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Agenda item 2: Midterm Review of the Implementation of the Ecosystem Approach Roadmap

Analysis of Existing Regional Measures and of the Needs for New/Updated Regional Measures to achieve Good Environmental Status of the Mediterranean

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Note by the Secretariat

According to the MAP Mid-Term Strategy (MTS) 2016-2021 and the MAP Programme of Work (PoW) 2016-2017, both adopted by COP 19 in 2016 (Decisions IG.22/1 and IG. 22/20), the Secretariat was requested under the Strategic Outcome 1.1 to prepare “a policy paper on potential additional and integrated programmes of measures to achieve GES in the Mediterranean also taking into account climate change”.

This mandate is also in line with the conclusions and recommendations of the EcAp Coordination Group Meeting, held in Rome, Italy, in September 2015, which reviewed an initial Ecosystem Approach Based Measures Gap Analysis and requested the Secretariat to further elaborate it, making more explicit linkages between the regional measures, GES and related targets. It should therefore identify gaps in the existing measures and their implementation which may cause a deviation between the current status and GES, in view of identifying a list of potential new/updated measures to achieve/maintain GES.

The Secretariat in collaboration with the EU-funded ActionMed Project¹, undertook a gap analysis² of existing regional measures to identify areas where measures are not sufficient and/or not efficiently implemented to achieve GES and developed a list of potential new/updated measures.

The present document focuses on pressures related to biodiversity and pollution. It consists of five parts:

- Part I is an introductory part providing the background and rationale for preparation of the present document.
- Part II presents the main findings of the regional gap analysis and a list of potential new/updated measures/actions for marine species and habitats-related ecological objectives (EO1, EO 2, EO 3, EO 6);
- Part III presents the main findings of the regional PoM analysis for pollution and marine litter related ecological objectives (EO 5, EO 9, EO 10). It also provides a list of clustering key regional pollution reduction plans as developed and agreed upon by the MED POL Focal Points Meeting;
- Part IV presents key findings from the socioeconomic assessment of four potential regional measures undertaken by Plan Bleu;
- Part V sets out the main elements of the way forward for the preparation of a list of new/updated regional measures.

The chapter on pollution and marine litter has been reviewed and revised by the regional meeting of experts on the implementation of the updated NAPs/PoM, held in Marseille, France in October 2016 and the meeting of the MED POL Focal Points, held in Rome, Italy on 29-31 May 2017.

A more detailed analysis and information with regards to the knowledge gaps can be found in the draft Quality Status Report (QSR2017).

¹ Action Plans for Integrated Regional Monitoring Programmes, Coordinated Programmes of Measures and Addressing Data and Knowledge Gaps in Mediterranean Sea

² The Secretariat led work package 3 of the ActionMed Project “Assistance in the preparation of programme of measures, by addressing particular gaps identified both at national and regional level, linking together work on Programmes of Measures (PoM) under the MSFD and under the auspices of UNEP/MAP-Barcelona Convention (the PoM Activity)”

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List of Abbreviations / Acronyms

ALDFG	Abandoned, Lost or otherwise Discarded Fishing Gear
BAT	Best Available Techniques
BEP	Best Environmental Practices
COP	Conference of the Parties
DDT	Dichloro-diphenyl-trichloroethane
EcAp	Ecosystem Approach
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EO	Ecological Objectives
EU	European Union
FP	Focal Points
GES	Good Environmental Status
HNV	High Nature Value
HW	Hazardous Wastes
IMAP	Integrated Monitoring and Assessment Programme
IMO	International Maritime Organization
LBS Protocol	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities
LC-LP	London Convention and Protocol
MED POL	Programme for the Assessment and Control of Marine Pollution in the Mediterranean Sea
MLRP	Regional Plan on Marine Litter Management in the Mediterranean
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
MTA	Multi-trophic aquaculture
NAPs	National Action Plans
PCB	Polychlorinated biphenyls
PCCP	Personal Care and Cosmetic Products
PoM	Programmes of Measures
POP	Persistent Organic Pollutants
PRTR	Pollutant Release and Transfer Register
SAP-MED	Strategic Action Programme to address pollution from land-based activities
SCP	Sustainable Consumption and Production
SoER-MED	State of the Mediterranean Marine and Coastal Environment Report
UNEP	United Nations Environment Programme
WWT	Wastewater Treatment
WWTP	Wastewater Treatment Plant
SPA	Specially Protected Areas
NIS	Non-indigenous species
IAS	Invasive Alien Species
SAP BIO	Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean
FRA	Fisheries Restricted Areas
MSY	Maximum Sustainable Yield
IUU	Illegal Unreported Unregulated (fishing)
ICZM	Integrated Coastal Zone Management
MSP	Marine Spatial Planning
ILUC	Indirect Land Use Change
CAMP	Coastal Areas Management Programme

Part I. Introduction

1. The MAP/Barcelona Convention provides a comprehensive legal and policy framework aiming to combat the main human-induced pressures on marine and coastal environment. The implementation of the Barcelona Convention and its Protocols is supported by Strategic Programmes (SAP/MED and SAP/BIO), Regional Plans, and Programmes, setting out legally-binding measures and timetables. This framework is complemented by non-legally binding instruments, like technical Guidelines.

2. The Ecosystem Approach (EcAp), first adopted by COP 15, has been recognized as an overarching principle of MAP-Barcelona Convention, with the ultimate aim of achieving and/or maintaining a Good Environmental Status (GES) of the Mediterranean Sea. In this regard, the ecosystem approach should guide and be streamlined into all MAP policies and it is therefore important to ensure that the regional measures are sufficient and efficiently implemented to achieve GES and related targets.

3. During the last biennium, the Secretariat prepared the Ecosystem Approach Based Measures Gap Analysis (hereinafter referred to as Gap Analysis) which was submitted to and reviewed by the 5th Ecosystem Approach Coordination Group (CG) Meeting, held in Rome, Italy, in September 2015 (UNEP(DEPI)/MED WG.420/5). This meeting requested the Secretariat to finalize the stocktaking component of the Gap Analysis for submission to the COP 19 (UNEP (DEPI)/MED IG.22/Inf.15) and further elaborate it after the COP 19 in view of assessing the current and prospective status of “GES” of the Mediterranean strictly related to the existing UNEP MAP/Barcelona Convention measures and quantify where appropriate the deviations or related trends from the agreed GES targets. The goal of this elaborated gap analysis would be to serve as the basis to identify the need for additional or update of existing measures to maintain or achieve GES at ecological objective level.

4. The MAP Programme of Work 2016-2017, adopted by COP 19 (Decision IG. 22/20), has mandated the Secretariat to “*prepare a midterm review of the implementation of the EcAp application roadmap including a policy paper on potential additional and integrated programmes of measures to achieve GES in the Mediterranean also taking into account climate change*” (activity 1.1.2.7).

