:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of France.

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | N.A.              | N.A.         |
| D8 and D9 Contaminants | 8                 | 6            |
| D10 Marine Litter      | 8                 | 5            |

*Eutrophication:* Measures addressing Eutrophication are present in the PoMs indirectly in the context of the “Objectif F”, which deals with the reduction of contaminants in the Mediterranean waters more generally.

*Contaminants:* France’s PoMs for the Mediterranean Sub-region addresses the main sources of pressures regarding contaminants extensively. Wastewater Management, Aquaculture, Solid Waste Management, Stormwater management are all taken into account by new and existing measures, which will just need to be implemented effectively. The issue of new contaminants might be addressed through the development of measures harmonizing the data in this area at the transnational level,

*Marine Litter:* The issue of marine litter is addressed extensively by the adopted measures in its different aspects. Additional measures aimed at promoting public awareness of this issue and increasing participation in its resolution at the level of general public are recommendable.

## Greece

Greece is in the process of developing its Programme of Measures according to the MSFD. The following assessment is based on an available proposal of measures, prepared with the support of the UNEP/MAP Secretariat to be adopted for the PoMs. As one of the ActionMED project’s evolved countries that have not yet completed the MSFD PoMs, Greek stakeholders and policy-makers were supported in the frame of the project, with the elaboration of concrete and applicable measures for Descriptors 5, 8/9 and 10.

The assistance was mainly delivered through the ISOTECH’s desk review of the PoMs of other Mediterranean countries (Cyprus, Slovenia and Spain) and compilation of the



lists of measures included in these PoMs to inform competent authorities and serve as a reference in drafting the Greek PoMs, as well as a list of measures included (i.e. already implemented, planned to be implemented or proposed) in European or national legislation and/or national action plans and strategies that was compiled with the assistance by a UNEP/MAP consultant. The list of suggested possible measures was further reviewed and refined during a national workshop<sup>9</sup> with relevant Greek stakeholders, which was organised by ISOTECH and was hosted in UNEP/MAP's premises in Athens, in the framework of the ActionMed Activity 3. All this work and consultations led to the preparation of a report entitled "MSFD – EcAp National Medium and Long-term Action Plans" - Evaluation of possible measures at national level (Greece),<sup>10</sup> accompanied by two supplements<sup>11,12</sup> identifying measures for biodiversity and pollution related descriptors. Assistance was also extended to the MSFD competent authority to facilitate socio-economic assessment of measures (overall advices were provided and a pilot assessment carried out for a selected measure). An outcome of the work on socioeconomic assessment is also annexed to the present report (Annex II). Finally, based on the information provided for by the aforementioned reports and studies, a specific Action Plan was developed for the elaboration of Greek PoMs (See section 6 on Action Plans, this report).

In regards to the implementation timeline, precise information is still not available as the PoMs are still in the development phase.

The analysis on Greek PoMs below has been based on the report developed in the framework of the ActionMed Activity 3, setting a list of suggested measures (Annex II).

The following Table 8 shows the ratio of existing and new measures in the list of proposed measures to be included in the PoMs:

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<sup>9</sup> See ActionMed Deliverable D3.4 (b): Report for the Greek National Stakeholder Workshop

<sup>10</sup> Caparis M., 2016a. ActionMed Deliverable 3.8A: "MSFD – EcAp National Medium and Long-term Action Plans" - Evaluation of possible measures at national level (Greece), December 2016, 87p.

<sup>11</sup> Caparis M., 2016b. ActionMed Deliverable 3.8A (Supplement A): Identified measures for pollution and marine litter MSFD Descriptors in Greece, November 2016, 22p. <https://cloudfs.hcmr.gr/index.php/s/qw9WXHICsk4o4G0>

<sup>12</sup> Caparis M., 2016c. ActionMed Deliverable 3.8A (Supplement B): Identified measures for biodiversity MSFD Descriptors in Greece, November 2016, 28p. <https://cloudfs.hcmr.gr/index.php/s/bpSGfpM0BKnx3M>

**Table 8:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of Greece.

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | <b>13</b>         | <b>9</b>     |
| D8 and D9 Contaminants | <b>36</b>         | <b>5</b>     |
| D10 Marine Litter      | <b>26</b>         | <b>0</b>     |

*Eutrophication:* The proposed programme of measures covers extensively the sources of pressure in the field of eutrophication, taking into account needs linked to WWT, agriculture and industrial chemical run offs, impact of aquaculture. The measures developed, especially those existing but not yet implemented (a relevant number according to the available list) will need to be strengthened and implemented effectively. Measures entailing an improvement in cooperation at the transnational level could be advisable.

*Contaminants:* The proposed measures cover widely issues linked to WWT, oil pollution, pollution in case of accident and disasters, solid waste management. Measures aiming at the separation and management of storm water could be added to the plan, as well as measures with a focus on researching, assessing and defining new contaminants and their possible impact.

*Marine Litter:* While measures addressing the management and collection of marine litter are addressed in the proposed PoMs widely, some more specific measures aimed at the reduction of specific and particularly common types of marine litter, such as cigarettes butts and plastic bags should be added to the plan. Measures researching the production, transportation and impact of marine litter is also advisable. Finally, it would be important to focus on an increase in public awareness regarding this issue, both among the general public and fishermen. Measures promoting awareness campaign and even cleaning and collection initiatives could be added to the PoMs.

## Italy

Italy has prepared its Programme of Measures throughout 2016 and the PoMs are currently undergoing the process of Public Consultation according to the MSFD cycle provisions. The following assessment is made on the basis of the measures which were made public for the purpose of the Public Consultation.

The implementation of the measures is done, according to the Italian legal system, on a regional basis. This makes difficult to identify a common timeline for implementation at the national level.

The following Table 9 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report:

**Table 9:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of Italy.

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | 4                 | 0            |
| D8 and D9 Contaminants | 9                 | 0            |
| D10 Marine Litter      | 5                 | 2            |

*Eutrophication:* Italy has not adopted new measures in regards to Descriptor 5, as the Gap Analysis they conducted didn't find the need to add new measures to the existing ones. The existing measures cover the needs linked to WWT, agriculture chemical run offs and fertilizers, organic farming promotion, aquaculture management. Transnational cooperation and harmonization of data for the sake of a more efficient exchange of information might be achieved through the adoption of ad hoc measures.

*Contaminants:* No new measures have been adopted in the PoMs regarding contaminants. While measures regarding WWT, Solid Waste Management and aquaculture are present in the PoMs and only need to continue to be implemented effectively, it would be useful to develop measures addressing the management and separation of stormwater, which contributes significantly to the issue of contaminants in the marine waters.

*Marine Litter:* Some new additional measures have been adopted by Italy to address gaps identified through the gap analysis on the existing measures. The new measures complement the existing ones on the issue of the marine litter collection. As a whole, the measures cover the pressure sources quite extensively, touching upon the need to raise awareness, as well. Possible measures to develop and add to PoMs could focus on researching and analysing the impact and effects of marine litter on the marine environment and human health, especially in regards to microplastics.

## Malta

Malta had not adopted its PoMs (until the completion of this deliverable or the end of project – January 2017) under the MSFD - public consultation was expected to start by the end of 2016. However, the 2nd Water Catchment Management Plan for the Malta Water Catchment District 2015-2021 contains a number of relevant measures which could contribute to the implementation phase of the MFSD. The following assessment

takes into account measures contained in the WCMP, since MSFD PoMs were not in place.

The main issues of significance for the coastal water management recognised in this document are:

- Poor chemical quality of Malta coastal waters (issues of concern: nutrient enrichment, mainly contained to bays and port areas; occasional sediment contamination with PAHs; high concentrations of some trace metals; mercury; knowledge gaps);
- The need to enhance knowledge on the sources of certain contaminants of concern and hydrographical characteristics of the marine environment beyond Malta shores (pollution sources, trans-boundary pollution, sea currents and mixing of waters, emerging contaminants);
- The need to control and investigate cumulative impacts.

Actions proposed to address these issues include:

- Continue with on-going efforts to regulate industrial discharges;
- Continue efforts to improve agricultural practices and waste management at farm and national level;
- Prevent unauthorized discharges to the sea;
- Targeted public awareness campaigns on the appropriate disposal of chemicals and chemical containers;
- Qualify the role of sub-catchments as major pathways of contaminant transportation to the immediate coastal environment;
- Launch an investigative monitoring programme for certain contaminants of concern, such as mercury;
- Investigate sources of contaminants in the Mediterranean by looking at case studies and by participating in the regional cooperation process of the Marine Strategy Framework Directive;
- Set up a watch list mechanism to monitor certain emerging substances identified at EU level that could potentially be of concern;
- Carry out a survey of all discharges to sea and identify their source, with the objective of setting out a plan to curtail or regulate such discharges.

The following Table 10 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report (N.A. since described measures above are not from MSFD PoMs):

**Table 10:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoMs of Malta (N.A.: Not available).

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | N.A.              | N.A.         |
| D8 and D9 Contaminants | N.A.              | N.A.         |
| D10 Marine Litter      | N.A.              | N.A.         |

*Contaminants:* Pressure issues causing contaminant pollution in the marine waters are addressed under several aspects in the measures contained in Malta's WCMP. Measures addressing the necessity to research, define and assess new contaminants affecting the Mediterranean could be introduced in addition to the existing ones. Measures addressing transnational cooperation and data sharing are also advisable. An effective and coordinated implementation of the measures is particularly recommended.

*Marine Litter:* Measures addressing the issues of marine litter in its different aspects are widely included in the WCMP, both regarding marine litter prevention and collection, and the need to increase public awareness of the problem. Measures aimed directly at specific and particularly detrimental kinds of marine litter, such as plastic bags or cigarettes butts, could be useful. Measures addressing specifically the diffusion of micro plastic and its effects would also be valuable.

## Slovenia

Slovenia has prepared PoMs according to the steps of the MSFD, integrating existing and new measures. The PoMs is in the process of public consultation, in order to be approved. It was expected that the process was going to be completed by the end of 2016, however until the completion of this deliverable or the end of project – January 2017, the process was not finalised. However, as a part of the NAP preparation process, potential hot spots and sensitive areas have been assessed, based on updated criteria and methodology (UNEP(DEPI)/MED WG. 404/7), leading to identification of two sensitive areas. The following types of measures have been considered for inclusion in the NAPs:

- Measures to reduce pollution from land based sources, agriculture area;
- Measures to prevent and reduce impacts of maritime transport;
- Measures to prevent and reduce trans-boundary impacts;
- Implementation of common plans for sea-based accidental pollution;
- Revision of maritime traffic security and rescue plan at national level and harmonized at regional level;
- Reorganisation and optimization of Service for the protection of coastal waters;
- Preparation of guidelines to mitigate the impact of urbanization and extensive agriculture land use;
- Preparation of measures to reduce the impact of TBT (Tributyltin) and improve water quality;
- Measures to prevent and reduce marine litter pollution from land based and sea-based sources;
- System for disposal or treatment of existing marine waste.

Slovenia indicated timeline is in line with the measures timeline set out in the Regional Action Plans of the Barcelona Convention.

- *Eutrophication*: 1 measure is to be implemented by 2019 and one other by 2021
- *Contaminants*: 1 measure to be implemented in the period 2016 – 2017, 1 in the period 2016-2018, 2 in the period 2017 – 2020 and 1 in the period 2017 -2021
- *Marine Litter*: 1 measure is to be implemented in the period 2016 -2020 and 1 in the period 2017 - 2021

The following Table 11 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report (N.A. since described measures above are not from MSFD PoMs):

**Table 11:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoM of Slovenia (N.A.: Not available).

|                        | Existing Measures | New Measures |
|------------------------|-------------------|--------------|
| D5 Eutrophication      | N.A.              | N.A.         |
| D8 and D9 Contaminants | N.A.              | N.A.         |
| D10 Marine Litter      | N.A.              | N.A.         |

*Eutrophication*: The PoMs address the main pressure sources concerning WWT and agricultural and industrial runoffs. The former measures especially will require an effort to ensure an efficient and complete implementation. It would be useful to consider the addition of measures addressing the development of coastal cities infrastructures and taking into account future major demographic changes. Measures entailing an improvement in cooperation at the transnational level could be also strongly advisable.

*Contaminants*: Contaminants are addressed extensively by new and existing measures in Slovenia’s PoMs. Stormwater separation might be further addressed by additional measures to add to the PoMs. Measures regarding the issue of the definition and assessment of the effects of new contaminants would also be valuable.

*Marine Litter*: The issue is addressed extensively by the list of proposed measures, with regard to marine litter prevention and collection. Measures directly addressing Solid Waste Management could be advisable. Some specific measures aimed at increasing public awareness and increased involvement of the general public, as well as fisheries professional is strongly advisable. Research on the sources, diffusion and impact on health and environment in regard to Marine Litter should also be considered.

## Spain

The MSFD was incorporated into Spanish legislation by means of Law 41/2010 on the protection of the marine environment. The Spanish marine environment is divided into 5 marine subdivisions (MD), taking into account the hydrological, oceanographic and bio-geographical characteristics of each area: north Atlantic MD, south Atlantic MD, Estrecho and Alborán MD, Levantine-balearic MD and Canary MD. For each of them a marine strategy has been developed. The Programme of Measures regarding the Mediterranean, as all the others, has been prepared during 2015, taking into account and integrating all the relevant measures adopted under other policies, connected to similar issues, and adding new, when necessary according to the preliminary Gap analysis conducted. The implementation of the PoMs has started in 2016 and it is valid for the period 2016-2020.

The PoMs is structured around nine themes: seven themes related to the eleven descriptors, and two additional themes – marine protected areas and horizontal, crosscutting measures (covering governance, coordination among public administration bodies, public participation, training, awareness raising, etc.). The nine PoMs themes are:

- Biodiversity (Descriptors 1, 4, and 6)
- Non-indigenous species (Descriptor 2)
- Commercially exploited species (Descriptor 3)
- Eutrophication, Contaminants and their effects, and Contaminants in fish and other seafood (Descriptors 5, 8, and 9)
- Permanent alteration of hydrographical conditions (Descriptor 7)
- Marine litter (Descriptor 10)
- Underwater noise (Descriptor 11)
- Marine protected areas
- Horizontal measures

Altogether, 95 new measures are included in the PoMs, with about half of them elaborated for biodiversity and marine litter themes.

Spain has not submitted NAPs for pollution related ecological objectives to the Barcelona Convention in a form distinct from the PoMs. During the NAPs meeting in October 2016, the country representative assessed that there was a high level of coherence between the approach and steps suggested in the NAPs update Guidelines 13, and those applied under the MSFD.

Spain has indicated the period 2018 – 2021 as the implementation timeline for most measures present in its list. The timeline is in line with the measures timeline set out in the Regional Action Plans of the Barcelona Convention.

- *Eutrophication and Contaminants*: 5 of the measures are to be implemented by 2016 and 3 in 2017.

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<sup>13</sup> UNEP(DEPI)/MED WG.404/7

- *Marine Litter*: 13 of the measures are to be implemented by 2016, 3 by 2017, 6 by 2018, 1 by 2019 and 1 by 2021.

The following Table 12 shows the ratio of existing and new measures in the PoMs for each of the Descriptors relevant for this report:

**Table 12:** Number of new and existing measures concerning D5, D8 and 9, D10 in the PoM of Spain.

|   | Existing Measures | New Measures |
|---|-------------------|--------------|
| D5 Eutrophication and D8 –D9 Contaminants | <b>64</b>         | <b>9</b>     |
| D10 Marine Litter                         | <b>32</b>         | <b>25</b>    |

*Eutrophication and contaminants*: The new and existing measures cover extensively the pressure sources causing eutrophication and just need to be implemented accordingly in an effective way. Existing measures derive mainly from those contained in the river basin management plans. The proposals of new measures are designed to address the offshore aspect of the descriptor in greater detail, dealing with the pressures most closely related to activities at sea.

*Marine Litter*: all the relevant issues are addressed extensively by the measures contained in the PoMs, with a focus on the source of the marine litter, the need to research and learn more about micro-plastics and its effects, as well as on the importance of public awareness and involvement in the resolution of this issue. The new measures are the product of an exercise to design and implement the OSPAR and Barcelona Regional Action Plans on marine litter, adapted to the peculiarities of the Spanish marine subdivisions. Therefore, this proposal of programmes of measures will also be the main tool for the application of these two Regional Action Plans in the Spanish marine environment.



#### 4. THE POM'S CONTRIBUTION TO THE BARCELONA CONVENTION FRAMEWORK

As already mentioned, under the MSFD, the EU Member States are required to prepare PoMs including existing and new measures relevant to achieve the GES. In order to avoid duplication of work and reporting, it was agreed in the course of NAPs preparation meetings that the countries which have prepared PoMs would not have the obligation to prepare separate NAPs, as long as the adopted PoMs take into account the provisions of the MAP Barcelona Convention system and are sufficient to respond to the commitments undertaken by its Contracting Parties for the ecological objectives 5, 9 and 10. Accordingly, Croatia, Cyprus and Slovenia have submitted their NAPs to the Barcelona Convention, with some adjustments (compared to the PoMs) to take into account certain specific characteristics of the country and NAPs-specific tools (i.e. National Baseline Budget of pollutants, hot spots assessment). Other countries have not prepared and submitted adapted versions of their PoMs as NAPs, but kept them in their original form because of their assessment of a high level of coherence between the process of preparation and the format conducted according to MSFD and the approach proposed by the NAPs update Guidelines<sup>14</sup>.

With regards to the Contracting Parties, which are EU Member States and are not preparing separate NAPs, the main issue concerns the different timelines followed by the different EU Member States. While most of the updated NAPs have been submitted by the COP 19 held in February 2016, the adoption of most PoMs is only concluding at the present time, at the end of 2016. In a few cases the PoM's proposal has still not been completed creating a relevant difference in the timeframe of the NAPs among Barcelona Convention's Parties.

On the overall, the two processes of adoption of the PoMs and of update of the NAPs across the Mediterranean region has been very much streamlined. The majority of measures common to most of EU Member States' PoMs and non EU countries' NAPs were adopted in line with the provisions set out in the Regional Action Plans and SAP/MED. On the other hand, measures regarding Waste Water Management infrastructures and contaminant reduction investments were not included in the lists of new measures prepared for the EU Members States PoMs, as similar measures were already adopted inside previous policies and national plans in response to the Water Framework Directive<sup>15</sup>.

The PoMs adopted by the EU Member States can contribute to the advancement of the instruments under the Barcelona Convention framework on several accounts. Notably,

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<sup>14</sup> *NAP update Guidelines*, UNEP(DEPI)/MED WG.404/7, 2015

<sup>15</sup> Markovic M. and T. Hema, 2016. ActionMed Deliverable D3.3: "Action Plan on Implementing the PoMs and the NAPs by integrating regional and MSFD requirements, and ActionMed Deliverable D3.7: "Medium and Long-term Regional PoMs Action Plan", December 2016, 79p.

on the following points the EU Member States formulation could open the way for all Barcelona Convention CPs to innovate:

- Measures adopted by EU Member States, which still have found no place in the other Barcelona Convention CP's NAPs concern marine litter especially; several of them entailed cleaning and collection of litter initiatives or targeted the issue of public and professional awareness through information campaigns. Those issues are still largely overseen in the NAPs.
- Existing measures adopted by EU Members under the Water Framework Directive and the Waste Framework Directive regarding the collection and treatment of wastewater and solid waste and their implementation can provide a useful point of reference for non EU Members, which still have relevant gap on this account.
- While the UNEP/MAP Barcelona Convention Secretariat has strongly encouraged the Contacting Parties that are non – EU member states to conduct a socio – economic assessment of measures in preparation of their NAPs and 9 out of the 11 countries have done so, if with different approaches and depth (the same can be said of EU Member States), the study conducted by Plan Bleu under this same Activity 3 of the ActionMed project on this issue shows how the EU countries experience can be a useful tool in the future for the entirety of the Barcelona Convention Parties, to support the undertaking of socioeconomic assessments of selected measures in a coherent and coordinated manner by all the CPs.
- The legally binding nature of the PoMs and the advantages of this legal value in term of implementation, as well as the process which leads the EU countries to adopt them as legal act is of interest for many non EU countries, which are searching for means to ensure a higher effectiveness of their NAPs and a more punctual implementation of the measures.

The points of contact between the two, as well as those areas where the MSFD has provided the EU Member States with the opportunity to adopt innovations, both in the adoption process and in the measures content, have the potential to ensure the productivity of the next policy making cycle of updating of both the PoMs and the NAPs.

## 5. IDENTIFICATION OF COMMON PRIORITY MEASURES AMONG POMs AND NAPs

In 2015, the Contracting Parties to the Barcelona Convention updated their NAPs with the view to achieve good environmental status through implementation of the commitments of the regional plans and SAP-MED. In the “Synopsis of updated NAPs: Hotspots, sensitive areas, targets, measures, indicators and investment portfolio”<sup>16</sup>, prepared for the NAPs meeting held in October 2016 in Marseille, an assessment was undertaken of the updated NAPs, in order to identify the way forward in terms of best means of implementation. The analysis was conducted by establishing cross-links of “common” aspects with regards to the NAPs operational targets, priority investment measures and their interlinkages with project fiches, hotspots’ status, and performance indicators.

The document identified seven common operational targets for the three ecological objectives (EO5 ‘eutrophication’, EO9 ‘pollution’ and EO10 ‘marine litter’) and examined the timeline for project implementation regarding projects linked to the above mentioned targets.

Based on this, nine common priority investment measures were identified for the three ecological objectives. These included:

- Municipal wastewater collection systems (EO5);
- Municipal wastewater treatment facilities (EO5);
- Industrial wastewater treatment facilities (EO9);
- Hazardous waste landfill facilities (EO9);
- Remediation of contaminated industrial sites (EO9);
- Municipal solid waste collection system (EO10);
- Municipal solid waste landfill facilities (EO10);
- Strengthening of existing waste collection and disposal systems (EO10);
- Closure of illegal waste dumps (EO10).

As already mentioned, the PoMs of EU Members States presented some relevant differences from NAPs mainly regarding measures, which were already introduced under the obligations of the Water Framework Directive and the Waste Framework Directives, notably measures addressing WWT and SWM. However, comparing the list of measures from PoMs (in their different forms available in English), with the operational targets identified by the aforementioned analysis, a number of priority measures, common to most PoMs as well as NAPs could be identified.

