



REPUBLIC OF CYPRUS

MINISTRY OF AGRICULTURE, NATURAL RESOURCES AND ENVIRONMENT

DEPARTMENT OF FISHERIES AND MARINE RESEARCH

Cyprus Programmes of Measures

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**Implementation of Article 11 of the
Marine Strategy Framework-Directive (2008/56/EC)**

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Introduction

The Marine Strategy Framework-Directive (MSFD, 2008/56/EC)

The MSFD (2008/56/EC) is one of the seven thematic strategies proposed by the Sixth Community Environment Action Programme (1600/2002/EC). It is often considered the environmental pillar of the Integrated Maritime Policy of the EU (COM (2006) 275, COM (2007) 575). According to Article 1 of the MSFD, a framework is established within which the member-states (and, to a large degree, the candidate member-states) take all necessary measures to achieve and/or to maintain the good environmental status (GES) of their marine waters the latest by 2020. This framework consists of marine strategies, which aim towards the achievement and/or maintenance of GES. GES is defined by Article 3 of the MSFD as the environmental condition of marine waters in which these waters provide an ecologically diverse and dynamic marine environment which is clean, healthy and productive within its intrinsic conditions, and where the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.

According to Article 5 of the MSFD, marine strategies are implemented in three phases:

(1) Preparation:

- a) Assessment of the environmental status,
- b) Determination of GES,
- c) Establishment of environmental targets,
- d) Establishment of a marine environment monitoring programme,

(2) Programme of measures:

- e) Programme of measures designed to achieve and/or maintain GES,

(3) Revision:

- f) The periodic (every 6 years) revision of the above actions.

Implementation of the MSFD in the Republic of Cyprus

In the Republic of Cyprus, the Department of Fisheries and Marine Research (DFMR) is the Competent Authority for the implementation of the MSFD, and it participates in all the activities for the implementation of the MSFD at the EU level (committees, working groups, etc.). The DFMR transposed the MSFD into the National Legislation with the Marine Strategy Law of 2011 (Law 18(I)/2011), and immediately initiated the process of implementing the MSFD.

Implementation of the provisions of Articles 8, 9 and 10 – 2012

The DFMR implemented Phase I, parts (a)-(c), that concern MSFD Articles 8, 9 and 10, respectively, in 2011-2012. The process was completed with the submission of the relevant reports to the EC in 2012. A total of three reports were submitted:

- An Initial Assessment report of the marine environment of Cyprus (DFMR, 2012c), consisting of Part I (Characteristics), Part II (Pressures and Impacts) and Part III (Economic and Social Parameters),
- A report on the determination of Good Environmental Status (DFMR, 2012a),
- A report on environmental targets and associated indicators (DFMR, 2012b).

Subsequently, the information contained in the reports was also submitted to the EC using typified reporting sheets.

Evaluation and revision of the 2012 reports

In February 2014, the EC concluded a review (EC, 2014a, 2014b) of the reports submitted by Cyprus (and other member-states) in 2012 after the implementation of Articles 8, 9, and 10 of the MSFD. This review was based on an extensive technical evaluation by a group of experts (Milieu Ltd. Consortium, 2014). The technical evaluation was analyzed and the critical aspects of the 2012 reports were revised in order to resolve critical issues that affect several aspects of the monitoring programmes and to lay the groundwork for the 2018-2020 revision of the implementation phases (DFMR, 2014b). The most important of these aspects are the development of indicators (especially when they were not established in 2012) and the revision of the definition of GES for Cyprus waters based on these indicators. Targets established in 2012 were reiterated and new targets were only developed in selected cases.

Establishment of monitoring programmes

Consequently, the DFMR documented and established monitoring programmes for the ongoing assessment of the environmental status of the marine waters of Cyprus (Article 11, Phase I, part d) on the basis of the reports submitted in 2012 and their revision in 2014. The relevant report (DFMR, 2014a) was submitted in October of 2014.