5. The aim of the present report is to generally review the main stressors and impacts on the Mediterranean Sea, examine the existing measures at regional level, assess their capacity to achieve GES and identify potential further regional actions that are required in order to reach GES, including strengthening of implementation and enforcement of existing measures or adoption of new/updated measures. The main analytical steps were to:

- (a) Identify main pressures and drivers;
- (b) List the measures adopted at regional level (to address pressures);
- (c) Outline measures’ efficiency;
- (d) Identify gaps i.e. assess whether the implementation of existing regional measures has the capacity to bridge the gap between the GES and current situation.

6. The present report has also used some of the main findings of the socio-economic assessment of selected potential new measures prepared by Plan Bleu in the framework of the EU funded ActionMed Project.

Part II. Marine species and habitats

1. Gap analysis of regional measures

1.1. Biodiversity

7. As regards biodiversity loss, the regional gap analysis highlighted the following gaps:

(a) Knowledge and data gaps

- i. Significant gaps in knowledge exist mainly regarding the population distributional range of some species, their abundance and demographic characteristics in order to prioritize their conservation. The gaps are more important in the biodiversity of deep sea areas.
- ii. The knowledge is also limited regarding the impacts of pathogens on marine and coastal biodiversity, especially the new pathogens³.
- iii. Knowledge gaps concern also the impacts of climate change on marine and coastal ecosystems, especially the impacts of acidification.⁴
- iv. Knowledge gaps exist on the value of ecosystem services provided by the oceans, even in MPAs
- v. There is disparity in distribution of research efforts and knowledge across the region

(b) Gaps in implementation/ enforcement of existing legal and policy framework

- i. According to SAP/BIO analysis⁵ regarding the objective to assess and mitigate the threats on biodiversity, insufficient progress has been achieved in the following areas:
 - Monitoring the impacts of global trade and economic policies on biodiversity, the effective control of coastal development, the enforcement of measures to control and combat international trade of endangered species, mainly due to lack of training for the competent agents and lack of resources.
 - Implementation of biodiversity protection legislation at national level
 - Identification of hotspots for pressures non-related to pollution
 - Shifting to more sustainable tourism has not been met, and further actions are required.
 - Prevention and tackling of the negative environmental impacts of aquaculture
- ii. The analysis of the implementation of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean during the biennial period 2014-2015⁶ reveals low level of implementation (less than half of the assessed countries) of the following measures: integrating emergency plans and measures, SPAMIs designation, national Strategies and Action Plans for the conservation of biodiversity, banning and regulation of activities involving the capture of species from SPAs, gaps in the implementation of species actions plans, especially those on cartilaginous fish, cetaceans and non-indigenous species introductions.
- iii. Important gaps exist in the enforcement and control of the biodiversity related legislation, particularly in the areas of fisheries and invasive alien species
- iv. There are not sufficient restoration measures and targets

³ UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

⁴ UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages

⁵ SAP/BIO Implementation: the first decade and the way forward (as reviewed by the National Correspondents of SAP/BIO in July 2013), document UNEP(DEPI)/MED WG.382/5;

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

⁶ UNEP(DEPI)/MED WG.3431/3, 2017

(c) Gaps in MPA designation and management

- i. Insufficient surface coverage by MPAs and other effective area-based conservation measures (around 7,14% at regional level), far from Aichi target⁷.
- ii. MPAs are not representative of the full range of species and habitats⁸. Except for rare cases, the MPAs are designated in coastal waters under national jurisdiction and not equally distributed across the region⁹.
- iii. There is a problem of connectivity and coherence¹⁰: in order for protection networks to reach the maximum potential of protection, they have to be coherent and allow exchanges of the species. Studies suggest a maximum distance of 80 km.
- iv. Management plans are not adopted for all the MPAs, while some of the existing plans are not adequately addressing the conservation needs of the sites

8. The following have been identified as the main areas where further measures are needed to address the gaps:

- Stronger implementation of SAP/BIO and biodiversity related Action Plans in the areas where gaps have been identified;
- Measures to achieve enhanced coherence, connectivity and representativeness of the MPA network; improved MPA management and adoption of new spatial measures (including other than MPAs) to complement the MPA network;
- Improved research to fill the knowledge gaps;
- Adoption of technical guidelines/ management standards for aquaculture;
- Better regulation of fisheries;
- Adoption of new measures to support and ensure restoration of degraded ecosystems.

1.2. Non-indigenous species

9. As regards non indigenous species, the regional gap analysis highlighted the following gaps:

(a) Gaps in implementation of legal/policy framework

- i. Gaps in implementation of IAS Action Plan and the Mediterranean strategy for ballast waters, especially in the areas of: legislation for introduction control; fight and monitor of ballast water discharges; action plans to combat the introduction of non-native marine species and mitigate their harmful impacts; training and awareness raising activities
- ii. Lack of harmonization of the national legislations for NIS;
- iii. Inadequate controls on imports/exports and lack of training for controllers at check points;
- iv. Not efficient regulation of aquaculture activities;
- v. The IMO Ballast Water Convention not yet in force.

(b) Knowledge/data gaps

- i. Significant knowledge gaps on NIS, especially regarding the ways of introduction, the conditions that enable or support their reproduction and spread, the impacts on native

⁷ MedPAN & UNEP-MAP-SPA/RAC. 2016. The 2016 status of Marine Protected Areas in the Mediterranean: Main findings. MedPAN & SPA/RAC Ed., 16 pp

⁸ 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

⁹ UNEP-MAP RAC/SPA 2010. The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. By Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., Lleonart, J., Torchia, G., and Rais, C., Ed. RAC/SPA, Tunis; 100 pages.

¹⁰ 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

species, the socioeconomic impacts, the cumulative and synergistic effects on biodiversity etc.

- ii. Lack of adequate, harmonized and long term monitoring programmes at regional level.
- iii. Lack of trends assessment in abundance and spatial distribution.

10. The following have been identified as the main areas where further measures are needed to address the gaps:

- Full implementation of the updated IAS Action Plan and the Mediterranean strategy for ballast waters (especially adoption of national legislation, measures to combat and monitor discharges of ballast water, development of National Action Plans etc.);
- Adoption of new measures to ensure efficient training of controllers at check points;
- Enhanced research and monitoring to overcome the knowledge gaps;
- Adoption of technical guidelines/ management standards for aquaculture;
- Adoption of a sub-regional Lists of Priority IAS.

1.3. Depletion of fish stocks

11. As regards depletion of fish stocks, the regional gap analysis highlighted the following gaps:

(a) Knowledge/data gaps

- i. Limited knowledge about fisheries, including the state of stocks, impacts of fishing practices, bycatch etc.;
- ii. Stocks assessments across the region lack homogeneity¹¹.
- iii. Significant knowledge gaps exist with regards to the effects of aquaculture.