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<sup>16</sup> UNEP(DEPI)/MED WG.426/3\*1

The operational targets identified in the analysis and used as a point of reference to identify common priority measures for both NAPs and PoMs were for ecological objective:

- EO5: two common operational targets defined in relation to wastewater collection and treatment for agglomerations in excess of 2000 inhabitants, and reduction of discharge of BOD to water bodies.
- EO9: a single target defined with regards to discharge/ emissions of hazardous substances from industrial plants and application of BAT/BEP to dispose wastes in a safe manner.
- EO10: four operational targets established in relation to collection of solid waste, construction of municipal landfills, adoption of waste reduction, sorting, recycling, recovery and reuse measures, regulation and reduction of fraction of plastics, and closure of illegal solid waste dumps.

The priority measures identified, taking into consideration the 9 listed above, among those which were present in some form in at least 5 out of 8 available list of measures from European countries were:

- a. Industrial wastewater treatment facilities (EO9)
- b. Hazardous waste landfill facilities (EO9)
- c. Remediation of contaminated industrial sites (EO9)
- d. Municipal solid waste collection system (EO10)
- e. Strengthening of existing waste collection and disposal systems (EO10)
- f. Closure of illegal waste dumps (EO10)

To ensure that the implementation of the common measures happens, in the future, in a coordinated manner between all the Contracting Parties to the Barcelona Convention (EU and non-EU member states) a number of actions are recommendable:

- An integrated assessment system of the implementation process at national and regional level, with consequent information sharing aimed at refining the measures and implementation system
- Increased organisation of information exchange forums at regional level, focused on specific priority measures and their implementation in order to share best practices
- Adoption of instruments to facilitate cooperation among countries in the implementation process, such as data banks on specific issues
- Increase of knowledge transfer among countries by facilitating cooperation on strengthening capacities and exchanging qualified personnel
- Endorsement of the common priority measures and the descending coordination needs by COPs.

Generally speaking, a coordinated implementation of the priority measures and more widely, a stronger cooperation between the EU Member States and Non EU Countries in the effort of preserving the Mediterranean Sea and region's ecosystem requires enhanced information sharing, know how exchange and common capacity building.

## 6. ACTION PLANS TO ALIGN THE IMPLEMENTATION OF MEASURES UNDER THE MSFD AND THE BARCELONA CONVENTION

In the framework of the Barcelona Convention the PoMs on descriptors related to pollution and marine litter (D 5, 8, 9, 10), similar to ecological objectives 5, 9, and 10 have been prepared through the NAPs for the Contracting Parties to the Barcelona Convention, which are not Member States of the EU, streamlining the regional provisions set out by the Convention, its Protocols and Regional Plans. For the rest of the Contracting Parties that are EU Member States, the PoMs developed in the framework of the MSFD cover all the provisions of the Barcelona Convention, which fall under the scope of the MSFD, excluding the Areas Beyond National Jurisdiction (ABNJ), as well as the coastal protection and the issue of sea-coast interaction.

The fact that the PoMs under the MSFD have included existing measures is very positive, because they incorporate all the measures that have been taken under other relevant EU Directives (Water Framework Directive, Waste Framework Directive etc.) with regards to pollution and litter related descriptors.

In terms of timeline, there is a full alignment of the MSFD PoMs with the regional measures adopted in the framework of the Barcelona Convention related to descriptors 5, 8, 9 and 10. The analysis of measures has shown that there is a number of common measures and with regards to their implementation every effort should be made for enhanced collaboration and coordination at subregional and regional levels.

Under the MSFD PoMs, there are important new measures with a high potential impact in achieving GES, as well as a very good potential for replication at regional/subregional levels, taking also into account the socioeconomic benefits, which don't appear in all of the NAPs of the Contracting Parties to the Barcelona Convention that are not EU Member States. This can be attributed partly to the fact that there are no regional measures, at the level of the Barcelona Convention, addressing the aforementioned national measures and partly to the lack of capacities at country level to design and implement such a package of new measures, that are provided for in the MSFD PoMs of the Contracting Parties to the Barcelona Convention that are EU Member States.

In this respect, the following are recommended:

- In the framework of UNEP/MAP - Barcelona Convention, the conditions should be created to ensure and strengthen collaboration between all the Contracting Parties for the implementation of common measures from now until 2025.
- UNEP/MAP - Barcelona Convention should consider developing, as appropriate, additional new/updated regional/ subregional measures to achieve and/or maintain GES, based on the concrete national measures developed under the MSFD PoM that would inspire the other Contracting Parties to consider them in the future. This should cover not only measures addressing pollution and litter,

but also other descriptors, that have strong potential for replication at regional/subregional levels as appropriate.

A detailed Action Plan for the development of a set of new/updated measures at regional/subregional levels is presented in the ActionMed Deliverable D3.3: “Action Plan on Implementing the PoMs and the NAPs by integrating regional and MSFD requirements, and ActionMed Deliverable D3.7: “Medium and Long-term Regional PoMs Action Plan” (Markovic, 2016).

Following is an MSFD - EcAp National Medium and Long-term Action Plan (Deliverable D3.8).

Furthermore, since Greece was the only country supported through the Project Activity 3 in the development of the national PoMs, it was considered relevant to include in this report (ANNEX II, see below) the Action Plan for the development of Greek PoMs, which was developed on the basis of the work undertaken in the framework of the Activity 3 (Caparis M., 2016a. ActionMed Deliverable 3.8A: “MSFD – EcAp National Medium and Long-term Action Plans” - Evaluation of possible measures at national level (Greece), December 2016, 94p.), as well as the outcomes and report of the national workshop on Greek PoMs, Athens, Greece, October 2016 (Orthodoxou *et al.*, 2016. ActionMed Deliverable 3.4b: “Report from the Greek National Stakeholder Workshop: Towards the definition of Programmes of Measures for achieving GES for Greece, 57p).

- MSFD - EcAp National Medium and Long-term Action Plan**

The overall objective of this Action Plan is to further streamline the PoMs and NAPs with regards to measures for pollution and marine litter related descriptors, focusing on the establishment of conditions at regional level to support more Contracting Parties, especially those which are not EU Member States, to adopt innovative measures and solutions appearing in certain PoMs and undertake socioeconomic assessment of selected measures.

| Gaps   | Solutions  | Actions   | Timeline  | Actors involved  |
|--|--|---|-----------|--|
| Some MSFD PoMs present innovative measures and solutions for pollution and marine litter related descriptors that don't appear in the NAPs | Adoption of new / updated regional measures at UNEP/MAP level, (for innovative national PoMs measures with a strong potential for replication at regional – subregional levels)  | Follow the specific actions for the development and adoption of a list of new/updated regional measures, as described in the Deliverable D3.7:<br>Presentation of a list of proposed measures to the MED POL Focal Points Meeting for refinement – submission of a revised list to the MAP FP Meeting through the EcAp Coordination Group – feasibility studies for selected measures – mandate given by COP21 for elaboration of concrete measures - adoption of new/updated measures by COP22 | 2017-2021 | UNEP/MAP EcAp Coordination Group MED POL Focal Points MAP Focal Points Contracting Parties |
|  | Capacity building in Contracting Parties, which are not EU MSs to design and implement innovative measures and solutions   | The UNEP/MAP and Horizon 2020 PoW is recommended to include activities to strengthen capacities at national level and enhance coordination and sharing of best practices for the elaboration and implementation of new innovative measures to achieve GES   | 2017-2021 | UNEP/MAP H2020 Contracting Parties   |
| Lack of socioeconomic assessment of measures in most of the NAPs   | Support the Contracting Parties to the Barcelona Convention that are not EU MS to undertake socioeconomic assessment of measures and use CEA/CBA/MCA and fill the knowledge gaps | UNEP/MAP and H2020 PoW, as well as concrete Projects to support and ensure:<br>Sharing of best practices;<br>Regional/subregional cooperation;<br>Financial support;<br>Transfer of knowledge   | 2017-2021 | UNEP/MAP H2020 Contracting Parties EU  |

- **Action Plan for the development of Greek PoMs**

| Gaps                                  | Solutions   | Actions  | Timeline | Actors involved   |
|---------------------------------------|---|--|----------|---|
| Greece hasn't developed national PoMs | Elaboration of a list of potential relevant measures to achieve GES, based on existing measures and the outcomes of the work undertaken in the framework of ActionMed Activity 3 by the national consultant and ISOTECH | Categorization of the existing Greek measures identified by the ActionMed Consultant, as concerns the status of implementation (fully implemented / not fully implemented / not implemented)   | 2017     | Ministry of Environment and Energy, Ministry of Rural Development and Food, Ministry of Shipping and Island Policy, local authorities, Scientific and research institutions |
|                                       |   | Preparation for reporting of the measures identified through assignment under Key Types of Measures  | 2017     | Ministry of Environment and Energy  |
|                                       |   | Incorporation of the results of the ActionMed National Workshop regarding measures considered as the most implementable and executable for Eutrophication, Contaminants and Marine Litter (D5, D8/D9, D10) (Deliverable D3.4.b), taking also into account the results of the subregional workshop (Deliverable D3.4.c) | 2017     | Ministry of Environment and Energy, Ministry of Rural Development and Food, Ministry of Shipping and Island Policy, Local authorities, Scientific and research institutions |
|                                       |   | Incorporation of the measures for Biodiversity Descriptors identified in the document "Supplement B: Identified measures for Biodiversity Descriptors" prepared by the ActionMed Activity 3 national consultant  | 2017     | Ministry of Environment and Energy, Ministry of Rural Development and Food, Local authorities Scientific and research institutions  |
|                                       |   | Selection of measures for the rest of descriptors and development of a first draft PoMs  | 2017     | Ministry of Environment and Energy, Ministry of Rural Development and Food<br>Local authorities<br>Scientific and research institutions                                     |
|                                       | Identification of the most feasible and cost effective  | Intereservice/ interministerial consultations to be held involving all the relevant stakeholders in different  | 2017     | Ministry of Environment and Energy, Ministry of Rural Development   |



|  |                                   |   |      |   |
|--|-----------------------------------|---|------|---|
|  | measures required to achieve GES  | Ministries and local authorities for the refinement of the list of measures   |      | and Food, Ministry of Shipping and Island Policy, Ministry of Finance, Ministry of Tourism<br>Local authorities |
|  |                                   | Socioeconomic assessment of selected new measures to be undertaken from the relevant competent authority (SSW) or by recruiting a dedicated expert            | 2017 | SSW (Ministry of Environment)   |
|  | Finalization and approval of PoMs | Public consultation to be held on the draft PoMs and development of final PoMs based on its outcomes for official approval, in line with national procedures. | 2017 | Ministry of Environment and Energy, Civil society, NGOs, Industry, Scientific and research institutions         |

## CONCLUSIONS

The EU, as a major regional actor in the Mediterranean area and one of the Contracting Parties of the Barcelona Convention has a crucial role to play in the elaboration, implementation and monitoring of policies aimed at preserving the unique ecosystems of the Mediterranean Sea and the socio-economic system which is based on it.

The MSFD and the Barcelona Convention Framework present many relevant synergies and a similar approach in addressing the issues identified as threatening to the Mediterranean marine environment. For this reason, it was agreed that the EU Member States would adopt the PoMs required by the MSFD, as their updated NAPs under the BC Framework.

This has produced some clear advantages and progresses, notably the adoption of sets of measures, which will eventually have an automatically legally binding character and, reasonably, a consequently easier process of implementation. The MSFD has also pushed for some notable advancement in regard, for example, to the obligation to conduct a Cost – Benefits Analysis for new measures included in the PoMs. The EU Member States’ PoMs include important measures addressing in an effective way WWT, as well as marine litter issues including measures directed at organising litter collection actions and raising public awareness on the issue. The EU Member States have also been requested to introduce measures with a particular attention to trans-boundaries cooperation and regional harmonization of research and actions. On the other hand, it must be noticed that the timing of elaboration, public consultation and adoption of PoMs by EU Member States has seen some relevant delays – still most of the PoMs are not adopted – and has not respected the expected time framework of the

MSFD cycle. On the other hand, most of the Contracting Parties to the BC, which are not EU Member States have prepared and submitted their NAPs, according to the decisions of COP 19, held in Athens in February 2016.

By comparing the PoMs with the previously identified priority measures among the updated NAPs, this report has identified a few measures of common interest among all CPs, EU and non – EU Member States. Ensuring coordination between the two groups of countries in the implementation of those measures could be the first step towards an increased level of cooperation and a more effective implementation of measures across the Mediterranean region. An effort of information and knowledge sharing among all countries, informing the implementation process, strengthening capacities and know how and facilitating the spread of best practices from one country to the other will be required in the next few years to realise this higher level of coordination.

In conclusion, it can be noted that the links between the two frameworks overcome the identified gaps. Hopefully, in those areas where the EU MSFD pushes forward and produces significant innovations, the EU Member States will act as a propelling force to induce useful progress for the whole region. The experiences and synergies between the two have the potential to inform and influence positively the next cycle of policy elaboration on both sides achieving overall advancement and increased synergies at the regional and subregional levels.

As indicated below, in view of further aligning the implementation of measures under the MSFD and the Barcelona Convention, two actions are recommended:

- In the framework of UNEP/MAP - Barcelona Convention, the conditions should be created and strengthened to ensure collaboration between all the Contracting Parties for the implementation of common measures from now until 2025.
- UNEP/MAP - Barcelona Convention should consider developing, as appropriate, additional new/updated regional/ subregional measures to achieve GES, based on the concrete innovative national measures developed under the MSFD PoMs, which would inspire the other Contracting Parties to consider them in the future. This should cover not only measures addressing pollution and litter, but also other descriptors, that have strong potential for replication at regional/ subregional levels as appropriate.



# ANNEXES

## **ANNEX I:**

# **OVERVIEW OF MEASURES INCLUDED IN THE POMS/ NAPS AVAILABLE FOR THE EU MEMBER STATES PARTIES TO THE BARCELONA CONVENTION**

### Croatia:

Three groups of new measures are included in the September 2016 draft **Croatia PoMs**: common governance measures, green colour code; measures relevant for MSFD, blue colour code; and measures relevant for the ICZM Protocol, yellow colour code. Highlighted measures are included in the NAPs).

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                 |                      |
|---|---|-----------------|----------------------|
| Descriptors   | Measures  | Existing or New | Included in the NAPs |
| All   | Establish permanent coordination mechanism for effective implementation of the Marine and Coastal Zone Management Strategy (MCZMS) (governance)   | New             | Yes                  |
| All   | Strengthen coordination in the preparation of legal, strategic and planning documents for protection and management of marine environment and coastal zone at national and county levels (governance)   | New             | Yes                  |
| All   | Strengthen coordination role of the spatial planning system in the processes of preparation of spatial plans as well as in the processes of preparation of sectoral and development strategic plans/ documents (governance)                               | New             | Yes                  |
| All   | Ensure better quality involvement and timely reaction of interested public in the processes of protection and management of marine environment and coastal zone (governance)  | New             | No                   |
| All   | Formulate priority needs for cross-border and wider international cooperation for protection of marine environment and coastal zone management within existing regional coordination bodies as well as EU territorial cooperation programmes (governance) | New             | No                   |
| Not defined   | Integrate principles of integrated management into normative framework for maritime domain management (ICZM)  | New             | No                   |
| All   | Elaborate additional normative preconditions for further development of maritime spatial planning (governance)  | New             | No                   |
| Not defined   | Apply coastal setback adaptation in line with the ICZM Protocol provisions (governance)   | New             | No                   |
| D1  | Align the existing and prepare new planning and implementation bylaws necessary for effective protected areas management (governance)   | New             | No                   |
| All   | Implement national MSFD monitoring programme in a harmonised manner with other national monitoring programmes implemented in the Adriatic Sea waters under jurisdiction of the Republic of Croatia (MSFD)   | New             | No                   |
| D1 – D5, D7 – D11   | Establish trans-national (Adriatic) programme for marine environment monitoring (MSFD)  | New             | No                   |
| Not defined   | Systematically monitor, research and assess state and processes in the coastal zone area (ICZM)   | New             | No                   |
| All   | Upgrade contents of the existing databases and spatial databases for the purpose of integrated management of the coastal zone and marine environment (governance)   | New             | No                   |

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| All   | Improve inter-operability of various databases (governance)   | New                    | No                          |
| D1 – D6   | Protect marine habitats by reducing humans-induced eutrophication, pollution and other activities (MSFD)  | New                    | Yes                         |
| D1 – D6   | Map <i>Posidonia</i> habitats, develop methods to monitor distribution and implement national Monitoring programme on the level of preservation of <i>Posidonia</i> habitats in line with Habitats Directive (MSFD)   | New                    | No                          |
| D1 – D6   | Prohibit fishing (bottom trawling and use of similar nets) and other activities above coralligenous areas and in their vicinity (MSFD)  | New                    | No                          |
| D1  | Undertake spatial analysis and map activities/ pressures on marine environment and coastal zone (governance)  | New                    | No                          |
| D1, D3, D6  | Identify priority areas for protection of renewable marine resources (Marine Managed Area – MMA) (MSFD)   | New                    | No                          |
| All   | Develop methods and criteria of spatial and protection planning emphasising multidisciplinary approaches (integrated landscape valuation, vulnerability and suitability assessments, carrying capacity assessment for coastal and marine ecosystems and areas) (governance) | New                    | No                          |
| All   | Improve results of strategic environmental assessments for spatial planning documents and sectoral plans and programmes focusing on their use in management and protection of coastal zone and marine environment (governance)  | New                    | No                          |
| All   | Improve environmental impact assessments focusing on their use in management and protection of coastal zone and marine environment (governance)   | New                    | No                          |
| All   | Strengthen professional capacities of coordination mechanism for participatory planning, intersectoral cooperation and sustainable management of marine environment and coastal zone (governance)   | New                    | No                          |
| Not defined   | Strengthen professional capacities for maritime domain management (ICZM)  | New                    | No                          |
| Not defined   | Strengthen capacities for maritime domain supervision through capacity building of competent inspectorates (ICZM)   | New                    | No                          |
| Not defined   | Improve quality of future construction and built environment and achieve distributional equity by using construction land management instruments in settlements (ICZM)  | New                    | No                          |
| Not defined   | Elaborate models and realistic instruments for urban rehabilitation and urban reo-organisation in order to resolve predominant infrastructure, environmental, shape and socio-economic problems of coastal settlements (ICZM)   | New                    | No                          |
| Not defined   | Determine boundaries of maritime domain for the entire Adriatic and ensure they are recorded in cadastre evidences (ICZM)   | New                    | No                          |
| Not defined   | Improve management and protection system for maritime domain which is in public use (ICZM)  | New                    | No                          |

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| D1, D3, D4, D6, D10   | Develop national marine litter management plan (MSFD)   | New                    | Yes                         |
| D1, D3 – D6, D10  | Assess level of harmful impacts of marine litter (MSFD)   | New                    | Yes                         |
| D1, D3, D4, D6, D10   | Collect/ remove marine litter through diving actions and through trawling (fishing for litter) (MSFD)   | New                    | Yes                         |
| D1 – D4, D6, D10  | Monitor renewal of living resources of the Adriatic in critical areas (MSFD)  | New                    | No                          |
| D1 – D6, D8 – D10   | Ensure regular implementation of monitoring programmes at aquaculture sites (MSFD)  | New                    | Yes                         |
| D1 – D6, D10  | Promote growing of “new” autochthonous aquaculture species (MSFD)   | New                    | No                          |
| D1 – D6   | Prepare a Rulebook to regulate transport of species in the growing cycle, growing tools and cages from one to another growth site (measure applies to transport between Croatian aquaculture sites) (MSFD)            | New                    | No                          |
| D1 – D6   | Develop and implement sub-regional (Adriatic) Protocol of the International Convention for the Control and Management of Ships' Ballast Water and Sediments for the Adriatic Sea (MSFD)                               | New                    | No                          |
| D1 – D6, D9   | Establish regular implementation of Port Control Surveys (MSFD)   | New                    | No                          |
| D1 – D6   | Establish and early warning, early detection and quick removal of introduced invasive species (MSFD)  | New                    | No                          |
| D1, D3, D4, D6, D11   | Establish and develop register to record, assess and manage spatial and temporal distribution of impulse anthropogenic noise sources in the frequency band 10 Hz to 10 kHz (MSFD)                                     | New                    | No                          |
| D1, D3, D4, D6, D11   | Monitor levels of continuous underwater noise within third octave bands 63 and 125 Hz (medium frequency) through measurement stations and/ or, if possible, through acoustic modelling (MSFD)                         | New                    | No                          |
| D1, D3, D4, D6, D11   | Establish regional cooperation on coordinated approach to Descriptor 11 in the Adriatic Sea, and enhance knowledge and experience sharing on possible impacts of noise on marine organisms in the Adriatic Sea (MSFD) | New                    | No                          |
| D1 – D4   | Analyse risks of turtles, sea mammals and sea birds by-catch by using different fishing tools (MSFD)  | New                    | No                          |



| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| D1 – D4   | Prepare plan to reduce by-catch of protected vertebrate species (sea mammals, sea birds, sea turtles, sharks and rays) with fishing tools (MSFD)                              | New                    | No                          |
| D1 – D4   | Adopt provisions on fisheries to influence reduction of by-catch (MSFD)   | New                    | No                          |
| D1 – D6   | Implement biological-fisheries surveys linked to utilisation of non-native (allochthonous) potentially important commercial species (MSFD)                                    | New                    | No                          |
| D1 – D6, D10  | Implement adaptation measures related to changes in fishing technology in order to catch non-native (allochthonous) potentially important commercial species (MSFD)           | New                    | No                          |
| D1 – D6, D10  | Implement adaptation measures related to introduction of new aquaculture species and increase in production of thermophilic species (MSFD)                                    | New                    | No                          |
| D1 – D6, D10  | Implement adaptation measures related to changes in growing technologies (MSFD)   | New                    | No                          |
| Not defined   | Strengthen resilience of coastal settlements towards extreme weather and climatic hazards (ICZM)  | New                    | No                          |
| Not defined   | Develop coastal zone's adaptation to sea level rise (ICZM)  | New                    | No                          |
| Not defined   | Establish competent bodies to implement Marine and Coastal Zone Management Strategy   | Existing               | Yes                         |
| Not defined   | Harmonise plans for development programmes of local and regional self-governments with county development strategies  | Existing               | No                          |
| Not defined   | Improve the process of public policy making and of strategic planning   | Existing               | No                          |
| Not defined   | Establish an effective system for integrated coastal zone management  | Existing               | No                          |
| Not defined   | Enhance public participation in decision making related directly or indirectly to nature protection (group of measures)   | Existing               | No                          |
| Not defined   | Increase effectiveness of nature protection and pressure reduction mechanisms as well as of mechanisms that incentivise sustainable use of natural assets (group of measures) | Existing               | No                          |
| D1  | Group of measures on nature protection in the WFD Water Area Management Plan (WAMP)   | Existing               | No                          |
| Not defined   | Adopt Strategic plan for maritime domain management and economic use  | Existing               | No                          |
| Not defined   | Establish a basis for maritime spatial planning   | Existing               | No                          |
| Not defined   | Plan construction conditions in the area of narrow coastal zone   | Existing               | No                          |
| Not defined   | Survey systematically quality of transitional and coastal waters of the republic of Croatia in accordance with WFD  | Existing               | No                          |