Programmes of measures (PoMs)

Since the establishment of monitoring programmes, the next phase of the implementation of the MSFD is the development of PoMs aimed at achieving and/or maintaining GES in Cyprus marine waters. The present report itemizes the recommended PoMs of Cyprus for the period 2016-2022.

The PoMs were drafted according to the provisions of Article 13 of the MSFD. Specifically:

- They address the GES definitions established during the earlier stages of MSFD implementation and the environmental targets and indicators set previously based on the Initial Assessment of the marine environment of Cyprus, summarized in Appendix I.
- They take into account measures required under other Community legislation,
- They are formulated with due consideration to sustainable development and their socioeconomic impacts
- They take spatial protection into consideration especially in accordance with the implementation of other Community legislation.

Programmes of measures implications to other countries

This PoP has no implications on waters beyond the Cypriot marine waters therefore have no risk or damage to any other country.

List of acronyms

ACCOBAMS	Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area
ARA	Artificial Reef Area
BWD	Bathing Waters Directive (2006/7/EC)
CAM	Coordination and Alignment Meetings/MED MSFD
CW	Coastal waters
DFMR	Department of Fisheries and Marine Research of Cyprus
CD477	Commission Decision on criteria and methodological standards on good environmental status of marine waters (2010/477/EU)
CFP-DC-MAP	Common Fisheries Policy-Data Collection Framework
CIS	Commercially important stocks
D01-11	Descriptors 01-11 according to the CD477
EC	European Commission
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EU	European Union
GES	Good Environmental Status
HM	Heavily-modified (WFD water bodies)
IAEA	International Atomic Energy Authority
IAS	Invasive non-indigenous species
KTMs	Key Types of Measures
MedITS	Mediterranean International Trawling Survey
MED/MSFD	Technical and administrative support for the joint implementation of the Marine Strategy Framework Directive (MSFD) by the EU Mediterranean Member States. <i>Developed under EC framework contract (ENV.D.2/FRA/2012/0017).</i>
MedPOL	The marine pollution assessment and control component of UNEP/MAP
MPA	Marine Protected Area(s)
MS	Member-State(s) of the EU
MSFD	Marine Strategy Framework-Directive (2008/56/EC)
NAS	Native species
NIS	Non-indigenous species
NTU	Nephelometric Turbidity Units
PAH	Polyaromatic hydrocarbons (WFD)
PCB	Polychlorinated biphenyls (WFD)
PIIAS	Primarily-introduced invasive non-indigenous species
PoMs	Programmes of Measures
RBMP	River Based Management Plan
SCI	Site(s) of Community Importance (Habitats Directive, 92/43/EEC)
SIA	Strategic Impact Assessment
SPA	Special Protection Area(s) (Birds Directive, 2009/147/EC)
UNEP/MAP	United Nations Environment Programme/Mediterranean Action Plan
WFD	Water Framework-Directive (2000/60/EC)
WG	Working group

Biodiversity measures (D1, D4, D6)

Biodiversity measures cover the descriptors of diversity (D1), food webs (D4) and seafloor integrity (D6). The GES definition of the marine waters of Cyprus with respect to these descriptors is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- Bird species continue to occur in all their natural habitats, in line with prevailing physiographic, geographic and climate conditions,
- Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity, and that allow them to achieve and maintain a favourable conservation status,
- Their populations are in good condition, as indicated by breeding success and survival levels,
- Marine mammal and reptile species continue to occur in all their natural habitats, including suitable breeding and nesting sites,
- Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity, and that allow them to achieve and maintain a favourable conservation status,
- Their populations are in good condition, as indicated by breeding success and survival levels,
- Fish and cephalopod species continue to occur in all their natural habitats, in line with prevailing physiographic, geographic and climate conditions,
- Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity,
- Their populations are in good condition, as indicated by sex ratios, population size and age structure, and diversity indices,
- Temperature, salinity, pH, water transparency, nutrient concentrations and ratios, and oxygen are in line with prevailing physiographic, geographic and climate conditions throughout the water column,
- The abundance and biomass of phytoplankton and zooplankton are normal and in line with prevailing physiographic, geographic and climate conditions, and at levels capable of ensuring their long-term abundance.
- Macroalgal, benthic macroinvertebrate and angiosperm species continue to occur in all their natural habitats, in line with prevailing physiographic, geographic and climate conditions,
- Their populations are at abundance and density levels that ensure the long-term presence of the species, and are in good condition, as indicated by diversity indices,
- Seabed habitat integrity is at a level that ensures that the structure and function of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