(b) Insufficient regulation of some unsustainable practices

- i. The issue of discards has not been adequately tackled;
- ii. Existing measures have not been able to maintain stock biomass and fishing mortality at sustainable levels for all the commercially exploited fish and shellfish stocks;
- iii. The impacts of recreational fisheries are not fully estimated and sufficiently regulated;
- iv. Bycatch is not sufficiently addressed, and there is a lack of mitigation measures developed and tested to minimize bycatch;
- v. Fisheries Restriction Areas is an important measure but it has not been fully exploited, since only 4 FRAs exist for the moment;
- vi. Despite the recognized importance of Multiannual Management Plans, a common subregional plan for fisheries management is missing;
- vii. Fisheries management is mainly species-targeted and the Ecosystem Approach is not fully integrated;
- viii. Some harmful fishing practices are not efficiently regulated and are still being used.
- ix. The aquaculture sector is not sufficiently regulated at regional level.

(c) Lack of enforcement/control

- i. General lack of control and enforcement of fishing-related measures and regulations especially in the High Seas;

¹¹ The State of Mediterranean and Black Sea Fisheries, FAO 2016

- ii. Some fishing practices that are particularly harmful and have been banned or restricted in the Mediterranean, such as driftnets, trawls and the using of dynamite and poison are still used illegally in certain areas¹².

12. The following have been identified as the main areas where further measures are needed to address the gaps:

- Enhanced research, monitoring and assessment of fish stocks;
- Adoption of new measures to minimise discards (e.g. through landing obligation);
- Better enforcement and control for prohibited/ restricted practices;
- Adoption of new measures to halt overfishing, including measures related to MSY, fleet capacity, IUU fishing, regulation of recreational fishing etc.;
- Adoption of new measures to minimise bycatch (improved data collection systems, testing of mitigation measures, provision of additional funding for adoption of technological modifications proven to reduce bycatch etc.);
- Expansion of FRAs;
- Better implementation of Multiannual Management Plans;
- Full integration of ecosystem approach into fisheries management;
- Adoption of technical guidelines/ management standards for aquaculture.

1.4. Impacts on sea-floor integrity

13. As regards damage on sea-floor integrity, the regional gap analysis highlighted the following gaps:

(a) Gaps in regulation of harmful activities

- i. Lack of regional measures for the protection of sea-floor integrity from the operation of offshore installations
- ii. Insufficient implementation of existing measures and need for new measures to minimize impacts on sea-floor integrity from fishing activities
- iii. Gaps in regulation of dredging activities

14. The following have been identified as the main areas where further measures are needed to address the gaps:

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

¹² UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

2. Potential new/updated measures/actions to achieve GES

Themes/ descriptors	Measures/Actions	Existing (E) or New (N)
Biodiversity EO 1, EO 4, EO 6, EO 11	Expand the network of protected areas, especially for the Ionian/ Central Mediterranean, Adriatic, and Aegean-Levantine sub-regions to reach the 10% target	E+N
	Develop regional guidelines on coherence and representativity of MPA network and hold coordination meetings at regional and sub-regional levels	N
	Strengthen management of MPAs (including work and transfer of best practices on conservation objectives, management plans, zoning)	E
	Strengthen enforcement of existing protection measures and restrictions, and improve control and surveillance of the MPA network	E+N
	Promote spatial measures other than MPAs (e.g. protection of important fish habitats or recovery areas, special fishing licences, real time closure areas to combat by-catch)	E+N
	Develop a regional strategy and proposal of mechanisms for long-term financing of MPA network	N
	Develop regional plan to reduce by-catch of protected vertebrate species (sea mammals, sea birds, sea turtles, sharks and rays)	N
	Undertake demonstration projects on mitigation and reduction of by-catch of marine turtles, birds and mammals by the different fishing gear	N
	Develop a Mediterranean strategy/ code of good practice on mooring and anchoring; ensure coordinated implementation of the existing and future (e.g. of the proposed Strategy/ code of good practice) guidelines	E+N
	Establish bottom trawling-free zones and ensure coordinated implementation of other measures aiming to minimise adverse impacts caused by various fishing practices on the sea floor	E
	Adopt Updated Guidelines on placement of artificial reefs	N
	Amend Offshore Action Plan as necessary to ensure prevention or minimisation of adverse impacts of offshore activities on sea floor	
	Identify important areas (hot spots) for cetaceans	N
	Map ambient noise at regional/ sub-regional level in cooperation with ACCOBAMs	N
	Promote installation of ship-strike alarm systems to prevent collisions with marine mammals	E+N
	Promote the 'Whale Watching' label recognised by ACCOBAMS/ Pelagos	E
	Map <i>Posidonia</i> habitats in and out of MPAs; and other significant habitats	E+N
	Develop regional guidelines on restoration of degraded habitats and a region-wide target (e.g. of 15%)	N
	Strengthen research efforts and systematic monitoring to address knowledge gaps related <i>inter alia</i> to population, size, distribution, abundance and conservation status for threatened species; sea-floor habitats; impacts of dredging on sea-floor integrity; marine food webs; deep sea ecosystems; impacts of invasive alien species and pathogens on biodiversity (especially the new ones)	N
Non-indigenous species EO 2	Set up/ strengthen control procedures for the management of ballast waters by vessels, in compliance with the provisions of the ballast water Convention and Mediterranean strategy for Ballast waters; assess feasibility and possibly develop/ implement sub-regional protocol/s of the Convention	E+N
	Improve aquaculture management to minimize spread and impacts of NIS	E+N

Themes/ descriptors	Measures/Actions	Existing (E) or New (N)
	Ensure full implementation of the updated IAS Action Plan through <i>inter alia</i> support for preparation of national action plans, training and awareness raising	E+N
	Agree/ adopt common sub-regional Lists of Priority Invasive Alien Species, subject to regular revisions	N
	Support establishment of early warning and rapid response systems, including exchange of information on new introductions	E+N
	Strengthen research and monitoring to improve knowledge on invasive species	E+N
Fish stocks EO 3	Develop sustainable fisheries guidelines or regional plan to provide recommendations/ common framework for coordinated regulations, policies and practices on MSY, fleet capacity, reduction of by-catch, recreational fisheries, IUU	E+N
	Support strengthened implementation of Multiannual Management Plans	E+N
	Increase research on new technologies to mitigate unsustainable practices and minimize by-catch, discards, ghost fishing seabed destruction etc. Testing (demonstration projects) of new by-catch mitigation/ reduction methods	N
	Strengthen control/ enforcement of fishing restrictions/ prohibitions	E
	Promote region-wide uptake of policies to minimise discards (e.g. introduction of landing obligation)	N
	Expand existing FRAs/ establish new ones	E+N
	Enhance research, monitoring and assessment of fish stocks	E+N

Part III. Pollution and marine litter

1. Gap analysis of regional measures

15. The present regional analysis took into account the outcomes of the 2012 State of the Mediterranean Marine and Coastal Environment Report (SoER-MED), UNEP/ MAP marine litter assessment, Horizon 2020 Mediterranean Report – Toward shared environmental information systems, and other available sources of information. For the assessment of socio-economic issues, Plan Bleu's report on the uses of coastal and marine waters in the Mediterranean (Socio-economic report) was also taken into consideration.