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| D1, D3, D4, D6  | Collect data on fisheries (in line with the Data Collection Framework)  | Existing               | No                          |
| D1 – D5   | Implement monitoring programme for the sea and shell-fish quality in production areas and areas for re-deposition of live shell-fish  | Existing               | No                          |
| D1, D4, D6, D5  | Recue introduction of nutrients from point and diffuse sources (group of measures from the WFD WAMP including measures to reduce loads from population, agriculture, atmosphere, energy generation, fisheries and aquaculture, industry, tourism and recreation, transport, and joint sources )                         | Existing               | No                          |
| D1, D4, D6, D8, D9  | Eliminate and reduce pollution with priority substances from point and diffuse sources (group of measures from the WFD RBMP including measures to reduce loads from population, agriculture, atmosphere, energy generation, fisheries and aquaculture, industry, tourism and recreation, transport, and joint sources ) | Existing               | No                          |
| D1, D4, D6, D8, D9  | Reduce possibilities of sudden pollution from point and diffuse sources (group of measures related to transport, population and industry – including energy sector, agriculture, fisheries and aquaculture, as well as to other sources)  | Existing               | No                          |
| Not defined   | Develop monitoring programme on the state of preservation of habitat types  | Existing               | No                          |
| Not defined   | Proposal of memorandum on exchange, access and use of spatial data for the NISD (National Infrastructure of Spatial Data) entities  | Existing               | No                          |
| Not defined   | Preparation of spatial database related to marine environment and coastal zone and spatial data (metadata) under INSPIRE Directive  | Existing               | No                          |
| Not defined   | Develop information infrastructure Improve monitoring   | Existing               | No                          |
| Not defined   | Improve monitoring system of coastal zone state and processes   | Existing               | No                          |
| Not defined   | Develop information instruments for coastal zone management (group of measures)   | Existing               | No                          |
| D6  | Preserve favourable composition and structure of sea floor, coast, coastal zone and river mouths (group of measures)  | Existing               | No                          |
| D6  | Preserve sea floor integrity at the level that ensures protection of structure and functions of ecosystems and that benthic ecosystems are not particularly affected by harmful impacts   | Existing               | No                          |
| D6  | Preserve muddy, sandy and pebble beaches in Natura 200 areas (group of measures)  | Existing               | No                          |
| D6  | Prohibit use of sediments (group of measures)   | Existing               | No                          |

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| D6  | Preserve favourable water regime  | Existing               | No                          |
|   | Increase effectiveness of marine habitats protection  | Existing               | No                          |
| D6, D7  | Hydrological processes – overview of environmental impacts, environmental protection goals and measures for environmental protection (group of measures)  | Existing               | No                          |
| D7  | Develop in more details baseline data in the environmental impact assessments (ensure that changes in hydrographical conditions do not have negative impacts on marine ecosystem) (group of measures)   | Existing               | No                          |
| D1, D7  | Decrease hydro-morphological loads in order to protect biodiversity and ecological networks (group of measures)   | Existing               | No                          |
| D1, D7  | Harmonise additional measures to reduce hydro-morphological loads with programme of additional measures for Areas designated for protection of habitats or species where maintenance or improvement of water status is an important element of their protection (group of measures) | Existing               | No                          |
| D1, D6, D7  | Involve adequate professional capacities and implement adequate research in early phases of planning and designing spatial interventions that may change water regime   | Existing               | No                          |
| D1, D6, D7  | Issue water right acts for protection of waters in protected areas  | Existing               | No                          |
| D1, D6, D7  | Continue with implementation of strategic environmental assessments   | Existing               | No                          |
| Not defined   | Improvement of methodological framework for coastal zone planning   | Existing               | No                          |
| Not defined   | Strengthen capacities of relevant public policy actors  | Existing               | No                          |
| Not defined   | Strengthen capacities for maritime domain registration  | Existing               | No                          |
| Not defined   | Ensure a comprehensive approach to urban rehabilitation   | Existing               | No                          |
| Not defined   | Improve maritime domain management (group of measures)  | Existing               | No                          |
| D1, D3, D6, D10   | Ensure conditions for sustainable and accessible service of acceptance and disposal of ship wastes and cargo residues   | Existing               | Yes                         |
| D1, D3, D6, D10   | Ratify and implement maritime conventions   | Existing               | No                          |
| D1 – D4, D6, D10  | Limit impacts of fisheries  | Existing               | No                          |
| D1 – D4, D6, D10  | Protect and renew marine biodiversity   | Existing               | No                          |

| <b>CROATIA</b> (unofficial translation of the draft PoMs from September 2016) |   |                        |                             |
|---|---|------------------------|-----------------------------|
| <b>Descriptors</b>  | <b>Measures</b>   | <b>Existing or New</b> | <b>Included in the NAPs</b> |
| D1 – D4, D6, D10  | Permanently halt (certain share) of fishing activities  | Existing               | No                          |
| D1 – D4, D6, D10  | Temporarily halt (certain share) of fishing activities  | Existing               | No                          |
| D1 – D4, D6, D10  | Ensure control and enforcement  | Existing               | No                          |
| D1, D4 – D6, D8 – D10   | Invest in aquaculture productively  | Existing               | Yes                         |
| D1, D4 – D6, D8 – D10   | Transition to environmental management systems  | Existing               | Yes                         |
| D1, D4 – D6, D8 – D10   | Develop aquaculture that provides environmental protection services   | Existing               | Yes                         |
| D1 – D6   | Develop energy efficient eco-shipping   | Existing               | No                          |
| D1 – D6, D8 – D10   | Designate Adriatic as specially sensitive marine area   | Existing               | No                          |
| D1 – D6   | Establish an early warning system for prevention of transport of harmful water organisms through ballast waters | Existing               | No                          |
| D1 – D6   | Strengthen supervision over ballast water management  | Existing               | No                          |

In addition to the highlighted measures from the MCZMS draft PoMs, ‘Adoption of appropriate marine litter legal framework’ is also included in the NAPs.

Furthermore, NAPs comprises measures reported under several other strategies/ plans including:

**Measure under the Strategy of Maritime Development and Integrated Maritime Policy of the Republic of Croatia for period 2014-2020**

- Improve accessibility and efficiency of the energy efficiency and pollution prevention system in harbours including waste and cargo residues integrated into general protection against pollution and waste management systems

**Measures adopted within the Water Areas Management Plans 2016-2021**

- Management plan of water area
- Local plans for sewer construction and upgrading
- Sewer and wastewater treatment plan and construction adjustment to the Multi-annual plan of water construction (2014-2023)
- Define measures of prevention and reduction of air emissions in order to adjust to the ELVs to the air
- Adjustment of the Decision on determination of vulnerable areas in Croatia with the research results and established monitoring
- Revise areas sensitive to nitrates - Decision on determination of vulnerable areas in Croatia
- Action plan of water protection against contamination caused by nitrates from agriculture in vulnerable areas
- Reduce nutrient inputs and pesticides from agriculture in NATURA 2000 areas
- Maintain vegetation strip along agricultural surfaces large 2-3m, in order to prevent rinsing of nutrients and pesticides from agricultural surfaces to the water
- Facilitate education of plant protection product and biocide users
- Regulate reduction of nutrient and pesticides input into waters by Action plan for water protection against contamination caused by nitrates originating from agriculture for vulnerable areas and by the other good practice implementation acts
- Continuous revision of the database of the sources/ systems for water supply intended for human consumption
- The regulation content adjustments content of water rights acts with the Law on Water and River Basin Management Plan
- Continuation of water system information development activities - Cadastre of water protection - municipal wastewater load
- Completion of the Guidelines for the implementation of the combined approach to regulating the liability of the budget impact load on the status of a body with respect to the law
- Adjustment of water right acts (water right permits and environmental permits)
- At revision or emission of new water right acts proscribe the following:
  - adjustment of ELVs (emission limit values) with the ELVs of the basic measures
  - ex post adjustment of ELVs
  - detailed monitoring of wastewater discharges
  - water gauge station of operative monitoring
- During the revision or emission of water right act adjust water right acts with the Water Area Management Plan

- Continuation of monitoring and reporting activities on wastewater discharges
- Establishment of criteria related to wastewater discharges into underground waters
- Introduction of water right acts
- Integral monitoring of hazardous substances transport
- Continuation of Emission registry adjustment with the cadastre of water protection in line with technical guide instructions
- Future permits for wastewater discharge needs to be strictly in line with the latest standards, prohibitions and limitations
- Additional monitoring and measures of waste water discharges for water bodies which did not reach good statuses with respect to physical and chemical indicators
- Additional measures for point polluters
- Adjustment to industrial wastewater discharge standards
- Definition of measures related to the removal of intruded alien species
- Adjust fishing activities where necessary in order to preserve or renewal of *Posidonia*
- Mandatory delivery, reporting and public announcement of data and information about technical and financial performance/ efficiency indicators of water public utility sector
- Bylaws which additionally regulate disposal of sludge coming from public utility devices
- Delivery of data and information about Multiannual program of communal water constructions
- Continuation of activities related to development of industrial sludge management system
- In case of waste water discharge into extremely small watercourses which periodically dry-up or sink, apply criteria for impact assessment analysis of project implementation on state of waters for extreme indirect waste water discharge into underground waters (methodology) and criteria for indirect discharges into underground waters (marginal emission values, purification degree, etc.)
- By lower level plans and by individual public utility project, support implementation of nature protection measures (biodiversity, protected areas, ecological network) in the early stage of project development
- Considering the stated prohibition of discharges into underground waters, occurrence of such cases needs to be reduced to the minimum possible level and to additionally evaluate alternative technical solutions
- During elaboration of the criteria for indirect discharge into underground waters:
  - it is necessary to include of the relevant nature protection specialists (biology, environmental protection) and/or Croatian agency for environmental protection and nature in the early stage of project development;
  - it is necessary to build the risk degree of bioaccumulation into criteria for indirect discharge into underground waters
- In case of waste water discharge into extremely small watercourses and to those which periodically dry out or sink, beside all the other proscribed measures, add that such a discharge is temporary until alternative solution is identified
- Operational plans enactment – the obligation to enact lower level plans within two year period after National plan enactment

- Monitoring of accidental pollution – as part of water information system:
  - establishment of the enacted operational plan measures registry;
  - define content and establish registry of accidental water pollution, including information about efficiency of prompt reporting
- Legal framework and methodology development for accidental pollution risk assessment
- Review of implementation/maintenance of measures for prevention and reduction of the impact of accidental pollution - Introduce a regular review of the status of implementation / maintenance measures for preventing and reducing the impact of accidental pollution:
  - Annual - for all taxpayers in the catchment area of the water body where the high risk of accidental pollution or moderate risk of accidental pollution was estimated, and for which have been found that it may have a trans-boundary impact
  - Triennial - for all other taxpayers in the catchment area of the water body where the moderate risk of accidental pollution was estimated
  - Taking stock of the implementation / maintenance measures for preventing and reducing the impact of accidental pollution
- Accidental pollution risk– Undertake risk assessment analysis from all pollution sources for all water bodies taking into account potential accidental pollution sources in the water catchment area of the water body, determined water bodies state, water sensitivity, related protected area, etc.
- As the permanent protection measure, it is suggested to keep the current measure of the minimum undersea discharge of 500 m which ensures good marine water quality along the whole coast and the possibility of safe bathing outside of the marked beaches
- Content and terminology adjustment of Decision about determination of the sensitive areas (NN, No. 81/10)

**Measures adopted within the Waste Management Plan 2015-2021 (final draft, November 2015) (link to Marine Litter RP provided in brackets)**

- Improvement of municipal waste separate collection system (Art 9/1)
- Improvement of processing biodegradable waste at the local level (Art 9/1)
- Recovery of identified locations polluted by waste: Recovery of hotspots and development of illegal dump sites database (Art 9/9; 10/a)
- Measures which can impact framework conditions for waste generation: Incentives for reuse of demolition material; Organisation of campaigns for food waste prevention; Development of food waste information system (Art 9/1)
- Incentives for green and sustainable procurement practices (Art 9/3b)
- Incentives for exchange and reuse of used products (Art 9/1)

## Cyprus:

Cyprus PoMs were finalised by early 2016. Highlighted measures are included in the NAPs

| CYPRUS   |   |                    |                        |
|--|---|--------------------|------------------------|
| Descriptor/<br>theme   | Measures  | Existing or<br>New | Included<br>in the NAP |
| Biodiversity<br>D1, D4, D6   | Species and habitat protection legislation  | Existing           | No                     |
|  | Turtle Protection Programme   | Existing           | No                     |
|  | Actions to control offshore activities for the protection of Cetaceans  | Existing           | No                     |
|  | Cetacean Standings & Sightings Programme  | Existing           | No                     |
|  | Mediterranean Monk Seal Monitoring Programme  | Existing           | No                     |
|  | Establishment of coastal MPAs   | Existing           | No                     |
|  | Management plans for MPAs   | Existing           | No                     |
|  | Mapping of <i>Posidonia</i> habitats within MPAs and high-activity areas  | Existing           | No                     |
|  | Ecological status assessment of coastal ecosystem components  | Existing           | No                     |
|  | Establishment of SPAs (Birds Directive 2009/147/EC)   | Existing           | No                     |
|  | Establishment of ARAs (artificial reef areas)   | Existing           | No                     |
|  | Prohibition of bottom trawlers to fish less than 50 m depth and 0.7 nm from coast   | Existing           | No                     |
|  | Dredged materials disposal policy   | Existing           | No                     |
|  | Mapping of <i>Posidonia</i> meadows outside MPAs  | New                | No                     |
|  | Implementation of MPA management plans  | New                | No                     |
|  | Studies for the establishment of new MPAs and FRAs  | New                | No                     |
|  | Research on population dynamics of birds  | New                | No                     |
|  | Research on population dynamics of marine mammals   | New                | No                     |
|  | Promote the development of guidelines on waste, marine litter and noise in waiting areas at sea for merchant ships and cruise ships | New                | No                     |
|  | Increase public awareness on the role and value of habitats towards the 10% designation of MPAs, Aichi target 11                    | New                | No                     |
| Use of private funding (by e.g. oil and gas platforms) for habitat mapping in deep sea (Economic Exclusive Zone) | New   | No                 |                        |
| Local privileges in certain MPAs   | New   | No                 |                        |
| Establishment of new ARAs and/ or enrichment of existing ARAs and improve management and protection              | New   | No                 |                        |



|   |   |          |     |
|---|---|----------|-----|
|   | Sustainable fisheries and species protection  | New      | No  |
|   | Marine food web studies   | New      | No  |
| D2  | Restrictions of alien species use in aquaculture                                      | Existing | No  |
|   | Monitoring of <i>Lagocephalus sp.</i>   | Existing | No  |
|   | <i>Lagocephalus sp.</i> population reduction programme                                | Existing | No  |
|   | Reduction of NIS populations through selective extractions methods                    | New      | No  |
|   | Alien species monitoring programme  | New      | No  |
| D3  | Reduction of small scale fishing fleet  | Existing | No  |
|   | Reduction of undersize catches  | Existing | No  |
|   | Restriction of monofilament net use   | Existing | No  |
|   | Purse-seining bycatch reduction   | Existing | No  |
|   | Trawling prohibition in selected areas ( <i>two areas on a rotational basis</i> )     | Existing | No  |
|   | Seasonal fisheries restrictions in the Lara-Toxeftra MPA                              | Existing | No  |
|   | Trawling restrictions ( <i>five months period, all territorial waters</i> )           | Existing | No  |
|   | Fisheries prohibition in ARAs   | Existing | No  |
|   | Fisheries restriction in Eratosthenes Seamount area                                   | Existing | No  |
|   | Large Pelagic fisheries restrictions  | Existing | No  |
|   | Restrictions in bottom fisheries ( <i>trammel and gill (set) net, area, period</i> )  | New      | No  |
|   | Further reduction of small scale fishing fleet  | New      | No  |
|   | Regulation of rod and line fisheries  | New      | No  |
|   | Evaluation of impacts of recreational fisheries                                       | New      | No  |
|   | Bycatch reduction methods   | New      | No  |
|   | Fishing pressures mapping from bottom trawling  | New      | No  |
|   | Studies on the establishment of new MPAs and FRAs ( <i>same as for biodiversity</i> ) | New      | No  |
| Establishment of new ARAs and/ or enrichment of existing ARAs and improve management and protection ( <i>same as for biodiversity</i> ) | New   | No       |     |
| D5  | Implementation of the WFD PoMs for the First River Basin Management Plan              | Existing | Yes |
|   | Agricultural best practices implementation  | Existing | Yes |
|   | Vessel waste management   | Existing | Yes |
|   | Open-sea aquaculture best practices policy  | Existing | Yes |

|               |  |          |     |
|---------------|--|----------|-----|
|               | Implementation of the WfD PoM for the 2 <sup>nd</sup> RBMP   | Existing | No  |
|               | Improvements in aquaculture operations   | New      | Yes |
| D7            | Desalination brine disposal controls   | Existing | No  |
| D8            | Vessel waste management ( <b>same as for eutrophication, D5</b> )  | Existing | Yes |
|               | Contaminant loading restrictions ( <i>limit values, discharge permits, management of oil spills</i> )  | Existing | Yes |
|               | Hydrocarbons exploitation activity regulations   | Existing | Yes |
|               | Accident management planning   | Existing | Yes |
|               | Hydrocarbons pollution national contingency plan   | Existing | Yes |
|               | Implementation of the WFD PoM for the 2 <sup>nd</sup> RBMP   | Existing | No  |
| D9            | Seafood quality standards  | Existing | No  |
| D10           | National Action Plan on marine litter  | Existing | Yes |
|               | Launch and encourage participation by all contracting parties to a Mediterranean coastal clean-up day (regional scale – UNEP/ MAP) [CAM measure]   | New      | Yes |
|               | Promote awareness with collaboration with municipalities for cleaning activities in riverbanks (river mouth area), where ecologically appropriate [CAM measure]                            | New      | Yes |
|               | Encouragement and implementation of “fishing for litter” [CAM measure]   | New      | Yes |
|               | Promote awareness by informing professional and amateur fisherman about marine litter to reduce littering from fishing activities [CAM measure]  | New      | Yes |
|               | Enhance the role of the public with regard to marine litter management, by promoting engagement/ awareness by applying, when appropriate, adopt a beach or similar practices [CAM measure] | New      | Yes |
| D11           | Hydrocarbons exploitation activity regulations ( <i>soft-start/ slow-start</i> )   | Existing | No  |
| Cross-cutting | SIA and EIA procedures implementation  | Existing | No  |
|               | Marine environment information database  | Existing | No  |
|               | Administrative support (to departments responsible for MSFD implementation)  | New      | No  |
|               | Integrated Coastal Zone Management   | New      | No  |

**France:**

**France PoMs** was published in spring 2016. Only new/ additional measures are presented in the tables below; highlighted measures are relevant for the NAPs.