Gaps and needs

Birds

Significant gaps in knowledge exist with regards to bird population demographics, such as sex ratios, survival, fecundity/mortality, etc., of all species. Moreover, while sufficient

knowledge exists for wetland species, little is known about all but a few coastal species, and almost nothing about offshore species. The established Cyprus MSFD monitoring programmes will address distribution patterns and population sizes for wetland and coastal birds. They do not sufficiently address the needs emerging from the GES definition. No specific plans exist to address gaps in knowledge, especially with regards to population demographics, but also with regards to distribution and population sizes of offshore birds. While protection measures may be adequate, there is a need for sufficient information to evaluate the appropriate indicators and set reasonable targets.

Marine mammals and reptiles

Significant gaps in knowledge exist with regards to the distribution, population size and condition (demographics) of marine mammals, including many cetacean species and the Mediterranean monk seal, *Monachus monachus*. The established Cyprus MSFD monitoring programmes will address distribution patterns and population sizes for all marine mammals and reptiles. They do not sufficiently address the needs emerging from the GES definition. No specific plans exist to address gaps in knowledge, especially with regards to marine mammal population demographics. There is a need for sufficient information to evaluate the appropriate demographics indicators and set reasonable targets.

Fish and cephalopods

Sufficient information is collected through the Data Collection Framework of the Common Fisheries Policy, including the Mediterranean International Trawling Survey (MedITS) and the collection of métier- and stock-related variables. The analysis conducted during the 2012 reporting phase concluded that the marine waters of Cyprus are not in GES with respect to several population condition metrics. Measures must be considered to improve the conditions of several fish populations, especially commercially important stocks (CIS; see Descriptor 3 below).

Water column habitats

The assessment of the marine waters of Cyprus, regarding water column physicochemical characteristics and Chlorophyll *a* concentrations as a proxy for phytoplankton abundance/biomass, based on data collected in the framework of WFD and MedPOL, indicated that Cyprus waters are in GES. Existing data did not allow the evaluation of phytoplankton and zooplankton populations. The established Cyprus MSFD monitoring programmes will address the lack of quantitative data for the population and/or biomass size of phytoplankton and zooplankton, and will upgrade the ability of the DFMR to monitor water column habitats.

Seabed habitats

The assessment of the marine waters of Cyprus, regarding macroalgae, benthic macroinvertebrates and angiosperms, indicated that Cyprus waters are in GES, and that existing data-collection mechanisms in the framework of the WFD provide a good foundation on which to continue this assessment in the future. The established Cyprus MSFD monitoring programmes provide a sufficient foundation on which to continue monitoring and assessing seabed habitats.

Existing Measures for Biodiversity

1. Species and habitat protection legislation

Many species of wetlands and marine birds, marine mammals, turtles and *Posidonia oceanica* are afforded protection under the national Fisheries Law of 1971, the Habitats Directive (92/43/EEC), the Birds Directive (2009/147/EC), the Barcelona Convention, etc. Similarly, many important habitats, including *Posidonia* meadows are protected under the Habitats Directive (92/43/EEC), the Birds Directive (2009/147/EC), the Barcelona and Ramsar Conventions, etc.

Relevant targets and indicators: CY141.1-4, CY142.1-5, CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

2. Turtle Protection Programme

Ongoing implementation of the Turtle Protection Programme, including the turtle strandings guidelines, established under National Legislation in 1978.

Relevant targets and indicators: CY142.1-5 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

3. Actions to control offshore activities for the protection of Cetaceans

Ongoing implementation of the ACCOBAMS guidelines regarding hydrocarbon exploitation activities, in order to protect cetaceans. For example, it is required to use a soft-start method during seismic surveys to give some time to cetaceans to move away from the area.