16. The main conclusion of this analysis is that a large number of regional measures have been adopted to tackle the most important pressures and ensure achievement of GES. Their effective implementation aims at achieving and or maintaining GES. However, although significant progress has been achieved in some areas, some pressures are persevering and in some cases even increasing.

17. With regards to the pollution related Ecological Objectives (EO5 on eutrophication, EO9 on contaminants and EO10 on marine litter) the main findings are presented below:

1.1. Eutrophication

18. As regards eutrophication, the regional gap analysis highlighted the following gaps,:

(a) Gaps in wastewater management

19. Most of organic pollution from sewage comes results from direct/untreated or inadequately treated discharges¹³.

- i. Despite the existing measures providing for the establishment of WWT systems in all agglomerations, there are many coastal cities without WWTPs. This measure needs to be better implemented at least for the major coastal cities;
- ii. At regional level, 21% of treated wastewater receives only primary treatment, while only 8% is subject to tertiary treatment;
- iii. Treatment systems need to be improved based on new technologies, i.e. extraction of nutrients for production of fertilizers, and use of sludge for production of energy;
- iv. New measures should provide for application of pre-treatment technologies;
- v. Revised standards and limits to assess and tackle overcapacity and mal function of WWTP should be adopted.

(b) Insufficient regulation of agriculture activities

20. Existing measures at regional level are not sufficient to adequately address the issue.

21. Stricter technical guidelines and management standards, or even Regional Plans are required to tackle inputs from agricultural activities and promote more sustainable farming practices, in line with the provisions under the SCP Action Plan. Some potential measures to be considered are the following:

- Better regulation of and restrictions in the use of fertilizers;
- Optimized nutrient use;
- Incentives for the establishment of more sustainable agriculture farms;
- Better management of animal manure¹⁴;
- Cultivation of nitrogen fixing crops and catch crops;
- Promotion of organic and HNV farming, by setting a target of e.g. 10% of total arable land;
- Creation of buffer stripes, especially in intensively farmed areas;
- Application of water pollution charges for polluting industries, in line with the polluter pays principle.

(c) Insufficient regulation of aquaculture activities

22. Existing measures at regional level are not sufficient to adequately address this sector.

23. Stricter technical guidelines and management standards, or even Regional Plans are required to tackle inputs from aquaculture activities. New measures need to be adopted to ensure that aquaculture activities are adequately planned and developed sustainably and that the environmental impacts are minimized. Nutrient balanced aquaculture needs to be promoted.

24. The GFCM Draft Version of the Strategy for the sustainable development of Mediterranean and Black Sea aquaculture, highlights the lack of guidelines on control and prevention, the lack of applied standards for prevention and control of contaminant procedures along the value chain and the lack of harmonized regulatory and monitoring frameworks, as factors that hamper the efforts to monitor interactions between aquaculture and environment. In this regard identifies the need for activities aiming among others at mitigating impacts on environment and improving environmental protection and enhancing research and knowledge sharing on aquaculture.

25. Documents submitted to and discussed by the 10th Scientific Advisory Committee on Aquaculture (CAQ) identify a number of potential measures that should be considered in order to better regulate the impacts of aquaculture activities on the marine and coastal environment, relevant to

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

¹⁴ http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index_en.htm

eutrophication, contaminants as well as invasive alien species Ecological Objectives. These include identification of restoration schemes for wild stocks and development of risk management tools including alert systems (e.g. for biotoxins and algal blooms) for mussel and oyster farming, use of adequate marine spatial planning to optimize site selection, determination of principles for identification of ecological borders for aquaculture production, development of guidelines on risk analysis and data recording, including environmental issues, training and assistance on the implementation of environmental monitoring programme (EMP), promotion of aquaculture better management practices (BMPs) etc.

26. Potential new measures extracted from the European Commission Staff Working Document¹⁵ that can be also considered may include: limitation of site biomass and production levels to a maximum level, limitation of fertilizer use to the real requirements of the site, use of nutrient enriched water for biogas production or irrigation, implementation of measures to minimize the release of nutrients such as use of closed containment or partial recirculation, development of multi-trophic aquaculture (MTA) systems, recirculating aquaculture systems etc.

(d) Knowledge/data gaps

27. During the Adriatic Sub-regional Workshop organized in the framework of the ActionMed Project, stakeholders from the participating countries identified as main gaps on eutrophication the modelling mesoscale, the insufficiency and/or bad design of monitoring programmes and the lack of data/information sharing systems.

28. New measures are needed, providing for the establishment of a bottom-up approach in monitoring, the transboundary cooperation and the development of harmonized indicators/metrics

29. The gap analysis concluded that further actions were necessary in the following areas:

- Full implementation of measures providing for establishment of WWT systems in all major coastal cities, promotion of secondary and tertiary treatment, upgrading treatment efficiency and increased reuse of wastewater;
- Adoption of new measures for agriculture (addressing inter alia restrictions in fertilisers use, optimised nutrient use, promotion of sustainable and organic farming etc.);
- Adoption of technical guidelines and/ or management standards for aquaculture (see section 1.1.c);
- Adoption of measures to prevent nutrient inputs from other sources (reduction of atmospheric depositions, better control of runoffs, use of wetlands as nutrient sinks etc.).

1.2. Contaminants

30. As regards contaminants, the regional gap analysis highlighted the following gaps:

(a) Waste and wastewater management gaps

- i. There is still 21% of wastewater quantity that undergo only primary treatment, while the percentage of wastewater quantity undergoing tertiary treatment is very low (8% at regional level) (UNEP/MAP MED POL, 2011)¹⁶;

¹⁵ European Commission; SWD (2016) 178 final, Commission Staff Working Document – On the application of the Water Framework Directive (WFD) and the Marine Strategy Framework Directive (MSFD) in relation to aquaculture; Brussels 2016

¹⁶ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

- ii. There is still a high number of collected municipal wastes that is disposed in open dumps¹⁷;
- iii. There are insufficient accounting and cost-recovery mechanisms in many Contracting Parties regarding wastewater and solid waste management¹⁸;
- iv. There no efficient measures for sludge management;
- v. According to the H2020 Mediterranean Report¹⁹, in many Mediterranean countries municipal solid waste management has the following gaps: i. Weak legislation, ii. No waste reduction policies, iii. Lack of separate collection, iv. Lack of knowledge, v. Strong regional disparities between urban and rural areas, vi. Lack of data;
- vi. There are gaps in storm water management, with very limited use of green infrastructure and nature based solutions;
- vii. Despite the existing measure providing for the establishment of WWT systems in all agglomerations, there are many coastal cities without WWTPs, especially in the southern and eastern Mediterranean²⁰;
- viii. There are important sectors contributing to pollution from contaminants that are not adequately regulated at regional level, including desalination, agriculture, aquaculture and tanneries²¹;
- ix. A general upward trend for mercury and lead has been identified in the period between 1998 and 2012²².