| <b>FRANCE</b> ( <i>Western Mediterranean marine sub-region</i> )  |   |
|---|---|
| <b>Descriptor/<br/>theme</b>  | <b>Measures</b>   |
| <b>D1, D4,<br/>D6, D7,<br/>D11</b>  | Better identify functional zones (spawning grounds, nurseries, etc.) of coastal sea beds  |
|   | Set up (temporary or permanent) protection areas in functional zones incorporating the concept of ecological corridor   |
|   | Update the list of marine protected species and habitats at national level  |
|   | Take account of new data on sensitive habitats in waiting areas near some merchant harbours and mooring zones for commercial ships over 80m LOA and over 1,600T in tonnage  |
|   | Define and implement an inter-regional strategy for diving activities, incorporating sensitive and utilised sites, stakes or recommendations for use (marking and buoyage, mooring, human presence)   |
|   | Complement the network of marine protected areas by setting up increased protection areas using existing tools (RNN national nature reserves, APB biotope protection orders, no-take zones in national parks, etc.) in sectors of remarkable biological diversity |
|   | Encourage the development of professional fisheries techniques to make them compatible with habitat conservation stakes   |
|   | Make it compulsory to draw up and effectively implement individualised SCOT plan chapters serving as sea enhancement schemes and ensure that a maritime strand of the PADDUC sustainable development and planning scheme is developed                             |
|   | Draw up a national guide to help implement individual SCOT plan chapters serving as sea enhancement schemes   |
|   | Reinforce the implementation of the Mediterranean management strategy for moorings of recreational vessels, on the scale of sailing areas   |
|   | Determine a Mediterranean strategy to manage mooring zones for large recreational vessels and cruise ships  |
|   | Encourage the setting up of strategies to develop collective use of recreational vessels and make valuable use of existing facilities or infrastructures  |
|   | Draft a guide or doctrine brief to encourage coastal towns to take better account of the marine environment in town planning schemes  |
|   | Take better account of cumulative effects of human activities on the marine sub-region scale, in projects, plans and programmes subject to environmental assessments, impact studies or assessment of effects   |
| Strengthen the policy of assigning and allocating natural areas in the State-owned domain to the Conservatoire du littoral coastal and lake shore protection entity |   |
| Define a seafront doctrine for the ecological restoration of degraded natural habitats, based on the results of studies and R&D work underway                       |   |

| <b>FRANCE</b> ( <i>Western Mediterranean marine sub-region</i> )  |  |
|---|--|
| <b>Descriptor/<br/>theme</b>  | <b>Measures</b>  |
|   | Launch a pilot operation for ecological restoration to apply the seafront doctrine   |
|   | Draft a guide intended for contracting authorities on eco-design of man-made structures in the marine environment  |
|   | Encourage eco-design, soft moorings, functional artificial reefs, functional foundations of bottom-fixed and floating wind turbines, etc.) of engineering works and structures in the marine environment by creating cross-compliance requirements for AOT and licences in the DPM state-owned maritime domain |
|   | Complement the offshore Natura 2000 network to address the challenges identified for mammals, birds and reefs  |
| <b>D1, D4,<br/>D6, D7,<br/>D11</b>  | Promote the implementation of territory-based guidance schemes for dredging operations and value chains for sediment management which can evolve and are adapted to local requirements   |
|   | Promote the installation of ship-strike alarm systems to prevent collisions with marine mammals by French and foreign vessels plying regular sea routes in the marine sub-region as well as on civilian vessels used by State services   |
|   | Encourage low-noise engine installations for new passenger vessels, as a priority for those which sail in the most sensitive marine protected areas  |
|   | Strengthen the regulatory framework for operations utilising seismic means for research/exploration (training/ qualification, pre-watch, soft start and ramping up, requiring independent and trained marine mammal observers (MMO) on board seismic exploration vessels                                       |
|   | Determining recommendations to limit the impacts of acoustic emissions during work at sea and seismic research surveys and operations  |
|   | Set up monitoring of pressures from acoustic emissions created by human activities which may affect the marine environment   |
|   | Promote the 'Whale Watching' label recognised by Pelagos and Accobams  |
|   | Strengthen the system for rat extermination on islands and islets used as breeding sites by sea birds  |
|   | Reinforce the legal means to control disturbances from sound and light at nesting sites  |
|   | Limit the factors that attract yellow-legged gulls caused by professional fisheries activities   |
| Deal with the specific issue of marine waste and litter in departmental prevention and management plans for non-hazardous waste |  |
| <b>D2</b>   | Disseminate and secure buy-in of French IUCN guidelines drawn up for managers, on the monitoring of invasive species in marine protected areas of the Mediterranean (2013)   |
|   | Set up a watch and alert system for non-indigenous species (NIS)   |
|   | Based on the initial assessment, establish a list of marine species whose introduction into the natural environment should be prohibited   |
|   | Set up a control procedure for the management of ballast waters by vessels, in compliance with the provisions of the international ballast water convention  |

| <b>FRANCE</b> ( <i>Western Mediterranean marine sub-region</i> )  |   |
|---|---|
| <b>Descriptor/<br/>theme</b>  | <b>Measures</b>   |
| <b>D3</b>   | Set up (temporary or permanent) protection areas in functional zones incorporating the concept of ecological corridor   |
|   | Encourage the development of professional fisheries techniques to make them compatible with habitat conservation stakes   |
|   | Take greater account of biological recovery periods for local species in statutory instruments and regulations on professional and recreational fisheries   |
|   | Update the list of marine protected species and habitats at national level  |
| <b>D8, D9</b>   | Examine the creation of a compulsory prior declaration of activity for practising recreational fisheries  |
|   | Pursue the setting up of storm water master plans to apply SDAGE plans  |
|   | Increase collection and disposal services for waste and dispersed toxic waste (DTW) products in ports (fishing harbours, marinas, commercial ports, industry, etc.)   |
|   | Continue to make waste water treatment systems of coastal towns and built-up areas more reliable, applying SDAGE master plans   |
| <b>D8, D9</b>   | Encourage setting off and shared use of hull-cleaning areas in harbours and pursue bringing them into compliance with standards in order to eliminate direct discharges to the sea  |
|   | Study the characterisation of fluxes (quantity/source) and determine action programmes by targeting the 5 main watercourses (Rhône, Var, Hérault, Aude and Argens rivers)   |
|   | Ensure the updating of plans to receive and process ship-generated waste and cargo residues in seaports, incorporating the setting up of appropriate services for collection and disposal of waste  |
|   | Encourage the setting up of municipal safeguard plans in each coastal town which incorporate combating forms of pollution coming from the sea and which are compatible with the special POLMAR contingency aspect of the departmental (county) level ORSEC plan |
| <b>D10</b>  | Delimit the French and Italian maritime areas (State, EEZ (FR), ZPE (IT)) at the Corsican trough  |
|   | Deal with the specific issue of marine waste and litter in departmental prevention and management plans for non-hazardous waste   |
|   | Include an orientation on marine litter in the national waste prevention plan and contribute to its implementation  |
|   | Identify and promote the most relevant systems to limit the transfer of macrowaste during dredge spoil dumping operations   |
|   | Define and develop a best practice guide for managing and disposing of waste in the coastal zone  |
|   | Install recovery and recycling systems which are adapted to the type of litter collected by fishermen and promote their use to generate value   |
|   | Encourage setting up 'sentinels of the sea' actions for marine litter   |
| Examine the options for collecting and processing or recycling fishing gear and equipment at the end of its serviceable life and waste from shellfish farming |   |

| <b>FRANCE</b> ( <i>Western Mediterranean marine sub-region</i> )   |  |
|--|--|
| <b>Descriptor/<br/>theme</b>   | <b>Measures</b>  |
|  | Disseminate marine environmental research priorities, as listed in the appendix of the Programme of Measures to research bodies and potential funders, with the objective of launching calls for projects on the scale of the seafront                     |
| <b>Cross-cutting</b>   | Disseminate marine environmental research priorities, as listed in the appendix of the Programme of Measures to research bodies and potential funders, with the objective of launching calls for projects on the scale of the seafront                     |
|  | Incorporate the research priorities listed in the appendix of the Programme of Measures in the objectives contracts of research bodies   |
|  | Delimit the French and Italian maritime areas (State, EEZ (FR), ZPE (IT)) at the Corsican trough   |
|  | Create a special day, once a year, of stepped-up inspections with media coverage, coordinated on the inter-regional scale  |
|  | "Propose existing marine protected areas as specially protected areas of Mediterranean interest (ASPIM), beginning with the Calanques national park, the Gulf of Lion marine nature park and the N2000 marine zone off the Camargue regional nature park   |
|  | Improve access to all data on the marine biocenoses of the French Mediterranean, which are homogenised and can be directly utilised by various public services in GIS format and by any users in map form  |
|  | Strengthen and coordinate awareness raising campaigns on the scale of seafronts which are adapted to different categories of users   |
|  | Set up an overarching strategy to raise awareness about marine environmental challenges and protection in keeping with targets (raising awareness of different groups, supporting the dynamic deployment of PAMM plans, modifying stakeholders' behaviour) |
|  | Incorporate or reinforce marine environmental challenges and protection measures in reference systems and examinations for maritime vocational training course, water sports training courses and the exam to pass for a motorboat licence                 |
|  | Develop the organisation marine environment seminars in the curriculum for master mariners training  |
|  | Increase marine environmental training for public stakeholders (State, regional and local civil servants and elected officials through their national association called the ANEL)   |
|  | Increase the training of water sports instructors about the sustainable management of sea and shore  |
|  | Work with the National Education system to strengthen local structures for earning about sustainable development related to marine environmental challenges  |
|  | Promote the 'Whale Watching' label recognised by Pelagos and Accobams  |
| Disseminate and secure buy-in of French IUCN guidelines drawn up for managers, on the monitoring of invasive species in marine protected areas of the Mediterranean (2013) |  |

**Greece:**

**Greece** has not published Programme of Measures yet. List of possible measures (existing but not implemented and new) arising from regulatory requirements and national strategies is provided below, as developed by UNEP/ MAP for the ActionMed national workshop held on 12 October. Measures relevant for D5, D8 and D10 are included. The list should by no means be considered as a part of Greek PoMs.

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>  |                                |
|---|--------------------------------|
| <b>Measures (key type of measures)</b>  | <b>Category</b>                |
| <b>D5 EUTROPHICATION</b>  |                                |
| <b>WFD KTM 1. Construction or updates of wastewater treatment plants</b>  |                                |
| Completion of wastewater treatment installation structural works for settlements falling under the provisions of Directive 91/271/EC  | 1.b. Existing-Not Implemented  |
| Determination of conditions and prerequisites for the connection of industries to the wastewater/industrial wastewater reception network of Wastewater Treatment Plants.  | 2.a. New-Builds on Legislation |
| Intensification of the checks of effective operation at wastewater treatment plants   | 2.a. New-Builds on Legislation |
| <b>WFD KTM 2. Reduce nutrient pollution from agriculture</b>  |                                |
| Delimitation of further nitrate vulnerable zones based on water body chemical condition assessment and drawing up action plans based on crop type.  | 1.b. Existing-Not Implemented  |
| Development of specialized methods/tools for the rational use of fertilisers and water in nitrate vulnerable zones  | 1.b. Existing-Not Implemented  |
| Creation of a cooperation framework through negotiation between coastal protected area management operators and operators of agricultural and farming activities for the purpose of improving the status of conservation of coastal wetland ecosystems through the adoption of environmentally friendly agricultural activities with a simultaneous improvement of the added value of their produce | 2.a. New-Builds on Legislation |
| Implementation of codes of good agricultural practice - encouragement to farmers to purchase slow degradation fertilisers   | 1.b. Existing-Not Implemented  |
| <b>WFD KTM 12. Advisory services for agriculture</b>  |                                |

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>   |                                |
|--|--------------------------------|
| <b>Measures (key type of measures)</b>   | <b>Category</b>                |
| Encouragement and support (technical and scientific) to producers implementing conventional cultivation techniques for the conversion to organic cultivation, as a priority in nitrate vulnerable zones                    | 1.b. Existing-Not Implemented  |
| Organisation of Information days on new technologies, modern cultivation techniques, environmental conservation, sustainability of agricultural lands etc.   | 2.a. New-Builds on Legislation |
| <b>WFD KTM 14. Research, improvement of knowledge base reducing uncertainty</b>  |                                |
| Feasibility studies on the sustainability of farm wastewater treatment installations and their prospective placement, with the purpose of facilitating their eventual construction.  | 2.a. New-Builds on Legislation |
| Systematic monitoring of the nitrate levels in water bodies designated as being subjected to or potentially subjected to nitrate pollution.  | 1.b. Existing-Not Implemented  |
| Integrated coastal water monitoring of environmental parameters of concern and means for their solution (FP7 My Ocean Project - Bay of Thessaloniki)   | 1.b. Existing-Not Implemented  |
| <b>WFD KTM 21. Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure</b>  |                                |
| Intensification of the periodic monitoring of rainwater outlet waters and other point sources of pollution that ends up at sea in coastal areas.   | 1.b. Existing-Not Implemented  |
| Creation of the regulatory framework for the tracking and control of heavy vehicles transporting urban sewage  | 2.a. New-Builds on Legislation |
| Rational management of wastewater in settlements with peak population < 2000 UEP   | 1.b. Existing-Not Implemented  |
| Design and implementation of a central warning and management system for pollution deriving from accidents at installations (sewage treatment plants, industrial wastewater treatment plants), or due to natural phenomena | 2.a. New-Builds on Legislation |
| <b>MSFD KTM 33. Measures to reduce nutrient and organic matter inputs to the marine environment from sea-based and air-based sources</b>   |                                |
| Production of guidelines delimiting the parameters to be regularly monitored at coastal fish/ shellfish farms  | 1.b. Existing-Not Implemented  |
| Completion of the necessary infrastructure at all port installations to ensure the safe reception of ship wastewater or oily residues and other wastes and avoid pollution of the sea                                      | 1.b. Existing-Not Implemented  |



| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>  |                                |
|---|--------------------------------|
| <b>Measures (key type of measures)</b>  | <b>Category</b>                |
| Creation of a cooperation framework through negotiation between coastal protected area management operators and operators of fish/shellfish farms for the purpose of improving the status of conservation of coastal waters and wetland ecosystems through the adoption of environmentally friendly fish/shellfish farming activities with a simultaneous improvement of the added value of their produce | 2.a. New-Builds on Legislation |
| Implementation of MARPOL Annex IV on the Prevention of Pollution by Sewage from Ships   |                                |
| <b>MSFD KTM 39. Other measures</b>  |                                |
| Intensification of targeted checks at creameries to ensure the environmentally sound disposal of their wastewaters.   | 2.a. New-Builds on Legislation |
| <b>D8 CONTAMINANTS</b>  |                                |
| <b>WFD KTM 15. Measures for the phasing-out of emissions, discharges and losses of priority hazardous substances or for the reduction of emissions, discharges and losses of priority substances</b>  |                                |
| Completion of works for the collection and treatment of wastes falling under the provisions of the IPPC Directive   | 1.b. Existing-Not Implemented  |
| Fulfilment of the requirement to hold a registry of installations falling under the provisions of the IPPC and SEVESO Directives  | 1.b. Existing-Not Implemented  |
| Enactment/determination of emission limit levels for priority substances and other pollutants affecting surface waters, in accordance with the provisions of Directive 2008/105/ EC.  | 1.b. Existing-Not Implemented  |
| Creation in each River Water District of a registry, including where available maps, of emissions, discharges and losses for all priority substances and pollutants in accordance with the provisions of Directive 2008/105/EC  | 1.b. Existing-Not Implemented  |
| Design and implementation of a central warning and management system for pollution deriving from accidents at installations (sewage treatment plants, industrial wastewater treatment plants), or due to natural phenomena  | 1.b. Existing-Not Implemented  |
| Completion of the External Contingency Plans for Large-Scale Technological Accidents  | 1.b. Existing-Not Implemented  |
| Compilation of Large Scale Technological Accident Contingency Plans for installations falling under the IPPC and SEVESO Directives, that include provisions for the protection of water bodies, particularly those listed in the registry of protected areas, from substantial fallouts or accidents.   | 1.b. Existing-Not Implemented  |

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>  |                                |
|---|--------------------------------|
| <b>Measures (key type of measures)</b>  | <b>Category</b>                |
| Determination of conditions and prerequisites for the connection of industries to the wastewater/industrial wastewater reception network of Wastewater Treatment Plants.  | 1.b. Existing-Not Implemented  |
| Updating of the national legislative framework on the management of wastes and industrial wastewater  | 2.a. New-Builds on Legislation |
| Completion of the necessary infrastructure at all port installations to ensure the safe reception of ship wastewater or oily residues and other wastes and avoid pollution of the sea   | 1.b. Existing-Not Implemented  |
| Cessation of the dumping of "red mud" as a bauxite residue, in the Bay of Antikira (WBD7)   | 2.a. New-Builds on Legislation |
| Cessation of the dumping of electric arc furnace "rust" from iron-nickel mining into the Northern Evoikos. (WBD7)   | 2.a. New-Builds on Legislation |
| Increase in the frequency of submission of reports of conformity to approved environmental terms of operation by industries located in areas of increased environmental pressure - timely recognition of possible adverse environmental effects and immediate undertaking of remediation measures | 2.a. New-Builds on Legislation |
| Issue of guidelines for the disposal of brine from desalination plants (WBD 13, 14)   | 1.b. Existing-Not Implemented  |
| Intensification of inspections of the conformity of oil press installations to environmental terms for the disposal of liquid wastes (WBD13, 14).   | 2.a. New-Builds on Legislation |
| Creation and implementation of a programme for the inspection and conformity of industrial installations with historic al problems of accumulation of industrial wastes of a number of years  | 1.b. Existing-Not Implemented  |
| Development of a system for the management of mercury wastes according to the existing legislation  |                                |
| <b>WFD KTM 3. Reduce pesticides pollution from agriculture</b>  |                                |
| Design and implementation of a National Action Plan for the rational use of plant protection products in accordance with the provisions of Directives 91/414/EEC, 2009/128/EC and Regulation 1107/2009  | 1.b. Existing-Not Implemented  |
| Implementation of a special programme for the monitoring of the presence of active substances that have been banned from plant protection products (WBD4, WBD5,WBD8)  | 1.b. Existing-Not Implemented  |

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>   |                               |
|--|-------------------------------|
| <b>Measures (key type of measures)</b>   | <b>Category</b>               |
| <b>WFD KTM 21. Measures to prevent or control the input of pollution from urban areas, transport and built infrastructure</b>  |                               |
| Intensification of the periodic monitoring of rainwater outlet waters and other point sources of pollution that end up at sea in coastal areas.  | 1.b. Existing-Not Implemented |
| <b>MSFD KTM 31. Measures to reduce contamination by hazardous substances (synthetic substances, non-synthetic substances, radionuclides) and the systematic and/or intentional release of substances in the marine environment from sea-based or air-based sources</b>   |                               |
| Implementation of Decision IG.20/12 Action Plan to implement the Protocol of the Barcelona Convention concerning the Protection of the Mediterranean Sea Against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil   | 1.b. Existing-Not Implemented |
| Implementation of Decision IG.22/3 Mediterranean Offshore Action Plan in the framework of the Protocol for the Protection of the Mediterranean Sea against Pollution resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil   | 1.b. Existing-Not Implemented |
| <b>WFD KTM 14. Research, improvement of knowledge base reducing uncertainty</b>  |                               |
| Enactment of a compulsory programme for the qualitative monitoring of metal mining runoff water  | 1.b. Existing-Not Implemented |
| Monitoring and analyses of waters inside and out of the Port of Thessaloniki (WBD 10) (including petroleum hydrocarbons, heavy metals)   | 1.b. Existing-Not Implemented |
| Monitoring and determination of the causes of excess of chemical substances in the Bay of Thessaloniki (WBD 10) (including heavy metals, organophosphates, organochlorinated pesticides, triazines)  | 1.b. Existing-Not Implemented |
| Master Plan for the sustainable protection and management of the coastal water bodies of the Thermaikos Bay (Monitoring of the effect of industrial activity, recording of points of discharge of treated municipal and industrial wastewater, rainwater network runoff, storm water overflow, feasibility studies for technical interventions to control pollution of coastal water bodies) | 1.b. Existing-Not Implemented |
| Investigative monitoring of Aegean island coastal water systems (WBD 14) (including PAH and heavy metals in sediments) and proposals of immediate implementation for measures for the amelioration of the quality of ecosystems under investigation.   | 1.b. Existing-Not Implemented |

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>   |                               |
|--|-------------------------------|
| <b>Measures (key type of measures)</b>   | <b>Category</b>               |
| <b>D10 MARINE LITTER</b>   |                               |
| <b>MSFD KTM 29: Measures to reduce marine litter</b>   |                               |
| <b>Measures under the National Plan for the Management of Waste, implementing Law 4042/2012 and the Waste Framework Directive 2008/98/EC, of potential relevance to the MSFD :</b>   |                               |
| Establishment of Zones for Special Waste Management for the creation of the infrastructure for recycling with sorting at source, on islands and areas with increased tourism   | 1.b. Existing-Not Implemented |
| Creation of an Electronic Waste Exchange Market  | 1.b. Existing-Not Implemented |
| Establishment of the separate selection of recyclable materials at public utility facilities   | 1.b. Existing-Not Implemented |
| Action "I don't throw away, I donate"  | 1.b. Existing-Not Implemented |
| Creation of a network of "Green Spots" and Centres for Recycling, and Training for Sorting at Source   | 1.b. Existing-Not Implemented |
| Improvement- Upgrading of collection and transfer networks to incorporate programmes for separate collection of the four waste streams   | 1.b. Existing-Not Implemented |
| Completion of the network for the treatment of mixed and/or preselected urban solid waste  | 1.b. Existing-Not Implemented |
| Development of networks for the collection and transport of agricultural and farming waste of non-organic origin (plastics, fertiliser packaging, medicinal packaging, etc.) to be included in networks for waste recovery | 1.b. Existing-Not Implemented |
| Extension of the existing networks for the separate collection of packaging wastes to cover the entire country   | 1.b. Existing-Not Implemented |
| Installation of a four waste stream network for packaging wastes to achieve high quality recycling   | 1.b. Existing-Not Implemented |
| Extension and intensification of the existing network for the collection of used portable electronic batteries and accumulators to more distant areas  | 1.b. Existing-Not Implemented |

| <b>GREECE (list of measures compiled for the ActionMed workshop)</b>  |                               |
|---|-------------------------------|
| <b>Measures (key type of measures)</b>  | <b>Category</b>               |
| Extension of recycling at health facilities (feasibility study for the recycling of medicinal packaging and other recyclable waste)   | 1.b. Existing-Not Implemented |
| <b>Measures implemented under the National Plan for the Prevention of the Creation of Waste, implementing Law 4042/2012 and the Waste Framework Directive 2008/98/EC, of potential relevance to the MSFD:</b> |                               |
| Development of waste prevention plans by the local authorities  | 1.b. Existing-Not Implemented |
| Promotion of environmental research, innovative technologies/ access to environmental information on waste prevention   | 1.b. Existing-Not Implemented |
| Creation, continuation and completion of the existing programmes for businesses, to increase awareness on the prevention of the creation of waste   | 1.b. Existing-Not Implemented |
| Further promotion of voluntary agreements for the prevention of the creation of waste   | 1.b. Existing-Not Implemented |
| Financial means for the reduction of the quantities of single use plastic bags  | 1.b. Existing-Not Implemented |
| Implementation of "pay as long as I throw away" systems   | 1.b. Existing-Not Implemented |
| Decision IG.21/7 Regional Plan on Marine Litter Management in the Mediterranean in the Framework of Article 15 of the Land Based Sources Protocol of the Barcelona Convention                                 | 1.b. Existing-Not Implemented |