Relevant targets and indicators: CY142.4.X (Appendix I)

Type of measure: 2, 3, 5 (See Appendix II)

4. Cetacean Strandings & Sightings Program

Ongoing implementation of a cetacean strandings and sightings programme to monitor potential human pressures on their populations.

Relevant targets and indicators: CY142.4.X (Appendix I)

Type of measure: 2, 3, 5 (See Appendix II)

5. Mediterranean Monk Seal Monitoring Program

Ongoing implementation of a monk seals monitoring programme to monitor potential human pressures on their populations.

Relevant targets and indicators: CY142.4.X (Appendix I)

Type of measure: 2, 3, 5 (See Appendix II)

6. Establishment of coastal MPAs

Establishment of 6 coastal MPAs in the framework of the Natura 2000 network (Habitats Directive, 92/43/EEC) for the protection of various priority habitats, including *Posidonia* meadows, submerged caves, and sandbanks.

Relevant targets and indicators: CY146.1-12, CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

7. Management plans for MPAs

Drafting of management plans for Natura 2000 MPAs, including various management measures.

Relevant targets and indicators: CY146.1-12, CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4 (See Appendix II)

8. Mapping of Posidonia habitats within MPAs and high-activity areas

Mapping of *Posidonia* priority habitats within Natura 2000 MPAs and areas of high activity (e.g., the Lemesos-Vasilikos corridor).

Relevant targets and indicators: CY146.3.1-6 (Appendix I)

Type of measure: 1,2, 3, 4 (See Appendix II)

9. Ecological Status assessment of coastal ecosystem components

Ongoing evaluation of the environmental status (ecological and chemical) of coastal components (benthic macrofauna, macroalgae, *Posidonia* meadows and Phytoplankton (Chlorophyll-a)) in the framework of the implementation of the Water Framework Directive (2000/60/EC).

Relevant targets and indicators: CY146.1-12, CY146.2.1-5, CY146.3.1-6, CY5.8-9 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

10. Establishment of SPAs

Establishment of Special Protection Areas for the protection of wetland and coastal bird populations in the framework of the implementation of the Birds Directive (2009/147/EC).

Relevant targets and indicators: CY141.1-4 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

11. Establishment of ARAs

Establishment of 6 artificial reef areas (ARAs) with controls on human activities for the protection of biodiversity and the recovery of local fish stocks.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 6, 7 (See Appendix II)

12. Prohibition of bottom trawlers to fish less than 50m depth or 0.7 nm from coast

Ongoing measure for the reduction of fishing activity using bottom otter trawlers according to EU legislation (EC No.1967/2006) and for the protection of habitats, for example *Posidonia* meadows, maerl beds etc.

Relevant targets and indicators: CY143.1-11, CY146.2.1-5, CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

13. Dredged material disposal policy

Implementation of a national policy for the disposal of dredged material for the protection of seafloor habitats.

Relevant targets and indicators: CY146.2.1-5, CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

New measures for Biodiversity

14. Mapping of Posidonia meadows outside MPAs

Mapping of *Posidonia* meadows in areas outside existing MPAs. EMFF Measure 1.18 is relevant.

Relevant targets and indicators: CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

15. Implementation of MPA management plans

Implementation of management plans for Natura 2000 MPAs, including various management measures. For example management of moorings included in MPA management plans. EMFF Measure 1.18 is relevant.

Relevant targets and indicators: CY143.1-11, CY146.1-12, CY146.3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4 (See Appendix II)

16. Studies for the establishment of new MPAs and FRAs

Studies will be conducted for the establishment of new MPAs and FRAs:

- To protect nursery and spawning grounds of many commercially important species, in coordination with the Habitats Directive (92/43/EEC) and Regulation 1967/2006,
- To protect hard substrate, *Posidonia* meadows, sea caves, and offshore, deep-sea habitats,
- In association with new large-scale artificial reefs for the recovery of fish stocks and the reduction of pressure from natural reefs.
- As ecological corridors, in conjunction with the installment of new artificial reefs.