(b) Knowledge/data gaps

- i. A lot of progress has been made at regional level, on data collection and we have a good knowledge of the situation. However there are short time series and differences in sampling conditions that don't allow for robust trend analysis of the available data (UNEP/MAP/MED POL 2011) while data availability on oil discharges is very limited²³;
- ii. Reporting under MED POL is not at annual basis²⁴;
- iii. Monitoring activities across the region lack harmonization;
- iv. Monitoring and reporting is particularly problematic in the area of wastewater management. According to the H2020 Mediterranean Report, large amounts of wastewater that remains uncollected is currently not accounted for²⁵.
- v. BAC/EAC don't take fully into consideration subregional specificities for occurring natural compounds;
- vi. Gaps in data and information for contaminants in commonly consumed seafood and microbiological pollutants.

(c) Insufficient implementation/enforcement of legislation

- i. The amendments of the Dumping Protocol are not yet in force;
- ii. The Offshore Protocol has entered into force, but it is still ratified by a minority of Contracting Parties;

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

¹⁸ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

¹⁹ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

²⁰ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

²¹ UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

²² State of Europe's seas, European Environment Agency, 2015

²³ UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

²⁴ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

²⁵ Horizon 2020 Mediterranean Report –Toward shared environmental information systems, EEA-UNEP/MAP joint report, 2014, 142 pp.

- iii. Enforcement of environmental legislation on marine pollution is in general weak;
- iv. MARPOL Convention has been ratified by a big number of Mediterranean countries. However gaps are identified with regards to the establishment of coherent legal frameworks for its implementation²⁶;
- v. According to the assessment of pollution data conducted by Gomez-Gutierrez et al. 2007, POPs have declined. However this decline is more evident for DDTs than for PCBs, which should, according to the SoER-MED²⁷, be alarming as an indicator of possible ongoing inputs. Moreover, in areas where trend analysis can be carried out, PCB concentrations in biota are relatively constant or even slightly increased (northwestern and eastern Mediterranean)²⁸.

31. The following have been identified as the main areas where further measures are needed to address the gaps:

- Full implementation of existing measures on urban and industrial wastewater treatment, better regulation, enhanced enforcement and control of sludge management;
- Stricter implementation and enforcement of measures aiming to eliminate some key contaminants that continue to be present in the Mediterranean;
- Adoption of new measures or Regional Plans for relevant sectors (including, aquaculture (see chapter 1.1.c), desalination and tanneries);
- Review and update of priority contaminants list, to also take into account emerging pollutants;
- Adoption of new measures to better address atmospheric deposition of contaminants;
- Adoption of measures to promote Green Infrastructure and nature-based solutions for storm water management;
- Upscale ratifications and implementation of both the Dumping and Offshore Protocols;
- Obligation for more frequent reporting, and improvements in data collection;
- Further improve BAC/EAC to take into consideration subregional specificities for naturally occurring compounds

1.3. Marine Litter

32. As regards marine litter, the regional gap analysis highlighted the following gaps:

- (a) Knowledge and data gaps^{29 30}
 - i. Data collection has been improved across the region, however it lacks consistency and harmonization and there is need for standardizing approaches;
 - ii. There is data inconsistency and not equal distribution across the region;
 - iii. For the moment, the main impacts on marine organisms for which scientific certainty exists are linked to entanglement, ingestion, colonization and rafting, while there is limited knowledge on the sub-lethal effects of marine litter ingestion on species populations, as well as the potential for secondary pollution;
 - iv. Knowledge is still very limited regarding microplastics and especially their potential impacts on biodiversity and human health. The gaps in knowledge are even bigger when it comes to nanoplastics, which, may have even greater impacts on marine ecosystems;
 - v. There is insufficient knowledge on litter colonization and transport dynamics;

²⁶ UNEP/MAP, 2015. Draft Ecosystem Approach based Measures Gap Analysis. UNEP(DEPI)/MED WG.420/5

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

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

²⁹ Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

³⁰ UNEP/MAP: State of the Mediterranean Marine and Coastal Environment, UNEP/MAP – Barcelona Convention, Athens, 2012

- vi. There is need for more research and improved knowledge on the degradation process of litter (especially plastics) and the leachability of pollutants;
- vii. The socio-economic impacts of marine litter are not fully assessed and understood, especially regarding the specific economic activities that are among the most impacted, such as tourism, fishing and aquaculture;
- viii. There is a limited knowledge on marine litter in the deep sea environments (over 500m).

(b) Key marine litter items not efficiently regulated

- i. Although smoking related activities in general are one of the most important sources of marine litter in the Mediterranean, especially compared to the global average, and cigarette butts the most commonly found litter on beaches, there are no targeted measures to ensure their prevention/reduction;
- ii. Single-use plastic bags are one of the most important marine litter items. There is only one measure in the Regional Plan on Marine Litter Management in the Mediterranean (MLRP) specifically aiming at the reduction of plastic bags. The problem of single-use plastic bags is still persistent;
- iii. Microplastics are not specifically addressed in the MLRP;
- iv. Existing measures are not sufficient to prevent/reduce the use of microplastics (microbeads) in Personal Care and Cosmetic Products (PCCP)³¹;
- v. Electronic waste and medical waste are not specifically addressed in the MLRP
- vi. Tourism is not adequately addressed at regional level as one of the main sectors responsible for generation of marine litter.

(c) Waste management gaps

- i. The percentage of inadequately managed waste remains very high in some countries, even more than 60% in some cases (Jambeck et al. 2015)³²;
- ii. A large proportion of the collected municipal solid waste is disposed in open dumps, despite the existing measures³³;
- iii. Port reception facilities still don't operate optimally, especially regarding small harbors and marinas;
- iv. Less than 10% of the waste collected in the Mediterranean region is currently recycled³⁴;
- v. A regional survey prepared by UNEP/MAP and MIO ECSDE in 2015, revealed some important gaps, relating to Abandoned, Lost or otherwise Discarded Fishing Gear (ALDFG) including i. Insufficient facilities for effective management of fishing gear and other marine litter collected on board, ii. Weak implementation and/or enforcement of the relevant legislation, iii. Worsening of the derelict fishing gear impacts on biodiversity;
- vi. The circular economy concept is not fully integrated and implemented in the framework of the marine litter policies in the Mediterranean;
- vii. Links to human health are not sufficiently addressed.