**Italy:**

| <b>Italy (Unofficial Translation of the PoMs made available for public consultation)</b> |  |                        |
|--|--|------------------------|
| <b>Descriptor</b>  | <b>Measures</b>  | <b>Existing or New</b> |
| D5   | Plans for protection of waters   | Existing               |
| D5   | Programmes of action for the individuation of fertilizers quantity to be used in coherence with the integration of agriculture, livestock and environment  | Existing               |
| D5   | Description of microbiologic activities in the treatment of waste water  | Existing               |
| D5   | Measures for the management of aquaculture sites   | Existing               |
| D5   | Enrichment of nutrients and organic substances   | Existing               |
| D8   | Measures to rebalance the relation between agriculture and environment, including pesticides   | Existing               |
| D8   | Measures of management and monitoring of superficial hydric bodies, coastal and balneal waters   | Existing               |
| D8   | Measures of sampling and control of contaminant agents for marine waters and species   | Existing               |
| D8   | Measures of control and prevention of pollution caused by marine transportation of dangerous products and liquids  | Existing               |
| D8   | Operational measures, both at national and international level, with direct effects on the prevention of acute pollution caused by accidents   | Existing               |
| D9   | Registration of aquaculture businesses for human consumption and controls and/or bans of hormonal, pharmacologic and disinfecting substances   | Existing               |
| D9   | Measures connected to the control and commercialization, labelling of products, food legislation and security  | Existing               |
| D9   | Measures of health police to prevent, control and limit the spreading of illnesses in aquaculture animals  | Existing               |
| D8 -9  | Measures of sampling and control of microorganisms and contaminant agents – for human consumption  | Existing               |
| D10  | Measures to regularize the autorisation of waste disposal in marine waters   | Existing               |
| D10  | Measure to reduce disposal of litter produced by ships using ports in the State territory, in the sea, especially not authorized ones, and to improve availability and use of port facilities for the collection of the litter | Existing               |
| D10  | Misura che definisce i rifiuti marini come rifiuti solidi urbani anche se non in maniera completamente in linea con la MSFD  | Existing               |

|     |   |          |
|-----|---|----------|
| D10 | Measure to regulate the use of plastic bags   | Existing |
| D10 | Measures of sensibilisation and communication to the public to increase knowledge of marine litter, to promote prevention and gradual reduction                                   | Existing |
| D10 | Green economy measures regarding marine fundal cleaning and reduction of litter of small dimension and cigarette butts  | Existing |
| D10 | Design and adoption of measure aimed at improve management of litter produced by fisheries and aquaculture activities, including unused equipment, promoting reuse and recycling. | New      |
| D10 | Study, project design and creation of a collection and disposal facility of litter accidentally collected by fishermen.   | New      |
|     |   |          |

| <b>Italy (Unofficial Translation of the PoMs made available for public consultation)</b> |  |                        |
|--|--|------------------------|
| <b>Descriptor</b>  | <b>Measures</b>  | <b>Existing or New</b> |
| D5   | Plans for protection of waters   | Existing               |
| D5   | Programmes of action for the individuation of fertilizers quantity to be used in coherence with the integration of agriculture, livestock and environment  | Existing               |
| D5   | Description of microbiologic activities in the treatment of waste water  | Existing               |
| D5   | Measures for the management of aquaculture sites   | Existing               |
| D5   | Enrichment of nutrients and organic substances   | Existing               |
| D8   | Measures to rebalance the relation between agriculture and environment, including pesticides   | Existing               |
| D8   | Measures of management and monitoring of superficial hydric bodies, coastal and balneal waters   | Existing               |
| D8   | Measures of sampling and control of contaminant agents for marine waters and species   | Existing               |
| D8   | Measures of control and prevention of pollution caused by marine transportation of dangerous products and liquids  | Existing               |
| D8   | Operational measures, both at national and international level, with direct effects on the prevention of acute pollution caused by accidents   | Existing               |
| D9   | Registration of aquaculture businesses for human consumption and controls and/or bans of hormonal, pharmacologic and disinfecting substances   | Existing               |
| D9   | Measures connected to the control and commercialization, labelling of products, food legislation and security  | Existing               |
| D9   | Measures of health police to prevent, control and limit the spreading of illnesses in aquaculture animals  | Existing               |
| D8 -9  | Measures of sampling and control of microorganisms and contaminant agents – for human consumption  | Existing               |
| D10  | Measures to regularize the autorisation of waste disposal in marine waters   | Existing               |
| D10  | Measure to reduce disposal of litter produced by ships using ports in the State territory, in the sea, especially not authorized ones, and to improve availability and use of port facilities for the collection of the litter | Existing               |
| D10  | Misura che definisce i rifiuti marini come rifiuti solidi urbani anche se non in maniera completamente in linea con la MSFD  | Existing               |
| D10  | Measure to regulate the use of plastic bags  | Existing               |



|     |   |          |
|-----|---|----------|
| D10 | Measures of sensibilisation and communication to the public to increase knowledge of marine litter, to promote prevention and gradual reduction                                   | Existing |
| D10 | Green economy measures regarding marine fundal cleaning and reduction of litter of small dimension and cigarette butts  | Existing |
| D10 | Design and adoption of measure aimed at improve management of litter produced by fisheries and aquaculture activities, including unused equipment, promoting reuse and recycling. | New      |
| D10 | Study, project design and creation of a collection and disposal facility of litter accidentally collected by fishermen.   | New      |
|     |   |          |

**Spain:**

**Spain PoMs** were finalised in spring 2016. Only new/ additional measures are presented in the tables below.

| <b>SPAIN</b> ( <i>measures included in the PoM for Estrecho and Alborán, and Levantine-Balearic marine subdivisions</i> ) |  |
|---|--|
| <b>Theme (descriptors)</b>  | <b>Measures</b>  |
| <b>Biodiversity (D1, D4, D6)</b>  | Conservation plan for the killer whale in the Strait of Gibraltar and Gulf of Cadiz  |
|   | Marine turtles conservation Strategy in Spain  |
|   | Strategies/Plans for the reduction of the by-catches of protected vertebrates (birds, turtles, marine mammals and elasmobranchii) in fishing gear                  |
|   | Conservation Strategies for threatened marine bird species   |
|   | Conservation Plans for endangered marine species   |
|   | Risk analysis of the by-catches of turtles, cetaceans and marine birds   |
|   | Demonstration projects on the mitigation and reduction of by-catch of marine turtles, birds and mammals by the different fishing gears                             |
|   | Fishery regulations to reduce by-catches ( <i>based on the results of by-catches risk analysis</i> )   |
|   | Establishment of specific protocols which improve post-capture survival for different fishing gears and ensure their application                                   |
|   | Guidelines on the management of recreational nautical activities   |
|   | Improvement of knowledge: promotion of research studies on birds, turtles, recruitment areas, as well as on the impact of human activities on Species and habitats |
|   | Protocol for action in response to turtle nesting on the Spanish coast and possible adoption of protection measures on optimal beaches for incubation              |
|   | Modification of Royal Decree 347/2011, of 11 March, regulating maritime recreational fishing in offshore waters  |
|   | Updating of the Electronic Fishing Log to systemise the gathering of data on by-catch  |
|   | Improvement of the monitoring of artisanal fisheries (VMS type)  |
|   | Actions related to the reduction of the risks of collision on large vessels  |
| Sea-floor mapping and data processing programme: Continuation of the ESPACE Project                                       |  |
| Guidelines on the acceptability of sand replenishment on beaches  |  |
| Exploration of alternative methods of low impact for capturing crustaceans on the seabed                                  |  |

| <b>SPAIN</b> (measures included in the PoM for Estrecho and Alborán, and Levantine-Balearic marine subdivisions) |  |
|--|--|
| <b>Theme (descriptors)</b>   | <b>Measures</b>  |
|  | Establishment of bottom trawling-free zones / increase of exclusion zones in shelf areas, based on the results of the ESPACE project (measure related to sea-floor mapping)  |
|  | Elaboration of guidelines on artificial reefs  |
|  | Promote a quality mark for recreational whale-watching activities (including tourism fishing)  |
| <b>Marine protected areas</b>  | RAMPE (MPA Network of Spain) Master Plan   |
|  | Preparation and implementation of the management plans of the Natura Network SCIs proposed by INDEMARES which competence belong to the central government  |
|  | Preparation and implementation of the management plans of the SPAs which competence belong to the central government   |
| <b>Marine protected areas</b>  | Analysis of the potential creation of and support to the implementation of a "Natura 2000 Network" quality mark to favour the commercialisation of products and services which are compatible with the management objectives of the Natura Network |
|  | Management and monitoring of Marine Reserves   |
|  | Awareness-raising / Information in Marine Reserves   |
|  | Preparation of studies for the designation of future MPAs  |
|  | Declaration of new MPAs (based on results of preparation studies)  |
|  | Surveillance plan of <i>Posidonia oceanica</i> in the Balearic Islands   |
|  | Expansion of the Maritime-Terrestrial National Park of the Cabrera Archipelago   |
| <b>Non-indigenous and invasive species (D2)</b>  | Preparation and implementation of instruments for the management of marine protected areas (not covered with previous measures on PA management)   |
|  | Improvement of knowledge on invasive species and other issues  |
|  | Systems of alert, early detection and rapid eradication of exotic invasive species   |
| <b>Commercially exploited species (D3)</b>   | Mobile application for alert and early detection of non-indigenous and invasive species in National Parks  |
|  | Permanent cessations based on the fleet action plan  |
|  | Temporary cessations of fishing activity (in accordance with Art. 33 of the European Maritime and Fisheries Fund (EMFF) Regulations)   |
|  | Actions aimed at fulfilling the discards policy  |
|  | Promotion of collaboration between scientists and the fishery sector   |

| <b>SPAIN</b> (measures included in the PoM for Estrecho and Alborán, and Levantine-Balearic marine subdivisions) |   |
|--|---|
| <b>Theme (descriptors)</b>   | <b>Measures</b>   |
|  | Actions related to the maintenance of the National Basic Data Programme (Article 77)  |
|  | Reinforcement of control work (article 76)  |
|  | Reduction of red coral fishery quotas per person and year (RD 629/2013)   |
|  | Management plan for the longline fleet in the Mediterranean   |
|  | Promote the fish and seafood management and co-management plans in the Mediterranean (Regional Government of Catalonia)   |
| <b>Eutrophication, Contaminants (D5, D8, D9)</b>   | Reinforcement of the “Plan Ribera” (coastal plan)   |
|  | Strategy for the rescue and recovery of oiled wildlife  |
|  | Guidelines for land-sea direct discharges   |
|  | Approval as Royal Decree of the guidelines for the management of dredged material   |
|  | Reinforcement of the National Rescue and Pollution Response Plan  |
| <b>Eutrophication, Contaminants (D5, D8, D9)</b>   | Preparatory work related to the UNEP-MAP Offshore Protocol Action Plan (Protocol for the protection of the Mediterranean Sea against pollution from the exploration and exploitation of the continental platform, the soil and the subsoil) |
|  | Preparation of the Interior Maritime Plans (state ports)  |
|  | Guide for the handling of bulk liquids (state ports)  |
|  | Improvement of knowledge of aspects related to marine pollution   |
| <b>Marine litter (D10)</b>   | <b>Measures for the prevention of marine litter from maritime sources</b>   |
|  | Implementation of a fixed fee system in regional ports similar to that regulated in RDL 2/2011  |
|  | Promotion of projects aimed at analysing the possibilities of recycling certain materials, such as expanded polystyrene (EPS) or fishing nets   |
|  | Promotion of innovative projects and initiatives on environmental aspects of technologies and processes in the fishery and aquaculture sectors  |
|  | Improvement of the wastes management in ports   |
|  | Promotion of projects for better management of the waste on board in fishing vessels or in aquaculture facilities   |
|  | <b>Measures for the prevention of marine litter from land sources</b>   |
|  | Preparation of regional waste management plans  |
|  | Revision of regulations which affect the application of the Extended Producer Responsibility  |
|  | Application of the measures contained in the regulations which transpose Directive 2015/720, amending Directive 94/62/EC with regard to the reduction of the consumption of light plastic bags  |

| <b>SPAIN</b> (measures included in the PoM for Estrecho and Alborán, and Levantine-Balearic marine subdivisions)   |  |
|--|--|
| <b>Theme (descriptors)</b>   | <b>Measures</b>  |
| <b>Marine litter (D10)</b>   | Study on the quantities of marine litter (including microplastics) from wastewater treatment plants and proposal of specific measures to be incorporated into the river basin management plans (3 <sup>rd</sup> cycle) |
|  | Ensure the inclusion of explicit references to marine litter in all waste management instruments to be promoted in the future  |
|  | Research into ecological aspects of microplastics. JPI Oceans pilot initiative: BASEMAN, EPHEMARE, PLASTOX projects  |
|  | Study on the quantification of sources of microplastics and identification of possible reduction/prevention measures   |
|  | Standards for the design of stormwater tanks   |
|  | Plan for Treatment or Removal to Controlled Landfill of paper waste and derivatives and plastics in Melilla (Chafarinas Islands)   |
|  | <b>Measures for the removal of marine litter</b>   |
|  | Promote the installation of waste-collection facilities at fishing docks   |
|  | Development of a framework document for the development of a coherent "fishing for litter" scheme  |
|  | Promotion and funding of "fishing for litter" activities   |
|  | Funding of clean-up activities in rivers, beaches, and shallow waters  |
|  | Promotion of events coinciding with <i>Cleanup Day</i> initiative, and encouraging participation   |
|  | Study of marine litter hotspots (areas of greatest accumulation or particularly vulnerable areas in the presence of waste)   |
|  | Clean-up campaigns aimed at identified marine litter accumulation sites  |
|  | Creation and maintenance of a national database of items collected in "fishing for litter" activities.   |
|  | <b>Awareness-raising and information measures on the problem of marine litter</b>  |
| Preparation of rise awareness/communication materials, with the possibility of including a campaign through media  |  |
| Creation of a technical group on marine litter as a coordination/discussion forum around the problem of marine litter and its possible solutions   |  |
| Creation of the figure of "Beach Guardians", aimed at associations, environmental organisations, fishermen, fishery associations and other groups, and a network of "guardian" organisations for the environmental conservation of rivers and beaches and raise awareness about this problem at local, regional and national level |  |
| <b>Underwater noise (D11)</b>  | Regulation of criteria for projects generating underwater noise and for the preparation of EIAs of those projects  |
| <b>Horizontal measures</b>   | Regulation of criteria of compatibility with marine strategies, in accordance with article 3.3 of law 41/2010  |
|  | Development of a strategy for the visibility and dissemination of marine strategies  |
|  | Education programme in schools   |

| <b>SPAIN</b> ( <i>measures included in the PoM for Estrecho and Alborán, and Levantine-Balearic marine subdivisions</i> ) |   |
|---|---|
| <b>Theme (descriptors)</b>  | <b>Measures</b>   |
|   | ACTIONMED Project: Action Plans for Integrated Regional Monitoring Programmes, Coordinated Programmes of Measures and Addressing Data and Knowledge Gaps in Mediterranean Sea   |
|   | Mar Menor “ITI”   |
|   | Training programmes for fishermen, on-board observers, personnel of stranding networks, and training of policy-makers and agents of the authority   |
|   | Raise awareness programmes targeted to users of beaches, nautical-recreational tourism companies, fishermen and civil society in general  |
|   | Preparation and implementation of a curriculum related to respect for and protection of cetaceans, marine turtles and birds, as well as marine litter, in official marine-related education in the recreational and fishing sectors |
|   | Promotion of innovative projects for the improvement of the sustainability of aquaculture facilities  |
|   | Promotion of entrepreneurship: prevention (business innovation) and management (support to the creation of new companies)   |



**ANNEX IIA**

**PILOT SOCIO-ECONOMIC ASSESSMENT**

**FOR THE MARINE PROTECTED AREAS**

**NETWORK EXTENSION MEASURE**

**INCLUDED IN THE DRAFT MSFD**

**PROGRAMME OF MEASURES FOR**

**GREECE**



## 1. Introduction

The project *Action Plans for Integrated Regional Monitoring Programmes, Coordinated Programmes of Measures and Addressing Data and Knowledge Gaps in Mediterranean Sea* (ActionMed) aims to address some of the issues<sup>17</sup> identified, following completion of the first phase of the EU Marine Strategy Framework Directive 2008/56/EC (MSFD) implementation, by supporting the development of regional action plans and best practices for integrated monitoring programmes, coordinated programmes of measures and filling of data gaps for the Mediterranean marine waters. The project is implemented through five interlinked activities.

The aim of the ActionMed Activity 3 is to assist the EU Member States in the Mediterranean region in their work on programme of measures (PoMs), 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 (Decision IG. 21/3). To this end, the following tasks have been implemented as a part of the Activity 3 (PoMs Activity): 1) assessment of common gaps in national and regional measures and selection of issues requiring further actions to achieve or maintain GES; 2) elaboration of possible measures; 3) socio-economic/ cost-efficiency analysis in elaborating the PoMs; and 4) preparation and dissemination of recommendations.

In the framework of Task 3, Plan Bleu has undertaken socio-economic assessment of four selected (potential) regional measures to achieve GES and has prepared a study<sup>18</sup> providing detailed information on the effectiveness, costs and benefits of the assessed measures. The study also provides guidelines for national socio-economic assessments of measures, based on the approaches applied in the course of PoMs preparation in three EU Member States and international best practice.

In agreement with the Special Secretariat for Water as the MSFD Competent Authority for Greece, and by building up on the methodological work done by Plan Bleu at regional level, further assistance has been extended to Greek authorities in the framework of the ActionMed project (Activity 3, Task 3) by conducting a pilot socio-economic assessment for the Marine Protected Areas (MPAs) network extension measures included in the draft PoM. Moreover, the assistance included drafting of Terms of Reference for the overall assessment of all new measures included in the Greek PoMs. This paper presents considerations and results of the assessment conducted for the MPAs network extension.

## 2. General information on the MPAs network in Greece

European Environment Agency (EEA, 2014) offers a definition of marine protected area as a geographically distinct zone, for which protection objectives are set. Similarly, the European Commission (EC, 2015) defines Marine Protected Areas as measures used across Europe's seas for protecting vulnerable species and habitats: MPAs are geographically defined marine areas, whose primary and clearly stated objective is nature conservation, and which are regulated and managed through legal or other effective means to achieve this objective. MPAs can have multiple objectives which, in addition to nature conservation, usually refer to resource

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<sup>17</sup> Including, for example, lack of coherence in the Member States' submissions under Articles 8, 9 and 10 (Initial Assessment, determination of GES, establishment of targets), which was assessed to be particularly pronounced in the Mediterranean.

<sup>18</sup> Plan Bleu, 2016, *Socio-economic assessment of selected potential new measures to achieve good environmental status of the Mediterranean waters, ActionMed Deliverable 3.2*

conservation (mainly fisheries), fostering sustainable tourism and job-generation (Plan Bleu, 2016).

According to the PAF – Prioritised Action Framework (Greek Ministry of Environment, Energy and Climate Change, 2014), Natura 2000 network in Greece comprises 419 terrestrial and marine areas including 241 Sites of Community Importance – Special Areas of Conservation (SCIs – SACs) and 202 Special Protection Areas (SPAs), whereas 24 areas are designated as both SCIs and SPAs. Total surface of existing Natura 2000 marine areas is 6,914 km<sup>2</sup> or 6.1% of the territorial waters. Marine SPAs cover an area of 1,587 km<sup>2</sup> or 1.4% of the territorial waters.

The existing marine SPAs are located both within and outside the four MPAs that are currently designated in Greece, including:

- National Marine Park of North Sporades covering an area of 2,220 km<sup>2</sup> (renown for monk seals habitats);
- National Marine Park of Zakynthos covers an area of 135 km<sup>2</sup> (renown for sea turtles habitats);
- National Lagoons Park of Mesologi – Aitoliko with an area of 250 km<sup>2</sup>; and
- National Park of Amvrakikos Gulf with an area of 405 km<sup>2</sup> (habitats important for birds).

### 3. Description of the assessed measure

Article 13.4 of the MSFD states that ‘programmes of measures established pursuant to this Article shall include spatial protection measures, contributing to coherent and representative networks of marine protected areas [...] as agreed by the Community or Member States concerned in the framework of international or regional agreements to which they are parties’.

Pursuant to this requirement, a measure aiming to extend existing MPAs network in the framework of the Natura 2000 has been included the draft MSFD PoMs for Greece (details in Table 1). The target is to increase the share of SPAs to 5% of the territorial waters by 2020, which in fact means designation of additional total surface of some 4,080 km<sup>2</sup> as SPAs in the course of the next 4 years. By achieving this target, total surface of marine Natura 2000 would increase to nearly 11,000 km<sup>2</sup> (10,994 km<sup>2</sup> or 9.7% of territorial waters), thus nearing the EU and AICHI targets of 10% share of MPAs (in Natura 2000 sites alone). Proclamation of new SPAs could in fact trigger establishment of wider Marine Protected Areas to ensure connectivity and coherence of the network and improve management and cost-effectiveness.

The measure of establishing new MPAs in the framework of Natura 2000 could be classified as category 1.b (existing measures relevant for the maintenance and achievement of GES under the MSFD that have been adopted under other policies, but have not yet been implemented or fully implemented). Alternative classification could be 2.a category (new measures)<sup>19</sup>.

Even though socio-economic assessment (cost-effectiveness and/ or cost-benefit analysis) is not required for category 1.b measures (for category 2.a the need for assessment is determined on a case by case basis), it was agreed to use this measure for the pilot socio-economic assessment, given the fact that the measure entails establishment of protection regime over new marine areas and that experience shows this process can sometimes be contentious. The aim

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<sup>19</sup> Additional measures to achieve GES which build on the existing EU legislation and international agreements, but go beyond what is already required under these.

for selecting this measure was to provide decision makers and stakeholders in Greece with more information on costs and benefits from implementing MPA network extension and to thus facilitate finalisation of the MSFD PoMs and contribute to effective implementation. Moreover, the measure was deemed suitable to demonstrate how methodological guidance compiled by Plan Bleu could be applied at national level.

**Table 13:** Description of the measure.

|                                       |   |
|---------------------------------------|---|
| <b>Title</b>                          | Establishment of MPAs in the framework of the Natura 2000 network for the protection of various priority habitats, including <i>Posidonia</i> meadows, submerged caves, and sandbanks   |
| <b>Description</b>                    | <p>The objective of the measure is to increase share of Special Protection Areas (SPAs) in the territorial waters from 1.4 to 5% by 2020. The target applies to all three marine sub-regions in Greece (Adriatic, Ionian and Central Mediterranean, and Aegean-Levantine) and assessment areas (as identified in the MSFD Initial Assessment<sup>20</sup>).</p> <p>To reach the target of 5% share of SPAs, a total area of 4,080 km<sup>2</sup> would need to be designated as new SPAs by 2020. Together with the existing SPAs (1,587 km<sup>2</sup>), total SPAs surface would rise to 5,667 km<sup>2</sup> increasing total marine Natura 2000 area from the existing 6,914 km<sup>2</sup> to 10,994 km<sup>2</sup>. Marine Natura 2000 sites would thus account for 9.7% of territorial waters.</p> <p>The actions needed to achieve 5% target for SPAs have been identified and prioritized in the Prioritised Action Framework (PAF) for Natura 2000 (as presented in Table 4).</p> |
| <b>MSFD category, type of measure</b> | 1.b/ 2.a<br>Spatial and temporal distribution controls  |
| <b>Link to policy objectives</b>      | MSFD, Directive for Natural Habitats, Directive for Marine Spatial Planning, Common Fishery Policy  |
| <b>Link to descriptors</b>            | D1, D3, D4, D6, D11   |
| <b>Drivers</b>                        | Fishing, maritime transport, tourism and recreation, sea & land use   |
| <b>Pressures</b>                      | Selective extraction of species, including non-target catches; damages to sea floor; underwater noise; marine litter; inputs of pollutants  |
| <b>Impacts</b>                        | Loss of biodiversity, declining abundance, distribution and condition of species and habitats   |

#### 4. Theoretical and practical effectiveness of the measure

It has been demonstrated that well-managed European marine protected areas have positive ecological effects. In marine reserves with high protection, species density increased an average of 116%, biomass of plants and animals increased on average 238%, body size of animals increased 13% and species richness by 19% (EC, 2015<sup>21</sup>).