33. The following have been identified as the main areas where further measures are needed to address the gaps:

- Research, monitoring and assessments, including implementation of IMAP; setting of quantifiable reduction targets for priority items;
- Stronger implementation and enforcement of existing measures and adoption of new measures to reduce plastic wastes;

³¹ Eunomia for European Commission DG Environment 2016, Study to support the development of measures to combat a range of marine litter sources, Chris Serrington, Chiarrina Darah, Simon Hann, George Cole, Mark Corbin

³² Marine Litter Assessment in the Mediterranean, UNEP/MAP, Athens, 2015

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

³⁴ <http://www.eea.europa.eu/soer-2015/countries/mediterranean>

- Adoption of new measures to address the emerging issues of microplastics and nanoplastics;
- Adoption of targeted measures specifically addressing the issue of cigarette butts;
- Better implementation of existing measures and adoption of new measures for pollution from ships (e.g. no-special-fee system);
- Better implementation and enforcement of prevention measures set out in the MLRP;
- Integration of circular economy measures in the MLRP;
- More detailed categorization of marine litter sources.

34. To conclude, the main gaps identified for pollution and litter related ecological objectives and targets can be overall summarised as follows:

Main gaps (implementation gaps or lack of measures)	Link with pressures
Insufficient coverage, level of treatment and operational efficiency of WWT systems	N, C
Lack of performance standards and guidelines for key economic sectors contributing to marine and coastal environmental pollution such as agriculture, aquaculture etc.	N, C
Insufficient measures to address atmospheric depositions and inputs of nutrients and contaminants through storm water/ runoff	N, C
Inadequate solid waste management (including lack of measures to ensure decoupling of waste generation from economic growth, circular economy)	C, ML
Insufficient implementation/ enforcement of existing measures to eliminate key contaminants	C
There is no list of emerging contaminants	C
Existing research, monitoring and assessment programmes are not sufficient for informed policy making and efficient management of marine pollution	N, C, ML
Existing measures do not address plastics and microplastics sufficiently	ML
There is a lack of specific measures on cigarette butts	ML
Lack of resource efficiency and insufficient use of economic instruments	N, C, ML

N = Nutrients (eutrophication); C = Contaminants; ML = Marine Litter]

2. Potential new/updated measures/actions to achieve GES

35. Possible new/updated measures to address the identified gaps vis a vis GES were formulated and screened against a set of criteria to identify the most relevant ones in terms of their effectiveness, significance of the driver/ impact they are addressing, relevance for other policies and potential for coordinated/ joint implementation. Particular attention was paid to areas where effectiveness of measures could be fostered through regional cooperation and/ or joint implementation of measures.

Suggested Pollution Reduction Regional Plans	Measures /Actions	Existing (E) or New (N)
Municipal WWTP	Strengthen implementation of Regional Plans' provision on sewage and WWT systems; strengthening of capacities and provision of support for construction, expansion and upgrading of sewage/ WWT systems	E
	Develop efficiency standards for WWTPs; support strengthened control of their operations	E+N
	Setting of targets for secondary treatment; promotion of tertiary treatment (with targets) and of uptake of new improved WWT technologies; setting of targets for reuse of treated wastewater	N
	Adopt an updated list priority contaminants taking into account 'emerging pollutants' such as pharmaceuticals, nano-materials etc.	N
	Promote upgrading of WWTPs to reduce the inflows of plastics into the marine environment	E
Sewage Sludge Management	Strengthen the existing and development of new measures to improve region-wide performance with sewage sludge management	E+N
Agriculture Nutrients Management	Develop technical guidelines and management standards to tackle inputs of nutrients and contaminants from agriculture and to promote sustainable farming practices	N
Aquaculture Nutrients Management	Develop technical guidelines and management standards to tackle inputs of nutrients and contaminants from aquaculture	N
Urban Stormwater Management	Develop guidelines on management of runoff from urban areas and effluents from storm water sewers; promotion of the use of Green Infrastructure and nature based solutions	N
	Establish appropriate sewage and storm water collection systems, WWTPs and waste management systems to prevent runoff and riverine inputs on marine litter	E
Marine Litter (upgrade)	Strengthen solid waste management systems in the region: adopt quantifiable targets as appropriate, promote adequate collection and treatment/ disposal, stimulate recycling and uptake of new waste management technologies	E+N
	Promote waste prevention at source, better integration of SCP principles and measures, decoupling waste generation from economic growth, green procurement and adoption and implementation of circular economy strategies	E+N
	Close the illegal dumps	E
	Incorporate marine litter into national regulations, prepare Marine Litter National Action Plans,	E+N
	Establish a regional marine litter database	E
	Stimulate reduction/ recycling/ prevention of plastics by, for example, adoption of recycling targets, promotion of sustainable consumption patterns, promotion of instruments to reduce packaging wastes, replacement of plastics with bioplastics where feasible, preventing/ reducing use of microplastics (microbeads) in personal care and cosmetics products, and similar	E+N
	Assess options for phasing out landfilling of recyclable wastes (in particular plastics)	N
	Adopt common definition of microplastics and studies to improve knowledge (sources, quantities, impacts, possible reduction/	N

	prevention measures, differentiated for primary and secondary microplastics)	
	Promote introduction of region-wide plastic bag tax (alternatively promote coordinated approach to restricting single-use plastic bags)	E+N
	Strengthen the implementation of MARPOL Annex V on the prevention of pollution by garbage from ships	E+N
	Use of port reception facilities at no-special-fee	E+N
	Implement prevention/ retrieval of lost/discarded fishing gear; assessment options for collecting and processing/ recycling fishing gear and equipment at the end of its useful life	E+N
	Encourage and implement to the extent possible 'fishing for litter' schemes	E+N
	Implement pilot projects for removal of marine litter accumulations impacting on MPAs	E+N
	Develop and implement measures to reduce incidence of cigarette butts in marine environment, including provision of adequate facilities and signs on organised beaches, awareness raising and clean-up activities	E+N
	Clean-up activities targeting riverbanks	E+N
	Promote and expand beach stewardship schemes	E+N

Part IV. Socioeconomic assessment of selected potential new measures

36. Plan Bleu has undertaken a socio-economic assessment of four selected (potential) regional measures to achieve GES and has prepared a study providing detailed information on effectiveness, costs and benefits of the assessed measures. The four measures assessed in the Plan Bleu's study are: i) introduction of a plastic bag tax; ii) a no-special-fee as a cost recovery mechanism for port reception facilities for ship-generated waste; iii) fishing for litter programmes; and iv) extension of the current surface of marine protected areas. The intent was to provide examples of socio-economic analysis of different types of measures and show what type of results are achievable through literature-based cost-effectiveness, cost-benefit and multi-criteria analysis, and how can they be applied. The analyses also provided useful information on alternative measures potentially leading to the same effects as the assessed ones.

37. The main findings of the analysis are as follows:

38. The overall estimated cost-effectiveness of a regional Mediterranean **plastic bag tax** is €670 million for a 95% reduction of incremental plastic bag waste. Due to a lack of data, it was not possible to quantify many of the impacts of the plastic bag tax and the cost-benefit analysis has been conducted qualitatively, with partial quantification. As it was not possible to calculate a cost-benefit ratio or net present value, a multi-criteria analysis has been undertaken, showing an overall positive effect of the measure.

39. The measure's direct costs are borne by consumers who pay the plastic bag tax. Tax revenues easily cover public costs incurred due to administration of the tax, leaving around €650 million/ year be spent on environmental purposes. The overall employment impact is estimated to be neutral. Direct economic costs borne by the plastic bag manufacturing sector are likely to be compensated (or exceeded) by increased sales of reusable bags and bin liners. All other impacts, namely on ecosystem services and indirect impacts on different economic sectors, are largely positive and mainly linked to the reduction of plastic bag waste present in marine and coastal ecosystems.

40. Cost-effectiveness and cost-benefit aspects of the **use of port waste reception facilities at no-special-fee** have been analyzed qualitatively. A multi-criteria analysis, comparing six different cost recovery mechanisms for port reception facilities has been conducted focusing on environmental and financial/ economic characteristics of the different mechanisms. The multi-criteria analysis indicates that the no-special fee scores highest against the selected performance criteria and is thus recommended as the preferred option to recover costs of port reception facilities for ship-generated waste. The measure's main benefits are linked to a significant reduction of chronic pollution from ships, positively impacting ecosystem services and several economic sectors which depend on the quality of the marine and coastal environment.

41. **Fishing for litter** schemes have been assessed quantitatively and qualitatively. Cost-effectiveness of relatively large-scale initiatives was estimated at a level of around €900/ ton of fished litter. Cost-benefit analysis has been conducted mostly qualitatively thus turning into to a multi-criteria analysis with an overall conclusion that the impact of the scheme is positive. The measure's costs include administrative/ management costs and waste management, treatment and disposal costs, which are generally borne on a project basis by public and private donors. The costs to the fishing sector are estimated to be small and mostly linked to the effort and time required to bag the waste and bring it to waste reception facilities at ports.

42. The management cost of Mediterranean **Marine Protected Areas (MPAs)** has been estimated at almost €50 million in annual running costs for a 10% MPA coverage and less than €140 million for a 30% coverage (both including running costs of already existing MPAs). Cost-benefit analysis has been undertaken qualitatively and since it was not possible to calculate a cost-benefit ratio or net present value, the analysis was transformed into a multi-criteria analysis, concluding that the extension of the current MPA surface would come with an overall positive socio-economic impact. The costs of the measure are mostly management costs, usually borne by public institutions, and foregone revenue – at least in the short-term – within the local fishing sector. The measure's employment impact has been estimated as generally positive whereas expected loss of jobs in the fishing sector would be offset by jobs created for MPAs management and in the ecotourism sector.

43. The Secretariat prepared factsheets for the four regional measures, presented in the Annex I of the present report, for which a socioeconomic assessment has been carried out by Plan Bleu, containing the following information:

- (a) Description of the measure;
- (b) Rationale;
- (c) Link to GES Ecological Objective;
- (d) Link to driver, pressure and impacts;
- (e) Expected effects;
- (f) Scale of application (regional/ sub-regional/ national);
- (g) Coordination requirements/ needs;
- (h) Information on the impacts and effectiveness of measure, if available; information on costs and benefits;
- (i) Timing for preparation/ implementation (in line with the action plans).

Part V. The way forward

44. The process of reviewing, preparing and deciding on the new/ updated regional measures may involve several steps:

Actions	Timetable
Submission of a proposed list of new/ updated measures to the MAP Components/ Thematic Focal Points meetings	May 2017

Submission of a revised list of potential new/updated measures to the MAP Focal Points Meeting through the EcAp Coordination Group, for information and/or discussion and to get guidance on follow-up, as appropriate	September 2017
Development of main elements/ factsheets for selected priority measures in line with the Programme of Work 2018-2019	2018-2019
Agreement on the list of measures and the timetables for their preparation	2019
Negotiation of new measures according to the agreed timetable	2021 -2030

Annex I
Factsheets for four regional measures

Title of the measure	Expansion of the network of marine protected areas to reach the 10% and 30% targets respectively
Description	Extension of the MPA surface coverage in the Mediterranean to 10% (Aichi target for 2020) and eventually to 30% (recommendation from World Parks Congress hosted by IUCN in 2014)
Rationale	Although the Aichi target provides for 10% coverage of sea surface by MPAs, MPA networks in the whole Mediterranean is relatively low, especially in some sub-regions
Link to Ecological Objectives (EO)	EO 1, EO 3, EO 4, EO 6
Link to driver, pressure and impacts	Driver: fisheries, tourism and recreation, maritime traffic Pressure: species extractions, pollution Impacts: biological disturbances
Expected effects	Positive effects on biodiversity and related descriptors are expected, provided that MPA expansion is followed with complementary measures, sound management including enhanced monitoring and reporting, improved stakeholder involvement and similar. Effectiveness of MPAs is generally increased if the MPAs are established within a network promoting cooperation and synergies and connected by the movement of species. The utility of establishing such networks also highlights the regional relevance of extending the current Mediterranean surface of MPAs
Scale of application	National and sub-regional
Coordination requirements/needs	High level of coordination needed between competent national authorities to ensure effectiveness and representativity at sub-regional/ regional level
Impacts, effectiveness, costs and benefits	The management cost of Mediterranean MPAs has been estimated at almost €50 million in annual running costs for a 10% MPA coverage and less than €140 million for a 30% coverage (both including running costs of already existing MPAs). Qualitative cost-benefit analysis showed that that the extension of the current MPA surface would have an overall positive socio-economic impact. The costs of the measure are mostly management costs, usually borne by public institutions, and foregone revenue – at least in the short-term – within the local fishing sector. The measure's employment impact has been estimated as generally positive whereas expected loss of jobs in the fishing sector would be offset by jobs created for MPAs management (around 3,100 jobs for a 10% coverage and around 8,800 jobs for a 30% coverage, including jobs in already existing MPAs) and in the ecotourism sector. All other socio-economic impacts are considered to be positive – at least in the long-term - and mainly concern the fishing and tourism sector, society in general and ecosystem services.
Timing for preparation/ implementation	2017 – 2021

Title of the measure	Use of port reception facilities at no-special-fee
Description	Ships generate different types of wastes. A no-special-fee system aims at discouraging the (illegal) discharge of waste into the sea and is defined as a charging system where the cost of reception, handling and disposal of