<sup>20</sup> Ministry of Environment, Energy and Climate Change of Greece – Special Secretariat for Water, 2012

<sup>21</sup> Based on Fenberg, P. B., *et al.*, 2012. The science of European marine reserves: Status, efficacy, and future needs. *Marine Policy*, 36(5): 1012–1021.

In addition to positive effects on biodiversity, effectively managed MPAs support generation of a range of socio-economic benefits and contribute to preservation of services provided by marine ecosystems. As shown in the different assessment studies, these benefits include increased attractiveness for tourism, increased catch (by increasing biomass, MPAs can contribute to fish stocks rebuilding<sup>22</sup>), strengthening of other ecosystem services (such as waste assimilation, coastal protection and flood management) and similar. The designation of a British network of MPAs, for example, was estimated to generate a monetary value of £8.2 billion for gas and climate regulation and £1.3 billion for nutrient cycling<sup>23</sup>.

A rough (order of magnitude) assessment (EC, 2013) of the value of benefits delivered by the marine Natura 2000 network (equivalent to 4.7% of the EU's marine area) indicates these areas generate annual benefits of €1.4 - 1.5 billion. This would increase up to €3.0 - 3.2 billion per year, if 10% of the European seas were protected. The higher figures apply to stronger protection measures. Another estimate published in this EC report is that between 1.2 to 2.2 billion visitor days to all the Natura 2000 sites (terrestrial and marine) are realised each year, generating recreational benefits worth between €5 and €9 billion per annum.

As regards tourism, experiences (European and non-European alike) have shown MPAs can become major tourist attractions contributing substantially to coastal/ national economy. One of the most prominent examples is the Australian Great Barrier Coral Reef Marine Park (among the largest MPAs in the world with a surface of around 344,000 km<sup>2</sup>, one of the largest MPAs in the world) which provides significant economic benefits and employment opportunities to coastal communities and the country, in general. National level contribution (value added) generated by tourism, recreation, commercial fishing and scientific research in the Marine Park's catchment area in 2012 was estimated at \$5.7 billion; number of full time jobs was estimated at around 69,000. The figures are based on both direct and indirect contributions of the considered activities and are driven by just over \$7 billion of expenditure in the catchment area and around 1.8 million tourist visitor days (Great Barrier Reef Marine Park Authority, 2014).

Potential benefits should not, however, be taken for granted. Plan Bleu's study (Plan Bleu, 2016) points out that due to a diversity of MPAs and the fact they often have multiple objectives (some of which are linked to specific targets and indicators, but others are not), the overall effectiveness of MPAs cannot be described in a common framework. Moreover, as substantiated by different research studies, the analysis of effectiveness of MPAs is complicated by the fact that a large share of these areas does not have management plans/ clear management objectives, which makes the assessment of effectiveness hard if not impossible. Natura 2000 PAF report (Ministry of Environment, Energy and Climate Change of Greece, 2014) also points out that lack of management plans has been recorded for majority of the existing SPAs in Greece (whereas the relevant target is to develop management plans for all the SPAs by 2020).

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<sup>22</sup> For instance, setting up the Columbretes Islands Marine Reserve in Spain increased catches in surrounding fisheries by about 10% a year (EC, 2015, based on Sala, E., 2012. *Here is one great way to save fish – and the fishing industry* in Tackling Science Challenges, Harvard Business Review 85).

<sup>23</sup> EC, 2015, based on Hussain *et al.*, 2010. An ex-ante ecological economic assessment of the benefits arising from marine protected areas designation in the UK. *Ecological Economics*, 69(4) :828-838.

Plan Bleu's study further found out there was a general consensus that well-managed MPAs had a positive impact on fish stocks. Biodiversity and ecosystem quality and resilience will grow as the size of and legal restrictions in the protected area increase, with big no-take MPAs achieving greater ecological benefits in terms of biomass production than small, multiple-use MPAs<sup>24</sup>. Empirical evidence regarding MPAs effectiveness in relation to objectives other than fisheries management (including *inter alia* sustainable tourism and/ or eco-tourism, awareness raising and education, preservation of historic/ cultural heritage and similar) was assessed to be more scarce and less applicable to a variety of different MPAs.

Plan Bleu has also identified a number of prerequisites for successful implementation and practical effectiveness of MPAs establishment. One critically important factor is the support of marine users and communities and their attitudes towards the equity of the MPA's rules. Moreover, monitoring and research, as well as political will, appropriate funding, and surveillance and enforcement were identified as prerequisites for effective MPAs management.

Addressing similar concerns, OECD has formulated the following recommendations for successful establishment and effective management of MPAs (OECD, 2016):

- State of and pressures on particular marine and coastal ecosystems need to be clearly understood, alongside with the likelihood that MPAs can address these and what stakeholders are involved.
- Clear goals and objectives of the MPAs need to be set, and the required level of protection to achieve these applied.
- Estimation of expected costs and benefits of MPAs can help decision makers to better evaluate the net benefits to society from investing in an MPA and to prioritise efforts amongst various possible MPAs, if resources are limited. It can also provide insights on how benefits are distributed (over time, different geographic scales and between different groups of users of marine environment).
- Siting of MPAs needs to be undertaken in more strategic manner, to enhance the environmental as well as cost-effectiveness of MPAs.
- MPAs management plan needs to be developed, and adequate monitoring programmes implemented.
- Robust compliance and enforcement regimes need to be applied; understanding motivations behind non-compliance can help to determine the most appropriate measures to address these.
- MPAs financing strategies, which include identification of financing needs and the possible instruments through which additional finance can be mobilised<sup>25</sup>, should form an integral component of an MPA management plan.

Even though establishment of MPAs cannot be substituted by alternative measures when it comes to biodiversity conservation objectives, MPAs alone are not sufficient to address full

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<sup>24</sup> Based on Roberts, C., Hawkins, J.P., Fletcher, J. *et al.*, 2010. *Guidance on the size and spacing of marine protected areas in England*. Natural England Commissioned Report NECR037, Natural England. Peterborough. Available on <http://publications.naturalengland.org.uk/publication/46009> (accessed on 29/08/2016)

<sup>25</sup> Potential MPA financing instruments are: government budgets, other public funds (including EU funding), trust funds, private funds, external development finance, NGOs, user fees, taxes and fines, subsidies (e.g. fisheries subsidies, particularly those that are potentially environmentally harmful), payments for ecosystem services, and marine biodiversity offsets (rarely used).

range of pressures on marine ecosystems. The OECD thus advises introduction of complementary instruments to manage pressures such as over-fishing, marine pollution (including from land-based sources), climate change, invasive alien species and others. A comprehensive package of policy measures is needed to ensure sustainable use of marine resources.

As identified in the Plan Bleu's study (based on Rodríguez-Rodríguez, 2016<sup>26</sup>), alternative measures (to MPAs) to achieve fisheries management objectives may include catch and fishing efforts limitations, restrictions on the size of catch, access controls (licenses), time-area-gear type closures (which can be a form of MPAs), and others.

## 5. Choice of the assessment method

Based on the commonly used definitions of the available assessment tools (cost-effectiveness analysis, cost-benefit analysis and multi-criteria analysis), nature of the measure, and availability of data, it was decided to use cost-benefit analysis (CBA) to assess the MPAs network extension. Due to data and time constraints, it was not possible to carry out monetised/quantitative CBA.

As expected, quantification has proved to be easier for the implementation costs. This in particular applies to direct management costs due to existence of national MPAs and a wide range of studies from which reference figures could be used (for e.g. unit costs of managing an MPA, number of management staff and similar). Assessment of direct and indirect benefits from implementing the measure was more complex for two major reasons. First, it was difficult to identify and quantify most of the specific effects attributable to the implementation of the measure (e.g. environmental improvement, contribution to tourism) due to complexities of the environmental, economic and social context (this also applies to the assessment of indirect costs of the measure<sup>27</sup>). Secondly, quantification and monetisation of benefits would require comprehensive and time-consuming process of deriving a total economic value<sup>28</sup> for the flow of goods and services to which MPAs contribute, including valuation studies to estimate (in monetary terms) benefits, which do not have a market value (or extrapolation of value based on similar studies). In principle, these difficulties are easier to overcome on a more specified/detailed level of implementing various measures (e.g. for a specific MPA with defined zones and protection regime, as compared to a national network of MPAs).

Despite significant limitations, a qualitative CBA conducted for this assessment is seen as a useful tool to illustrate positive (benefits) and negative impacts (costs) of the measure and their relation. It combines quantified data on direct costs associated with MPAs management with a qualitative data on indirect cost, as well as on benefits (with limited quantification of benefits based on certain assumptions and available data). This is expected to contribute to better

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<sup>26</sup> Rodríguez-Rodríguez D., 2016. *MPAs as sustainable fishery tools*, MedPAN

<sup>27</sup> For example, estimation of costs to fishery sector from introducing fishing restrictions within the MPA network is not straight-forward due to fact that catch may be reduced and jobs in the sector lost as a consequence of several factors other than protection regime, including declining fish stocks, emergence of other economic opportunities, implementation of fishery policies, and similar.

<sup>28</sup> Total economic value is a framework for considering various constituents of value, including direct use value, indirect use value, option values (value placed by an individual on maintaining or preserving a public asset or service even if there is little or no likelihood of the individual actually ever using it) and existence value.

understanding of what does the planned extension of the MPAs network mean and how costs and benefits are distributed across time and different sectors, thus contributing to the overall implementation and acceptance of the measures, and consequently to the achievement of good environmental status (GES) of marine waters.

## 6. Information and data on which the assessment is based

### 6.1 Establishment and management costs for the existing MPAs

#### International/ regional studies

In contrast to numerous (even though not complete) available studies and information on the costs of managing MPAs, information on the costs of establishing such areas is rarer. Plan Bleu's study concluded that one-off establishment costs were likely to include: (i) acquisition costs if part of the new or extended MPA is privately owned (which is rather uncommon in the case of marine parts of protected areas), (ii) transaction costs associated with negotiating modalities and level of protection, including time and staff involved in stakeholder negotiations, and (iii) education and outreach costs to inform users of new zoning schemes and requirements. Other one-off costs related to establishment of MPAs can include costs of surveys, studies and assessments leading to designation and cost of development of related infrastructure (when such interventions are needed/ included in the MPAs establishment).

The study<sup>29</sup> by McCrea-Strub *et al.* (2010) has shown that variation in the MPAs start-up costs is mainly linked to MPAs size and the duration of the establishment phase. Based on a review of the costs of establishing 13 MPAs around the world, researchers calculated that anywhere between \$41 and \$1.1 million was spent per square kilometre of new marine reserves in the establishment process. The size of analysed MPAs ranged from small-scale preserve in the Philippines (Bibilik) covering just 0.2 km<sup>2</sup> to a vast Hawaiian (Papahanamokuakea) reserve with a surface of 362,000 km<sup>2</sup>. Total amount (in 2000 US dollars, adjusted for local purchasing power) spent on establishing Bibilik MPA was just around \$8,000 over 3 years, however in terms of costs per unit, the establishment of this reserve was costly (with some \$40,000 spent per km<sup>2</sup>). On the other hand, total costs for the Papahanamokuakea MPA reached \$34.8 million over 9 years, but per unit costs were rather low at \$96 per km<sup>2</sup>. The highest per unit costs – \$1.1 million per km<sup>2</sup> – were recorded for a 0.5 km<sup>2</sup> reserve near Zanzibar, Tanzania, due to lengthy political and permit delays and the construction of a visitor's center and tourist villas.

As for the recurrent management costs for the MPAs in the Mediterranean, the study<sup>30</sup> by Gabrié *et al.*, 2012 (quoted in Plan Bleu, 2016) summarised survey responses received from management authorities and found out there was a large variation in the running costs of different MPAs. Seven MPAs reported annual operating budget between 20,000 and €100,000/km<sup>2</sup>, 8 between €10,000 and €20,000/km<sup>2</sup>, and 15 MPAs between €1 and €10,000/km<sup>2</sup>.

Other international studies analysed by the Plan Bleu (including Balmford *et al.*, 2004, and Ban *et al.*, 2009) showed that MPAs operating costs were most notably linked to the size of MPAs

<sup>29</sup> Key findings of McCrea-Strub, A., Zeller, D., Rashid Sumaila, U., Nelson, J., Balmford, A., & Pauly, D., 2010. Understanding the cost of establishing marine protected areas. *Marine Policy*, published on <http://conservationmagazine.org/2010/08/pricing-protection/> (accessed on 11/01/2017)

<sup>30</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.

and that per unit (km<sup>2</sup>) costs were lower in bigger MPAs. Almost 80% of variability in the running costs of MPAs analysed at global level was attributable to the size. Other important factors affecting the level of running costs per km<sup>2</sup> were distance from inhabited land, number of years since establishment, share of MPAs designated as special purpose areas, number of zones, and IUCN protection level.

Based on a model developed by Balmford *et al.* (2004), which assessed costs of a global extension of MPAs to 10% and 30% coverage, Plan Bleu extrapolated an estimate of the annual running costs for the Mediterranean MPAs as follows: €48.5 million for a 10% coverage and €136.8 million for a 30% MPAs coverage.

### Zakinthos Marine Park

National Marine Park Zakynthos (NMPZ) has a total surface of around 135 km<sup>2</sup> and is managed by the NMPZ authority. The main activities of the NMPZ are linked to area management (including surveillance and enforcement) and research. The marine part has three zones with different protection regimes (referring mainly to vessel passage and mooring restrictions). The land part encompasses a small strictly protected area on Sekania beach where, on average, 50% ( $\pm$  5%) of the total nesting of the sea turtle *Caretta caretta* on Zakynthos takes place.

NMPZ has a total of 32 permanent staff – 19 guards and 13 administration and scientific staff. Payroll costs (for 2017) are €570,000. Moreover, 25 seasonal staff is employed for five months during the tourist season for the beach surveillance needs (payroll costs are €200,000). Total number of staff (in full time equivalent) is 42. Total operating costs are estimated at € 840,000 (realistic operating costs budget is assessed to be at the level of €1,000,000 per year).

Around 700,000 people visit the beaches supervised by the NMPZ, mainly in July and August.

## 6.2 MPAs costs and benefits and their distribution

### **International/ regional studies**

A study by Pascual *et al.*, 2016,<sup>31</sup> examined a total of 208 published studies on socioeconomic impacts of MPAs and marine uses, focusing the analysis on the Mediterranean and Black Seas. A total of 22 marine uses that could potentially be impacted by the establishment of MPAs were identified for the purpose of this study, including: 1) industrial fishing (including trawlers, seiners, and purse seiners); 2) artisanal fishing (including hooks, lines, traps, fixed nets, trammel nets, fish barriers, gill nets, and multi-purpose vessels); 3) recreational fishing (land- or boat-based angling); 4) underwater recreational fishing (spearfishing); 5) aquaculture/ mariculture (open ocean); 6) shell fishing; 7) biological resources extraction (including species not considered in fishing, aquaculture or mariculture activities, such as sea cucumbers, algae or corals); 8) tourism (including sunbathing); 9) hiking, walking, access to beaches; 10) swimming, snorkelling, canoeing, surfing, paddle surfing, wind surfing, etc.; 11) diving; 12) underwater archaeology; 13) recreational boating (sailing and marine cruising); 14) scientific research; 15) educational activities; 16) sand/gravel extraction; 17) oil/gas extraction; 18) offshore wind farming; 19) wave farming; 20) industrial maritime transport; 21) building along the coastline; and 22) military uses.

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<sup>31</sup> Pascual M, Rossetto M, Ojea E, Milchakova N, Giakoumi S, Kark S, Korolesova D, Meliá P, 2016. Socioeconomic impacts of marine protected areas in the Mediterranean and Black Seas, *Ocean & Coastal Management*, 133: 1-10.



The study found most impact assessments have explored how fishing, tourism, and recreational activities have been affected by the establishment of MPAs. Assessments for the remaining uses were scarce or absent. Overall evidence from the examined studies suggests that artisanal, land and boat-based recreational fishing, tourism and beach access, scuba diving, and other recreational activities can be generally benefited by the establishment of MPAs. Conversely, industrial fishing, spearfishing, aquaculture and mariculture, as well as sand and gravel extraction, seem to be negatively impacted by MPAs. For the industrial fishing, however, it is important to point out that for the Mediterranean Sea, mainly positive impacts were identified (in 58% of the reviewed studies), especially in French and Spanish MPAs, while some negative impacts were found for specific MPAs in France, Greece, Israel, Malta, Italy, and Spain.

The overwhelming majority (96%) of the reviewed studies testified of positive impacts of MPAs on tourism. Positive impacts were also recorded for swimming, snorkelling, canoeing, surfing, diving, scientific research, and educational activities. However, evidence on negative impacts of MPAs on recreational boating prevailed (found in 53% of the reviewed studies).

In the 2013 study<sup>32</sup>, Rees *et al.*, 2013 have analysed a three year dataset to understand the themes associated with the economic, environmental and social costs and benefits of an MPA in Lyme Bay, United Kingdom, following the establishment of this 206 km<sup>2</sup> protected area in 2008. Two hundred and forty one individuals from seven stakeholder groups (mobile gear fishermen, static gear fishermen, scallop diver fishermen, divers, charter boat operators, dive business owners and anglers) were interviewed between 2008 and 2010 to determine perceptions on cost and benefits, and the level of support towards the MPA.

Results revealed that despite the contentious manner in which this MPA was established, support for the protected area was strong amongst the majority of stakeholder groups (with varying levels of support and reasons). Overall, the stakeholders perceived the social, economic and environmental benefits of the MPA outweighed the perceived costs. Perceived environmental and economic benefits substantially exceeded perceived costs, while as the situation was reverse for social impacts of the MPA, as stakeholders assessed social costs were higher than social benefits. Economic and social costs of the MPA policy have been mainly borne by mobile and static gear fishermen and charter boat operators.

### 6.3 Sectors of the Greek economy related to marine waters

For the MSFD Initial Assessment, economic sectors related to marine waters have been grouped in the following three categories:

- the group of resource users such as fisheries, aquaculture, fisheries product processing and coastal fisheries infrastructure;
- the group of recreation such as tourism, tourism infrastructure (marinas, beaches);
- the group of maritime transport such as ports, maritime transportation of goods and humans and the large scale infrastructure.

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<sup>32</sup> Rees, S.E., Attrill, M.J., Austen, M.C., Mangi, S.C. and Rodwell, L.D., 2013. A thematic cost-benefit analysis of a marine protected area, *Journal of Environmental Management*, 114:476 – 485.

Tourism is a very important sector in Greece, which to a significant extent depends on marine and coastal attractions and amenities. The sector's contribution to GDP in the period 2010 – 2012 has been estimated at 15.4 – 16.5% (Table 2). With the total employment estimated at around 0.7 million (around half i.e. 350,000 are jobs directly linked to tourism), the sector is also a significant contributor to overall employment in the country. International tourist arrivals in the observed period were in the range of 15 – 16 million, generating receipts of around €10 billion annually.

**Table 14:** Key tourism data 2010 – 2012.

|  | 2010    | 2011    | 2012    |
|--|---------|---------|---------|
| Contribution to GDP                        | 15.4%   | 16.5%   | 16.4%   |
| Contribution to employment                 | 17.1%   | 18.4%   | 18.3%   |
| Total employment (direct + indirect)       | 754,000 | 758,300 | 688,800 |
| International tourism receipts (billion €) | 9.6     | 10.5    | 10.02   |
| International tourist arrivals (million)   | 15      | 16.4    | 15.5    |
| Average per capita tourism expenditure (€) | 640     | 639     | 646     |
| Overnight stays (million)                  | 140.2   | 151.9   | 140.9   |
| Average duration of stay (days)            | 9.3     | 9.2     | 9.1     |

Sources: MSFD Initial Assessment and SETE, 2013

According to official statistics, the number of arrivals (of non-residents) to Greece has risen significantly in the period 2013 – 2015 to 17.9 million in 2013, 22 million in 2014 and 23.6 million in 2015 (Hellenic Statistical Authority, 2016), which indicates that tourism continued to play a very important role in the national economy and that due to recent developments affecting international tourism market it has become even more significant sector in recent years.

Fishery is one of the traditional sectors of the Greek economy. There are still rural areas dependent on fisheries. According to the MSFD Initial Assessment data, the Greek fishing fleet was composed by 16,332 professional vessels in 2012. Total employment in the sector was estimated at 38,000. Overview of the key marine fishery figures for the last five years is provided in Table 3. Value of the catch has decreased by almost 20% in 2015 compared to 2011, even though fishing effort/ number of vessels and total catch increased.

**Table 15:** Sea fishery 2011 – 2015.

|  | 2011  | 2012  | 2013  | 2014  | 2015  |
|--|-------|-------|-------|-------|-------|
| Motor propelled fishing vessels (20 HP and over) | 5,737 | 5,842 | 5,803 | 5,783 | 6,054 |
| Quantity of catch (thous. tonnes)                | 63    | 61    | 64    | 60    | 64    |
| Value (million €)                                | 259.2 | 225.5 | 234.0 | 229.8 | 207.5 |

Source: Hellenic Statistical Authority, 2016

The employment in the aquaculture sector is estimated at 10,000 persons (MSFD Initial Assessment data). Official statistics show that total aquaculture production ranged between 104

and 111 thousand tonnes in the period 2011 – 2015, showing a slightly decreasing trend. Production value was in the range of €435 - €475 million.

According to the Inter-European Transportation Network, 22 Greek ports are considered as international ones since they are hubs for the movement of more than 1.5 million tonnes of goods or more than 200,000 people. A large number (around 1,250) of rural ports, marinas and fishing ports is also in operation (MSFD Initial Assessment). In 2015, Greek merchant fleet had 1,831 vessels with the total capacity of 44.3 million GRT. Overall, 38 million passengers and 135.6 million tonnes of goods were transported in 2015 (Hellenic Statistical Authority, 2016).

## 6.4 Costs of degradation of marine environment

For the MSFD Initial Assessment, the net present value of the production value and the gross value added was estimated for the key sectors/ activities depending on marine waters (namely fisheries, aquaculture, sea food processing, tourism, beaches/ recreation and ports) under 3 scenarios of degradation of marine environment. The analysis referred to the period 2008 – 2020. The discount rate was set at 2.38% (two more scenarios with higher discount rates were also analysed).

Maximum cumulative losses (costs of degradation) to the fisheries sector were estimated at 0.07% of GDP for production value and 0.03% for value added. As for tourism, maximum losses were assessed at 0.81% of GDP for production value in the sector, and 0.15% for value added.

## 7. Costs and benefits of extending the MPA network in Greece

### 7.1 Assessment of costs

#### 7.1.1 *Direct costs of extending the MPA network in the framework of Natura 2000*

Direct economic costs of extending the MPA network have been estimated taking into account one-off establishment costs and operational/ management costs.

Considering that significant preparatory activities on Natura 2000 establishment have already been undertaken, including negotiation with stakeholders and communication activities, that some of the new MPAs might be managed by already existing bodies etc., lower-end estimates from the available studies have been used to assess establishment costs for the new SPAs in Greece. These costs are estimated at around €260,000 over the next 4 years. This is consistent with the PAF planning where relatively low financing needs have been identified for designation of new Natura 2000 sites (priority measures for extending marine Natura 2000, as identified in the PAF, are presented in Table 4). It is important to bear in mind that potential conflicts over new designations, the need for acquisition in certain areas, necessity to undertake certain infrastructural works and similar developments could substantially prolong the time needed for the establishment of SPAs and increase the start-up costs.

Annual costs of managing the additional marine protected areas (SPAs) have been estimated based on the operating cost in Zakynthos Marine Park and are projected to be in the range of

€25.4 – 30.2 million per year<sup>33</sup>. This simplified estimate does not take into account size of individual protected areas, zoning/ protection categories and other relevant factors as these were not available for the pilot assessment. Operational costs can be reduced by connecting SPAs into larger marine protected areas thus triggering economy of scale. The lower potential costs of managing some areas are assumed to be offset by the need to implement more expensive conservation measures at other locations.

**Table 16:** Priority measures for Natura 2000 marine and coastal habitats and species.

| Priority measures   | Type of costs      |
|---|--------------------|
| Establishment of Natura 2000 sites (evaluation studies, designation of new areas)   | One-off            |
| Scientific studies/ inventories for the identification of sites – surveys, inventories, mapping, condition assessment   | One-off            |
| Preparation of management plans, strategies and schemes   | One-off/ recurrent |
| Establishment of management bodies  | One-off/ recurrent |
| Conservation management measures – maintenance and improvement of habitats’ favourable conservation status (including anti-erosion works, restoration of hydrological balance, sediment management, assessment of the need for artificial reefs to protect <i>Posidonia</i> seabeds, fisheries and anchoring limitations, visitors management, sand extraction limitation/ prohibition)                       | Recurrent          |
| Conservation management measures – maintenance and improvement of species’ favourable conservation status (including creation of Fisheries Restricted Areas, measures to prevent and/ or reduce deaths caused by fishing gear, artificial nests, rafts etc. for specific species, anti-erosion works, control of the number of tourist boats in sea caves, reintroductions, identification of spawning areas) | Recurrent          |
| Conservation management measures related to invasive alien species (IAS)  | Recurrent          |
| Monitoring, surveillance  | Recurrent          |

Source: Ministry of Environment, Energy and Climate Change of Greece, 2014

### 7.1.2 Indirect costs

Indirect costs (including economic, social and environmental costs) have been identified based on the assumption that designation of new SPAs with a surface of 4,080 km<sup>2</sup> will cause negative impacts for several marine users/ sectors. These negative impacts will be manifested in the form of lost welfare and/ or accrued opportunity costs (foregone benefits of not using coastal/ marine ecosystems in a different way). The main sectors likely to be affected by the measure in a negative way are fisheries (commercial fishing in particular), aquaculture and maritime transport.

Expected negative impacts and related costs incurred to the commercial fisheries will be linked to decreased catches due to displacement of fishing effort or loss of access to fishing areas (leading to increase in fuel and time costs, increased competition). Other negative impacts

<sup>33</sup> Based on the management costs ranging from €6.200 – 7,400 per km<sup>2</sup> (derived from the available data on Zakynthos Marine Park operational budgets)

include increased risks from fishing in new areas and increased conflicts. It is not clear what share of the Greek fishery sector (with current catch of around 64,000 tonnes and a total value of €207 million) will be affected by introduction of new SPAs, therefore quantification and estimation of potential costs was not possible in the scope of this assessment. Loss of jobs in the fishery sector (currently standing at around 38,000) can be also expected. As pointed out by the Plan Bleu (based on Alban *et al.*, 2008<sup>34</sup>) it is possible that the costs will be relatively more important for small boats which have less alternatives to their fishing grounds than larger boats. The short term losses/ increase in costs are, however, likely to be compensated to a large degree by a positive impact MPAs are expected to have on fish stocks in the long run.

Based on the data and information presented in sections 4 and 6, it is possible to conclude the overall costs to fishing sector would not be significant and that fisheries are at greater risks from further degradation of marine waters than from MPAs introduction. As demonstrated for specific Mediterranean countries, positive impacts of MPAs on commercial fishing have been also recorded (Pascual *et al.*, 2016). Available information thus points to a conclusion that the overall impact for fisheries might be neutral or positive in the long run, with a benefit to cost ratio of 1 or higher than 1 (meaning that the total benefits would be equal to or higher than costs).

Additional efforts to better understand cost and benefits of MPAs for the fishing sector are needed in the designation process for specific areas that are likely to affect local fisheries significantly, focusing in particular on distributional/ equity impacts for different size of fishing boats and different fishing gear.

Negative impact can be expected for aquaculture due to sea use restrictions imposed by MPAs. These impacts are more likely to affect siting of new aquaculture capacities than the existing sites. This in turn highlights the need for improved application of maritime spatial planning to reduce conflicts and related costs.

As regards the costs to maritime transport, some MPAs may prohibit the transit of specific types of vessels through the protected area. Vessels can thus be forced to modify their navigation routes, potentially leading to higher fuel consumption and longer shipping time (Plan Bleu, 2016). Recreational boats are also likely to be impacted in a negative way by the establishment of MPAs due to navigating and mooring restrictions.

Indirect environmental costs of MPAs will mainly refer to increased pressures on habitats and species outside the MPAs due to displacement of certain activities, as well as to increased disturbance within protected areas due to higher numbers of visitors. In addition to the already mentioned social costs (such as increased conflicts, distributional issues etc.), loss of traditional property rights due to MPAs designation is also important.

## 7.2 Assessment of benefits

As already mentioned, an order of magnitude assessment indicated the value of benefits delivered by the marine Natura 2000 network in the EU was in the range of €1.4 - 1.5 billion

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<sup>34</sup> Alban F., Appéré G., Boncoeur J., 2008. *Economic Analysis of Marine Protected Areas: a Literature Review*, EMPAFISH Project, Booklet no 3. Editum 51 pp.

per year (EC, 2013). Number of visitor days to all Natura sites (terrestrial and marine) was estimated at 1.2 to 2.2 billion.

By downscaling these results to Greece, it can be concluded that the existing network of marine Natura 2000 sites already generates benefits worth between €28 and 30 million annually. If new SPAs (targeted by the assessed measure) would be taken into account, the figures would increase to between €43 – 46 million per year. As for the visitation, 45 – 82 million visitor days could be linked to Greek Natura 2000 sites.

These indicative figures are in line with empirical evidence (presented and/ or referred to in the previous sections of this assessment) that MPAs benefits as a rule outweigh the costs incurred by their establishment and management. However, as is the case with other public investments, potential benefits from investing into MPAs (and from bearing the associated costs) are often realised at some point in future whereas costs are incurred at sooner time.

### 7.2.1 Environmental benefits

Environmental benefits of MPAs are significant and undisputed, provided MPAs are set up with clear conservation objectives and backed with effective management and adequate resources. The main environmental benefits of the planned extension of MPAs network in Greece include biodiversity protection, habitats and fish stocks recovery, contribution to provision of ecosystem services and contribution to the achievement of GES. Ecosystem services that are likely to be positively affected by MPAs include provisioning services (e.g. securing long-term availability of sea food through increased biomass production), regulating (e.g. CO<sub>2</sub> capture by *Posidonia* meadows) and cultural services (including recreation, preservation of historic and cultural heritage).

### 7.2.2 Economic benefits

Establishment and effective management of MPAs comes at a significant cost. On the other hand, it has been demonstrated that a well-managed and effective network of MPAs generates a range of benefits for the economy and society. By contributing to healthy ecosystems and to upholding of ecosystem services, MPAs play an important role in preventing further degradation of marine environment, whereas costs of degradation (cumulative losses due to potential degradation) over the period 2008 – 2020 for Greek tourism sector alone have been estimated at 0.81% of GDP.

There is a large body of evidence (EC, 2013; Great Barrier Reef Marine Park Authority, 2014; Pascual *et al.*, 2016) that there is positive impact of MPAs on tourism and recreational activities such as swimming, snorkelling, canoeing, surfing, diving etc. Based on a rough assumption that the extension of MPA network in Greece (i.e. designation of new SPAs to reach the 5% coverage target by 2020) would increase demand for tourism and attract additional 3% of tourists (compared to 2012 number of visitors), additional 1.4 million of visitor days could be realised leading to total revenues of around €100 million. The assumption is a conservative one given the growing number of tourists and a growing market for eco- and nature based tourism.

Fishery is another economic sector where positive impacts are expected. MPAs can provide direct benefits by contributing to the restoration of fish stocks due to so called spillover effect (increase of biomass in the protected reserve and its eventual transfer to adjacent fishing zones)

or due to decrease in fishing within MPAs. This in turn leads to increased catch and improved catch quality, as well as to improved fishing productivity.

Other economic benefits linked to MPAs include increased spending in local business and stimulation of local economy (if local communities, for example, utilise opportunities offered by increased demand for tourism). These can increase the social and political acceptability of MPAs establishment. However, tourism and eco-tourism in and around MPAs need to be closely monitored in order to avoid an uncontrolled increase in the number of tourists which could lead to overcrowding. Congestion can lower the quality of the ecosystem and, by contradicting the objectives of the MPA, in turn decrease the attractiveness of the MPA to future visitors (Plan Bleu, 2016).

Employment related to the management of extended MPAs network was estimated (based on Zakynthos Marine Park staffing) at around 950 – 1,250 jobs, depending on the specific needs for site surveillance and enforcement. These may be very low in e.g. remote areas where pressures are not pronounced, but very high for tourist attractions such as Zakynthos beaches that are visited by as many as 700,000 tourists annually. Other job creation opportunities exist in tourism sector, especially for eco-tourism and recreational activities such as diving, snorkelling and similar. This new potential employment is expected to offset job losses in other sectors, fishery in particular.

Finally, MPAs generate benefits by preserving option and existence values of biodiversity i.e. by preserving the possibility of future use of biodiversity and/ or utility of delaying a decision concerning the use of resource, as well as benefit people gain simply by knowing that the ecosystem in question exists.

### 7.2.3 Social benefits

Social benefits include protection of cultural and social values, improved recreation experiences, positive impact on scientific research, and educational activities, improved environmental awareness, improved prospects for local communities and similar. Thorough identification of stakeholders and robust stakeholder process in the MPAs design, designation and implementation phase is likely to lead to better decisions concerning MPAs and to ensure that social benefits would be even to or overcome social costs.

## 8. Conclusions and recommendations

Total direct costs of managing the extended network of SPAs has been estimated at €25.4 – 30.2 million euros annually. One-off establishment costs are estimated to be low (around €260,000 for the next four years). Indirect costs have been assessed in a qualitative manner and the main ones include losses/ foregone benefits due to fisheries, maritime transport and land/ sea use restrictions in the protection zones, as well as reduced employment in the affected sectors.

Extended network of SPAs is on the other hand expected to generate significant environmental, economic and social benefits. Based on a conservative assumption that new marine SPAs could generate additional demand for tourism and attract more visitors (3% annually), tourism revenues alone would be increased by an estimated amount of some €100 million per year. Other benefits (such as biodiversity recovery, increase in fish stocks, benefits for the local economy, protection of social and cultural values and others) have been assessed qualitatively.

Extension of the MPA network would have an overall positive impact on employment whereas expected loss of jobs (primarily in the fisheries sector) would be compensated by creation of between 950 and 1,250 new jobs related to MPA management and an undetermined number of jobs in tourism and recreation sector.

Overall benefits will outweigh costs i.e. benefit to cost ration will be higher than 1. This is in particular true for the environmental and economic costs and benefits, while as the ratio between social benefits and costs would be lower, indicating that MPAs extension social costs would be significant and approximately at the same level as benefits.

Tourism and fisheries are likely to be the most affected sectors. Tourism as the most important sector of the Greek economy using marine waters will reap significant benefits. For the fisheries, negative impacts are expected in the short-run, to be to a large extent offset by longer-term benefits due to positive impact of MPAs on fish stocks recovery. Local economies are also expected to gain a net welfare improvement, even though this gain will come at an economic and social cost, warranting careful planning and management of distributional effects of the MPA network extension.

As regards temporal distribution of costs, the highest ones are expected in the first years of establishing the network due to higher initial costs of setting up the sites. Many of the benefits are expected to come at a later stage, some even for the next generations (such an example are benefits from the option value of preserved biodiversity).

Summary of the key findings of the assessment is presented in Table 17.



**Table 17:** Summary of costs and benefits of MPA extension.

| Category of costs/ benefits | Costs  | Benefits   | Benefit to cost ratio |
|-----------------------------|--|--|-----------------------|
| Environmental               | Displacement of pressures to habitats and species outside MPAs<br><br>Increased disturbance due to higher visitation                   | Potential to protect biodiversity and allow habitat recovery   | <b>&gt;1</b>          |
|                             |  | Contribution to fish stock recovery  |                       |
|                             |  | Contribution to provision and preservation of ecosystem services (including regulating, cultural and provisioning services)  |                       |
|                             |  | Contribution to achieving GES  |                       |
| Economic                    | One-off establishment costs of €260,000 over the next 4 years  | Reducing potential losses from degradation of marine environment (maximum cumulative losses over the period 2008 – 2020 to tourism were estimated at 0.81% of GDP and to fisheries at 0.07% of GDP, both for production value) | <b>&gt;1</b>          |
|                             | Annual operational costs in the range of €25.4 – 30.2 million  | Potential for increase in tourism: additional revenue of close to €100 million (based on the assumption of additional 465,000 tourists or 1.4 million visitor days)  |                       |
|                             | Fisheries: reduced catches, increased operational costs, loss of profits (potentially having stronger impact on small-scale fishermen) | Job creation: additional 950 – 1,250 jobs in MPA management; additional jobs in tourism and related services   |                       |
|                             | Opportunity costs for aquaculture  | More fish, improved catch/ catch quality, increased fishing productivity   |                       |
|                             | Increased cost for maritime transport (fuel costs, travel time)  | Increased spending in local businesses   |                       |
|                             | Reduced employment, in particular in fishing sector  | Option value of preserved biodiversity; biodiversity existence values  |                       |
| Social                      | Potential conflicts/ increased tensions  | Protection of cultural and social values   |                       |

|                |  |  |              |
|----------------|--|--|--------------|
|                | Fairness/ equity/ distributional issues                          | Improved recreation experiences  |              |
|                | Loss of employment/ job security (primarily in fisheries sector) | Increased environmental awareness  |              |
|                | Increased risks, time and efforts for fishing                    | Positive impacts on scientific research and education                                    |              |
|                | Loss of traditional property rights                              | Improved job and business development opportunities, in particular for local communities |              |
| <b>OVERALL</b> |  |  | <b>&gt;1</b> |

To ensure potential benefits are reaped and to minimise the costs, it is essential to set up an effective management system for the new MPAs. This can be achieved by following recommendations based on best practices in designing and managing MPAs i.e. by setting clear objectives, strategic siting of the new MPAs, conducting a cost-benefit analysis for specific MPAs in the designation process whenever possible, and ensuring adequate management (including monitoring, compliance and enforcement) and financing.

The benefits and costs of MPAs can be systematically identified and described but expressing them in monetary terms is often not feasible in the framework of time and data limitations faced by those who work on the MPA designation and implementation. This is often due to the fact that precise prediction and valuation of the impact of a new management regime on the complex natural and economic/ social systems is difficult. Nevertheless qualitative or semi-quantitative cost-benefit analyses for the MPAs have proven to be useful tools for decision-makers and other stakeholders. Conducting cost-benefit analysis for specific sites and a rigorous stakeholder involvement process can be particularly useful to lay out appropriate management and financing strategies, identify stakeholders, adequately address distributional/ equity effects, and increase public acceptance.

As suggested by Pascual *et.al*, 2016, the ultimate success or failure of an MPA at least partly depends on the public acceptance, which is sometimes constrained by the different uses that occur in the marine environments. Public attitudes towards MPAs can significantly affect (reduce or increase) management costs, in particular their compliance and enforcement component.

As SPAs are likely to include areas with smaller surface, it is recommended to consider extension of the SPA network within larger MPAs to achieve economies of scale (whenever ecological criteria would not be compromised by such an action).

## **ANNEX IIB**

# **TERMS OF REFERENCE FOR CONDUCTING SOCIO-ECONOMIC ASSESSMENT FOR THE DEVELOPMENT OF MSFD PROGRAMME OF MEASURES FOR GREECE**

## 1. BACKGROUND

Under the EU Marine Strategy Framework Directive (MSFD) Member States are required to develop programmes of measures to achieve or maintain Good Environmental Status (GES) of their marine waters by 2020. When drawing up their programmes of measures (PoMs), Member States are requested to give due consideration to sustainable development and, in particular, to the social and economic impacts of the measures envisaged. Article 13(3) of the MSFD further stipulates Member States shall ensure that measures are cost-effective and technically feasible, and shall carry out impact assessments, including cost-benefit analyses, prior to the introduction of any new measure.

PoMs typically comprise **existing** i.e. measures that have been adopted under other policies (whether implemented or not), and **new** i.e. additional measures to achieve GES which build on the existing legislation, or constitute completely new measures. Cost-effectiveness and/ or cost-benefit analysis are required for the **new measures** to be included in the PoMs. An overview of different categories of measures (existing or new) with related requirements for socio-economic assessment (cost-effectiveness and/ or cost-benefit analysis) is provided in Annex 1 (page 98) to this Terms of Reference.

**Cost-effectiveness** analysis (CEA) has been widely applied in evaluating different policy options or specific measures/ projects, and an extensive literature on both the theoretical underpinnings of the concept and on the practical experiences and *pros* and *cons* of its application is available. CEA is an analysis of the costs of alternative individual and/ or programmes of measures designed to meet a well specified/ quantified objective. It is often interpreted as a tool that helps find the least-cost solution for meeting a prescribed target (for example, how to attain a set level of nitrogen in coastal waters at least cost). The cost-effectiveness is calculated by dividing the annualised costs of the assessed measures/ sets of measures by a quantified physical effect. When monetisation of all the costs incurred by the assessed measure is not possible, application of qualitative and semi-quantitative approaches can also give valuable results.

**Cost-benefit analysis (CBA)** is a method for comparing policy measures against the baseline situation in terms of their advantages (benefits) and disadvantages (costs). This essentially involves estimating all of the negative and positive economic, social and environmental impacts. CBA can be done at various levels, depending on data availability. It can be either a full-scale CBA when the most significant part of both costs and benefits can be monetised, or a partial CBA in cases when quantification/ monetisation will only be possible for a part of the costs and benefits. The results of the analysis can be interpreted as a benefit to cost (B-C) ratio (total benefits divided by total costs) where a ratio higher than one indicates that the policy measure is beneficial, or as a net present value (NPV - the present value of the net benefits) where a positive NPV indicates a welfare improvement.

## 2. EXPERIENCES WITH APPLYING COST-EFFECTIVENESS AND COST-BENEFIT ANALYSIS IN IMPLEMENTING MSFD AND DEVELOPING POMs

In the framework of the ActionMed project, Plan Bleu has undertaken socio-economic assessment of four selected (potential) regional measures to achieve GES and has prepared a study<sup>35</sup> providing detailed information on the effectiveness, costs and benefits of the assessed measures. The study also provides guidelines for national socio-economic assessments of measures, based on the approaches applied in the course of PoMs preparation in three EU Member States and international best practice. These guidelines are presented in Annex 2 to this Terms of Reference (page 99). Based on these guidelines, a pilot socio-economic assessment of selected measures is being undertaken in the scope of the assistance extended to Greek authorities in the framework of ActionMed project (Annex IIA, this report).

The Plan Bleu's review of the three national experiences with the development of PoMs (in Spain, Germany and France) showed the analysed countries applied very different approaches to socio-economic analysis, whereas each approach exhibited a number of advantages and limitations. An important conclusion reached was that time and resources needed to conduct a rigorous cost-effectiveness and/ or cost benefit analysis for a large number of measures obviously exceeded those that were available in the course of PoMs preparation in different countries. Therefore, multi-criteria analysis with elements from cost-effectiveness and cost-benefit analysis could be preferable option for countries, providing good levels of useful information on measures to guide decision making.

**Multi-criteria analysis (MCA)** is a decision support method that can be used to evaluate different alternatives (e.g. different policy options) according to their performance against a selected set of evaluation criteria. These performances are presented in a so called performance matrix, or consequence table. MCA applies cost-benefit thinking to cases where it is necessary to deal with impacts that are a mixture of qualitative, quantitative and monetary data and where there are varying degrees of certainty.

Some specific examples of how different tools have been combined and what semi-quantitative or qualitative approaches can be used in conducting socio-economic assessment of measures are provided in Annex 3 (page 106) to this Terms of Reference.

## 3. SCOPE OF THE ASSIGNMENT

The Special Secretariat for Water (SSW) as the Competent Authority in Greece for the implementation of the MSFD has prepared a draft programme of measures in line with Article 13 of the MSFD. Preparation of the draft PoMs builds upon a sequence of steps, including preparation of an Initial Assessment report of the marine environment of Greece (SSW, 2012), consisting of:

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<sup>35</sup> *Socio-economic assessment of selected potential new measures to achieve good environmental status of the Mediterranean waters, ActionMed Deliverable 3.2, Plan Bleu, 2016*

- Part I (Characteristics),
- Part II (Pressures and Impacts) and
- Part III (Economic and Social Parameters).

The MSFD was transposed into Greek legislation through the Law 3983/2011. This law establishes the general legal framework for the protection of the Greek marine environment. The good environmental status (GES) criteria were determined by the ministerial decision 175/2012 following the initial assessment. The monitoring programmes were determined by 126635/21-11-2016 Ministerial Decision.