	<p>ship-generated wastes, originating from the normal operation of the ship, as well as of marine litter caught in fishing nets, is included in the harbor fee or otherwise charged to ships calling at port, irrespective of whether wastes are delivered or not. The no-special-fee therefore qualifies as an indirect fee and at the same time provides an incentive for ships to deliver their waste on shore. It is indirectly aligned with the polluter pays principle, as the overall polluting sector - maritime shipping – pays, but individual ships not generating waste also remain liable to the fee. The central idea of the no-special-fee is that the port fee should not be related to the amount of waste the vessel leaves in port.</p>
Rationale	<p>UNEP-MAP's Regional Plan for Marine Litter Management in the Mediterranean (2013) urges Mediterranean rim countries to “in accordance with Article 14 of the Prevention and Emergency Protocol explore and implement to the extent possible by 2017, ways and means to charge reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system.”</p> <p>This is in line with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) of the International Maritime Organization (IMO), under which there is an obligation to provide port waste reception facilities (PRF), which must be adequate to meet the needs of ships using the port, without causing undue delay.</p> <p>In the Mediterranean, there are about 600 ports and terminals recording ship movements and maritime transport produces around €70 billion in turnover per year and sustains around 550,000 direct jobs. Some Mediterranean ports have already adopted a no-special-fee system. However, a comprehensive survey of Mediterranean ports, the characteristics of their PRF and the cost recovery mechanism applied for these facilities is currently lacking.</p>
Link to Ecological Objectives (EO)	EO 9, EO 10; possibly also EO 1, EO 2, EO 4, EO 5
Link to driver, pressure and impacts	<p>Driver: maritime transport, fishing, tourism</p> <p>Pressure: Introduction of heavy metals, POPs, oil</p> <p>Impacts: Contamination by hazardous substances</p>
Expected effects	<p>Shipping accounts for about 20% of the global discharges into the sea. On a global level it is assumed that only about 27% of all ship waste is delivered to reception facilities, while the majority is dumped or incinerated on board or at port. Theoretically, adequate provision and use of PRF could absorb these discharges into the Sea and thus avoid the pollution stemming from them. Practical effectiveness of the measure depends on the existence of adequate PRF, provision of swift handling of wastes at ports, the level to which the system is harmonized on the regional level, etc.</p>
Scale of application	National, regional
Coordination requirements/ needs	Coordinated approach is needed across region, requiring high coordination efforts

Impacts, effectiveness, costs and benefits	Qualitative information on cost-effectiveness and cost-benefit aspects of the use of PRF at no-special-fee is available. A multi-criteria analysis, comparing six different cost recovery mechanisms for port reception facilities has been conducted focusing on environmental and financial/economic characteristics of the different mechanisms. The multi-criteria analysis indicates that the no-special fee scores highest against the selected performance criteria and is thus recommended as the preferred option to recover costs of port reception facilities for ship-generated waste. The measure's main benefits are linked to a significant reduction of chronic pollution from ships, positively impacting ecosystem services and several economic sectors which depend on the quality of the marine and coastal environment.
Timing for preparation/ implementation	2017 – 2021

Title of the measure	Plastic bag tax
Description	A plastic bag tax is an environmental levy on single-use plastic shopping bags, imposed at a fixed per unit rate at the manufacturer or retailer/point of sale of plastic shopping bags to customers. The primary purpose of a plastic bag tax is to provide an incentive to reduce the use of plastic bags and thus, indirectly, to prevent littering. The introduction of a plastic bag tax is designed to change and explicitly itemize the price of plastic bags and therefore alter the behaviour of producers and consumers.
Rationale	The introduction of a plastic bag tax is in line with UNEP-MAP's Regional Plan for the Marine Litter Management in the Mediterranean, aiming at reducing 20% of beach litter by 2024 and a significant and measurable decrease of other marine litter items.
Link to Ecological Objectives (EO)	EO 1, EO 9, EO 10
Link to driver, pressure and impacts	Driver: multiple sectors and society in general Pressure: marine litter (land-based) Impacts: mostly physical disturbance (plastic bags comprise app. 8.5% of marine litter)
Expected effects	Precise proportion of marine litter attributed to plastic bags is variable and differs depending on the location and the sampling methodology. Practical experiences with application of plastic bag tax show positive results. For example, introduction of a plastic bag levy in Ireland in 2002 (at a unit rate of 15 cents) brought the use of bags per capita from an estimated 328 to 21 bags/year. This has fallen further when the levy was raised to 22 cents in 2014 to an estimated 14 bags/capita. Practical effectiveness of the measures is likely to depend on the a set of factors including fixing of the tax rate at right amount, broad definition of tax base (bags to which the tax is applied), use of revenues, visibility and others.
Scale of application	National, regional
Coordination requirements/ needs	Medium coordination needs

Impacts, effectiveness, costs and benefits	<p>The overall estimated cost-effectiveness of a regional Mediterranean plastic bag tax is €670 million for a 95% reduction of incremental plastic bag waste.</p> <p>The measure's direct costs are borne by consumers who pay the plastic bag tax. Tax revenues easily cover public costs incurred due to administration of the tax, leaving around €650 million/ year be spent on environmental purposes. The overall employment impact is estimated to be neutral. Direct economic costs borne by the plastic bag manufacturing sector are likely to be compensated (or exceeded) by increased sales of reusable bags and bin liners. All other impacts, namely on ecosystem services and indirect impacts on different economic sectors, are largely positive and mainly linked to the reduction of plastic bag waste present in marine and coastal ecosystems.</p>
Timing for preparation/ implementation	2017 – 2021

Title of the measure	Fishing for litter
Description	Fishing for litter initiatives have a twofold aim: to remove marine litter from the marine environment and to raise awareness of marine litter issues, particularly within one of its main stakeholders – the fishing sector - where the measure helps to prevent littering due to Abandoned, Lost or otherwise Discarded Fishing Gear. The main actors in fishing for litter initiatives are the fishermen who are provided with bags to collect litter that accumulates in their nets and other fishing gear during normal fishing activities and to dispose of unwanted fishing gear. The collected waste is disposed at port reception facilities for recycling or final disposal at land. Fishermen participate on a voluntary basis while harbours and ports assist with the handling of waste.
Rationale	UNEP/MAP's Regional Marine Litter Plan urges Mediterranean countries to “explore and implement to the extent possible the ‘Fishing for Litter’ system, in consultation with the competent international and regional organizations, to facilitate clean-up of the floating litter and the seabed from marine litter caught incidentally and/or generated by fishing vessels in their regular activities including derelict fishing gears”.
Link to Ecological Objectives (EO)	EO 10, possibly also EO 1 and EO 3
Link to driver, pressure and impacts	Driver: general land-based activities, tourism, fisheries, shipping Pressure: marine litter Impacts: mostly physical disturbance
Expected effects	Effectiveness of fishing for litter initiatives has been proven repeatedly, through several projects/ initiative implemented in various marine regions. Prerequisites for a successful implementation and practical effectiveness include size of participating boats and sound administration/ management of the scheme, including communication and monitoring.
Scale of application	National, regional

Coordination requirements/ needs	Medium coordination needs
Impacts, effectiveness, costs and benefits	Cost-effectiveness of relatively large-scale fishing for litter initiatives was estimated at a level of around €900/ ton of fished litter. Overall conclusion of a qualitative cost-benefit/ multi-criteria analysis is that the impact of the scheme is positive. The measure's costs include administrative/ management costs and waste management, treatment and disposal costs, which are generally borne on a project basis by public and private donors. The costs to the fishing sector are estimated to be small and mostly linked to the effort and time required to bag the waste and bring it to waste reception facilities at ports.
Timing for preparation/ implementation	2017 – 2021

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