Based on the so far results of the MSFD implementation in Greece and available information, and in close cooperation with the SSW, the consultant will utilize the available ActionMed guidelines, best international practices and findings of the pilot assessment to conduct socio-economic assessment of new measures comprising the draft PoMs of Greece.

#### 4. OBJECTIVES OF THE ASSIGNMENT

The objectives of the assignment were:

- to assist the Special Secretariat for Water with finalization of the PoM;
- to ensure comprehensive assessment of the proposed new measures in terms of their social and economic impacts, costs, benefits and effectiveness; and
- to contribute to the overall implementation and acceptance of proposed new measures, thus contributing to the achievement of GES.

#### 5. ACTIVITIES UNDERTAKEN

The socio-economic assessment of MSFD measures in Greece were carried out under the overall supervision and in close collaboration with the SSW. Methodological approach applied determined in agreement with the SSW, based on the national guidelines prepared by the Plan Bleu in the framework of the ActionMed project (included in Annex 2 – page 97, below) and in line with best international practices (whereas some examples of possible approaches are provided in Annex 3- page 104, below).

The assignment entailed a sequence of interlinked activities, as outlined below:

|               |   |
|---------------|---|
| <b>Step 1</b> | Identify all the relevant national studies and sources of information; review the ActionMed/ Plan Blue guidelines, results of the ActionMed pilot assessment of measures and identify comparable international sources and examples (other than those mentioned in this Terms of Reference) |
| <b>Step 2</b> | Discuss and agree with SSW and other stakeholders, as appropriate, what role should socio-economic assessment play in finalising PoMs and in the decision making process. Some indicative questions to guide this discussion were:  |

|               |  |
|---------------|--|
|               | <ul style="list-style-type: none"> <li>- <i>Will the results of the assessment be used to justify inclusion of specific measures in the PoM (to convince stakeholders about their feasibility/ usefulness) or to, for example, explain why certain measure/s will not (yet) be implemented?</i></li> <li>- <i>Should socio-economic assessment serve as a means to compare different measures – to choose the most relevant ones or prioritize them?</i></li> <li>- <i>Is the assessment needed to gain a good understanding of the distribution of costs and benefits across economic sectors/ society?</i></li> <li>- <i>Is it necessary to identify when and what alternative measures would be most beneficial?</i></li> </ul> |
| <b>Step 3</b> | Analyse the draft PoM and determine which measures to be assessed  |
| <b>Step 4</b> | Decide on the appropriate tool – cost-effectiveness, cost-benefit and/ or multi criteria analysis - to be applied for the assessment of different measures based on the available information, the agreed purpose/ role of socio-economic assessment, ActionMed/ Plan Blue guidelines and applicable comparative experiences   |
| <b>Step 5</b> | Conduct the assessment for each selected measure by using the ActionMed/ Plan Blue guidelines as an overall methodological framework, while adopting necessary modifications to address availability of data and other specificities. In conducting the assessment, appropriate forms will be developed and utilised to solicit and take into account expert opinions (such as direct meetings/ interviews, workshops, questionnaires)   |
| <b>Step 6</b> | Interpret results and provide recommendations to the SSW as regards the overall effectiveness, costs and benefits of each assessed measure, while integrating results of the pilot assessment; provide recommendations on alternative measures, if/ as needed.   |

## 6. OVERALL INPUT TO CONDUCT THE ASSIGNMENT

Estimated time needed to complete the assignment is one working month.

## 7. DELIVERABLES

The assignment resulted with the following deliverables:

- Assessment methodology indicating tools selected for the analysis of different measures (with justification);
- Assessment tables/ matrices providing for systematic assessment of costs, effects and/ or benefits from implementing various measures;
- Results of the assessment of selected measures with recommendations to the SSW as regards the overall effectiveness, costs and benefits of measures.



### Annex 1: Categories of measures according to the PoMs Recommendation

| Measures   | Measure category | Cost-effectiveness analysis (CEA) | Cost-benefit analysis (CBA) |
|--|------------------|-----------------------------------|-----------------------------|
| Article 13(1) & 13(2)<br><i>Measures relevant for the maintenance and achievement of GES under the MSFD that <u>have been adopted under other policies and implemented</u></i>   | EXISTING<br>1.a  | No                                | No                          |
| Article 13(1) & 13(2)<br><i>Measures relevant for the maintenance and achievement of GES under the MSFD that <u>have been adopted under other policies but that have not yet been implemented or fully implemented</u></i> | EXISTING<br>1.b  | No                                | No                          |
| Art 13(3)<br><i>Additional measures to achieve GES which build on existing EU legislation and international agreements but go beyond what is already required under these</i>  | NEW<br>2.a       | Yes<br>Case by case               | Yes<br>Case by case         |
| Art 13(3)<br><i>Additional measures to achieve GES which do not build on existing EU legislation or international agreements, i.e. that are completely new</i>   | NEW<br>2.b       | Yes                               | Yes                         |

## Annex 2: ActionMed/ Plan Bleu's guidance for socio-economic assessment of measures at the national level

*The main steps of the guidance are described below; the guidance is presented in a schematic way in Table 2.*

### Description of the measure

The first step to conducting any type of analysis should be the description of the measure, which will briefly situate the measure within the DPSIR framework, indicate the geographical scope and timescale, implementation status, linked policy objective and the measure's link with the GES and its descriptors. It should normally also include a description of the reference condition from the initial assessment which the measure is meant to influence and the target situation under GES. In fact, measures are intended to fill this gap between reference condition and GES target. A description of relevant cases or practical application of the measure and linked assessments can be useful as well.

### Cost-effectiveness analysis

The cost-effectiveness analysis starts by assessing the measure's effectiveness, that is to indicate if a measure can actually lead to its intended result. The steps to assessing effectiveness are the following:

#### Evaluating theoretical effectiveness

- Provide scientific evidence for effectiveness of the measure. Identify studies on the subject, if possible in similar ecosystems/regions, search for estimates of the effectiveness of the measure and define units of measurement (for example reduction of NO<sub>x</sub> in kg)
- Reflect on alternative measures leading to the same or similar result

#### Evaluating practical effectiveness

- Identify any issues possibly impacting the effectiveness of the measure during its design or implementation, especially likely to occur when more than one institution is involved in the measure (coordination and sharing of responsibilities) or when a change of behaviour of concerned stakeholders is required (reliance on information, communication and support). Therefore, check:
  - o Actors responsible for the design and implementation of the measure,
  - o Stakeholders involved in the implementation (who and how?),
  - o Change of behaviour of society, economic sectors etc. required? If so how to inform them?
- How to mitigate the occurrence of these issues? For example, list flanking measures in the field of communication and awareness raising.

#### Evaluating direct costs (financial costs)

Costs evaluated here are direct financial costs caused by the measure itself and incurred by the regulator and the regulated.

- Costs for the regulator
  - o Human resources / personnel /administrative costs for the regulator

- For the development, design and launch of the measure, research, information and meeting costs, enactment and lobbying costs, costs linked to application for permits
- For the implementation and coordination of the measure
- For maintenance, monitoring and surveillance of the measure, including prosecution costs
- Investments and goods
  - For the development and launch of the measure, including for exercise purposes
  - Investments in abatement equipment
  - For maintenance, monitoring and surveillance of the measure
  - Investments for compensation payments, land/real estate purchases, plantings, ...
- Compliance costs for the regulated
  - Which economic sectors or other stakeholders are impacted by the measure (see table below)?
  - Does the measure imply any communication obligations? If so, what are the linked financial/organizational requirements?
  - Does the measure imply any other obligations?
    - Changes in operations/ production processes or behavior?
    - Changes in the quantity or quality of inputs (abatement equipment, human resources, machines, raw materials, other investment)?
    - Additional (production) processes, for example surveillance?
    - Limitations of quantities produced?
  - Does the measure require any payments of taxes, duties or changes in prices? Application for permits?
- Funding
  - What are the funding sources? What is the cost per funding source? Are there any alternative funding sources?
  - Is there potential for revenue capture (for example through fines, taxes, etc.)?

### Cost-benefit analysis

Cost-benefit analysis should be done in two steps: a descriptive analysis and a quantifying (and monetizing) analysis. Data availability and homogeneity largely impact the feasibility and significance of CBA and in particular of the monetization of impacts. However, qualitative information can also provide valuable inputs for decision makers and can constitute the basis for a multi-criteria analysis.

#### Cost assessment

Data from the cost-effectiveness analysis (above) should be used here. Additionally, indirect costs or negative impacts, not captured under the cost-effectiveness analysis, should be identified during the following assessment of costs and benefits.

#### Assessment of economic and social impacts (changes in welfare)

To determine these impacts, the following questions should be answered:

- Economic impacts:

- Which economic sectors or social groups are impacted by the measure? How and when?
- Does the measure bring about financial revenues? For whom, how and when?
- Does the measure create employment? How many jobs? In which sector(s)? When?
- Impacts resulting from the improvement of the marine and coastal environment on economy and society, taking into account the concept of total economic value (use and non-use values)
  - Which economic sectors benefit from the measure's impact on the marine and coastal environment? Where? Over which time span? How does society benefit from the improvement?
  - Changes in value added and employment linked to the improvement of the marine and coastal environment?

#### Assessment of the improvement of the marine and coastal environment

- Identify relevant already existing valuation studies and apply them to the national context via benefit transfer/unit value transfer
  - Positive testing: Check if relevant studies are available and applicable
  - Selection of values and units and attribution to economic/ societal sectors which benefit from them
  - Identification of the reference value of the study and conversion to reference unit per pressure or sector
  - If relevant, adapt to national purchasing power (level of income and price)
  - Establishment of a reference to unitary values for pressure reductions (unit reduction of pressure)
- If no relevant valuation study is available, illustrate the ecosystem goods and services of the marine and coastal environment
  - Benefits stemming from the goods and services the marine and coastal ecosystems provide. These include provisioning services (food, water, minerals, etc.), regulating services (air quality, climate change, etc.), cultural services (aesthetic, recreation, etc.) and supporting services (primary production, nutrient cycling, etc.). Quantify impacts of the measure on specific ecosystem services, assess the effects on human welfare and value the changes in ecosystem services
  - Use of different techniques, according to the circumstances and available data (market price, cost-based approach, hedonic pricing, travel cost, revealed or stated preferences etc.)
  - Indicate avoided costs (costs of degradation under no-measure scenario)
  - Indicate if additional benefits are leveraged for other descriptors than the one targeted by the measure

If relevant, values should then be discounted to present value (rate according to timeline, approximately 2%).

#### **Multi-criteria analysis**

Multi-criteria analysis and its different techniques have been extensively studied in a manual for the use of MCA by the UK Department for Communities and Local Government (Department for Communities and Local Government, 2009). The

methodology proposed here is mainly derived from the recommendations of this UK manual, which can also be of great help for national socio-economic assessments of measures.

Both cost-effectiveness and cost-benefit analysis are analytical ways of comparing different forms of input or output, normally by giving them monetary values, and might themselves be regarded as examples of multi-criteria analysis. However, in this case, multi-criteria analysis concentrates on techniques which do not involve giving all of the inputs, outputs and outcomes explicit monetary values, although data from cost-effectiveness and cost-benefit analyses can be included. The multi-criteria analysis here will represent an ‘alternative’ to defining monetary values for costs and benefits when this is not possible or desired.

The multi-criteria analysis will allow decision makers to put emphasis on their judgement, in establishing objectives and criteria and estimating relative importance weights. The subjectivity involved in this process can be a matter of concern. Its foundation, in principle, is the decision makers’ own choices of objectives, criteria, weights and assessments of achieving the objectives, although ‘objective’ data such as observed prices can also be included. However, the multi-criteria analysis can bring a degree of structure, analysis and flexibility to decision making beyond the practical reach of cost-effectiveness and cost-benefit analysis. One limitation of the multi-criteria analysis approach is that it cannot show if an action adds more to welfare than it detracts (positive or negative net present value). This is also the case with cost effectiveness analysis, where the ‘best’ option can be inconsistent with improving overall welfare, so doing nothing could in principle be preferable (Department for Communities and Local Government, 2009).

The following process is proposed to be applied to multi-criteria analysis of the chosen measures (see, as an example, Table 1 multi-criteria analysis of different cost recovery mechanisms for port reception facilities):

- Identifying objectives of the measure. In the example in Table 1, the objectives are minimizing economic cost and maximizing environmental benefits.
- Identifying performance criteria to be used to assess how and to which extent the objectives are likely to be reached by the measure and to compare different measures. In case of the example in Table 1, performance criteria are the measure’s capacity to encourage waste disposal at port, the degree to which measure provides an incentive to reduce waste on board of vessels, the degree to which the measure adheres to the polluter pays principle, the administrative burden of the measure, the degree to which the measure guarantees income for ports and the capacity to create employment and generate revenue. Criteria may also be weighted according to relative importance and aggregated using a scoring system.
- Analysis of the measures (inputs, outputs, outcomes, impact) with regard to the fixed criteria. Depending on the measure, the analysis can offer a number of ways of aggregating the data of individual criteria to provide indicators of the overall performance of a measure. In the case of the example in Table 1, scores from 0 to 2 have been attributed to each performance criterion and each measure. Scores have then been aggregated to build a single performance indicator for each measure. Scores have not been weighted under this analysis.

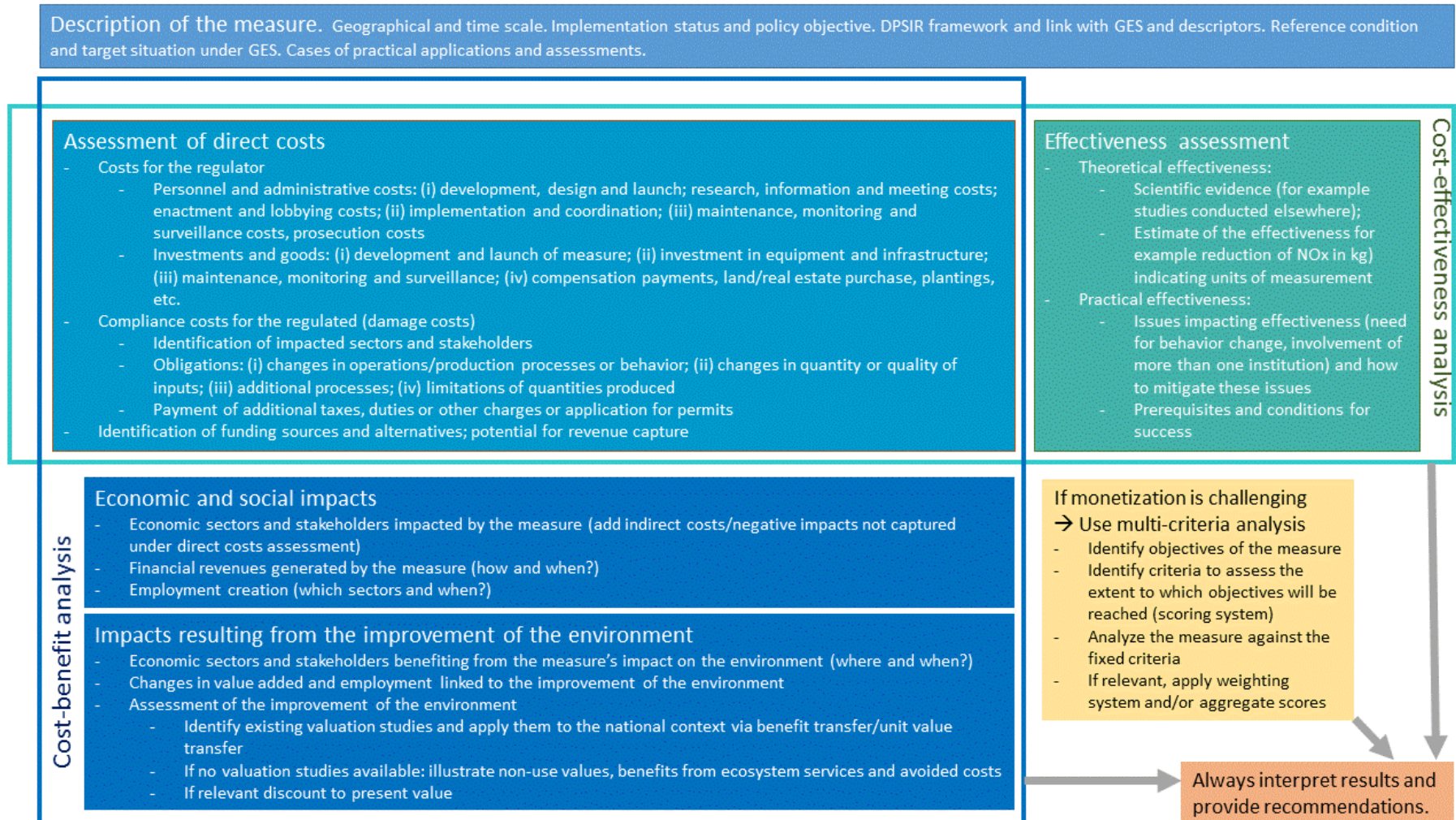
- As a last but important step, it is recommended to indicate any uncertainties about parameters used in the multi-criteria analysis and to provide recommendations on how to use the analysis' results in the decision making process.

**Table 1:** Example of multi-criteria analysis of different cost-recovery mechanisms for port reception facilities

| Mechanism             | Environmental objectives         |                                    | Total environmental objectives | Economic and financial considerations |                                     |                             |                             | Total economic/financial considerations | Grand Total | Comment                         |
|-----------------------|----------------------------------|------------------------------------|--------------------------------|---------------------------------------|-------------------------------------|-----------------------------|-----------------------------|---|-------------|---------------------------------|
|                       | Encourages waste disposal at PRF | Incentive to reduce waste on board |                                | Adheres to polluter pays principle    | Administrative burden <sup>36</sup> | Guaranteed income for ports | Employment +economic impact |   |             |                                 |
| <b>Direct fee</b>     | 0                                | 2                                  | 2                              | 2                                     | 0                                   | 0                           | 0                           | 2                                       | 4           |                                 |
| <b>Free of charge</b> | 2                                | 0                                  | 2                              | 0                                     | 2                                   | 0                           | 2                           | 4                                       | 6           |                                 |
| <b>Contract</b>       | 1                                | 1                                  | 2                              | 2                                     | 0                                   | 2                           | 1                           | 5                                       | 7           | Applies only to certain vessels |
| <b>Combined fee</b>   | 1                                | 1                                  | 2                              | 2                                     | 0                                   | 1                           | 1                           | 4                                       | 6           |                                 |
| <b>Capped fee</b>     | 1                                | 1                                  | 2                              | 2                                     | 0                                   | 1                           | 1                           | 4                                       | 6           |                                 |
| <b>No-special-fee</b> | 2                                | 0                                  | 2                              | 1                                     | 1                                   | 2                           | 2                           | 6                                       | 8           |                                 |

<sup>36</sup> Scores for «administrative burden»: 0 = high burden and 2 = low burden.

**Table 2:** Guidance scheme for cost-effectiveness, cost-benefit and multi-criteria analysis of measures





### Annex 3: Examples of possible approaches to conducting cost-effectiveness and/or cost-benefit analysis

#### Spanish experience in the PoMs development

Spain has used forms of cost-effectiveness and cost-benefit analysis specifically developed for the MSFD PoMs. To analyse costs, available information on the budgets of identified measures has been collected. The costs of different measures have then been categorized on a 1-5 scale: 1= very high cost, 2= high, 3=moderate, 4=low, 5=very low cost. To analyse effectiveness of measures, their mitigation effects in relation to 18 pressures identified under MSFD has been also categorised on a 1-5 scale, but with reverse meaning of scores: 1=very low effect, 2=low, 3=moderate, 4=high, 5=very high. Average scores were then calculated to come up with a unique score on effectiveness. Assessment of benefits was done based on the effect of measures on 9 economic activities (aquaculture, fishing, tourism, etc.), also by assigning scores on a scale 1-5 for each activity and by calculating averages to come up with a single score to describe benefits.

The cost effectiveness of new measures was assessed by adding the cost and effectiveness scores and deriving an overall score for each measure, always ranging between 2 and 10. The same logic was applied for cost-benefit analysis. By using a scoring system instead of monetary and unit values, the cost-effectiveness and cost-benefit analyses conducted for the Spanish PoMs have in fact assumed characteristics of a multi-criteria analyses.

#### Other possible approaches

In case sufficient data will not be available for monetary expression of costs of all measures, the experiences with the implementation of the EU MSFD show that the use of qualitative and semi-quantitative approaches is also possible and can give valuable results. Examples of several possible approaches are summarised in points a) to d) below.

- a) Collecting opinion of experts, civil servants and scientists (through workshop and interviews) on the contribution of each measure to the GES indicators. This approach is useful in situations when physical effects of potential measures can be identified but not quantified. An illustration referring to marine litter is presented below.

| Measures   | Effect   |
|--|--|
| Additional fishing for litter                                      | Negative effect: decreased seafloor integrity                                      |
| Additional beach cleaning on non-bathing beaches (once a year)     | Less litter on the beach   |
| Adding individually recognisable markers to fishing nets and wires | Reduce illegal or improper spill of nets (the first source of litter on the beach) |

b) A scoring system can be applied to classify:

- expected reduction of different pressures for each measure, and
- the relation (and importance) of each pressure for each individual target (and indicator)

as low, moderate, high or very high, based on the set of pre-determined criteria. Multiplying the expected reduction in pressure with the importance of a pressure for a certain target gives the on-site effect for a certain measure (displayed on a scale 1 to 5). The pressures are then scored according to their geographic dimension using the same classes (low to very high). Multiplying the on-site effect and scale of the effect gives the overall effectiveness of the measure. The effectiveness scores are then compared with costs scores in a matrix form to allow for conclusion on the overall cost-effectiveness of measures. This approach is particularly useful to overcome the knowledge gaps regarding driver-effect-pressure relations.

c) Environmental effectiveness of measures can be evaluated and classified (as strong, potentially strong, or uncertain) and compared with categories of implementation costs (low, moderate and high). Based on such an analysis, four levels of cost-effectiveness can be defined:

- cost-effective measures,
- moderate cost-effective measures,
- low cost-effective measures, and
- non cost-effective measure.

d) A ‘scale’ (‘+++’ to ‘---’) system can be used to assess costs and effectiveness (and possibly other criteria including benefits, feasibility, etc.) of measures when monetized assessments will not be possible.

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