EMFF measure 1.18 is relevant.

Relevant targets and indicators: CY143.1-11, CY146.1-12, CY146.3.1-6, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

17. Research on population dynamics of birds

Planning of research measures to fill gaps in knowledge on population dynamics of coastal and offshore birds.

Relevant targets and indicators: CY141.1-4 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

18. Research on population dynamics of marine mammals

Planning of research measures to fill gaps in knowledge on population dynamics of coastal and offshore marine mammals. EMFF measure 6.3 is relevant.

An acoustic and visual survey in the marine waters of the Republic of Cyprus is planned during 2016 in order to get a population assessment of cetacean distribution and population size for all species present in the marine waters of Cyprus.

Relevant targets and indicators: CY142.1-4 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

19. Promote the development guidelines on waste, marine litter and noise in waiting areas at sea for merchant ships and cruise ships

Waiting areas of ships can cover large coastal-marine areas near big ports. The promotion of guidelines on the management of waste, marine litter and underwater noise in waiting areas for merchant and cruise ships can contribute in the reduction of the impacts of these activities on habitats and species (e.g. cetacean species) found in these areas.

This measure is an outcome of the EU MED Support Project for MSFD (Phase II, CAM 4)

Relevant targets and indicators: CY141-CY146, CY5, CY10.3-6.X, CY11.1-2 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

20. Increase public awareness on the role and value of habitats towards the 10% designation of MPAs –Aichi Target 11/CBD

Increase of public awareness on the role of habitats and their (economic) value can contribute in avoiding - amongst others- the misunderstanding that reaching the Aichi target 11 of the CBD (that is 10 % MPAs) does not correspond to 10 % economic loss. Such an understanding will help to reach a consensus and agreement on the % of marine-coastal area to be protected.

This measure is an outcome of the EU MED Support Project for MSFD (Phase II, CAM 4)

Relevant targets and indicators: All (Appendix I)

Type of measure: 8 (See Appendix II)

21. Use of private funding (by e.g. oil & gas platforms) for habitat mapping in deep sea (Economic Exclusive Zone, EEZ)

The use of private funding mainly by hydrocarbon companies for habitat mapping in the EEZ and especially in the deep sea, will help gain the necessary scientific knowledge, in order to identify sensitive species and habitats and expand the MPA network further offshore.

This measure is an outcome of the EU MED Support Project for MSFD (Phase II, CAM 4)

Relevant targets and indicators: CY141-CY146, CY5 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

22. Local privileges in certain MPAs

The provision of sustainable local privileges in certain MPA areas is expected to promote the awareness of the local communities and support their control on potential violation of the MPAs, thus contributing to their effective protection and management.

This measure is an outcome of the EU MED Support Project for MSFD (Phase II, CAM 4)

Relevant targets and indicators: All (Appendix I)

Type of measure: 8 (See Appendix II)

23. Establishment of new ARAs and/or enrichment of existing ARAs and improve management and protection

This measure consists of a group of actions-projects related to ARAs, which will be funded by the *European Maritime and Fisheries Fund (EMFF) – Operational Programme for Cyprus 2014-2020*. The development of new ARAs and/or the upgrade and enrichment of the existing ones with new modules (including actions related to the preparation and implementation of management plans, monitoring and surveillance, public awareness, information and education) will further promote the protection and management of the coastal-marine biodiversity and ecosystems. EMFF measure 1.18 is relevant.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4, 6, 7 (See Appendix II)

24. Sustainable fisheries and species protection

Remunerations to fishermen for damages from marine birds and mammals. EMF measure 1.19 is relevant.

Relevant targets and indicators: CY141.1-4, CY142.1-4 (Appendix I)

Type of measure: 1, 2, 3, 6, 7 (See Appendix II)

25. Marine food web studies

Studies for the determination of marine food webs, especially in the coastal environment. EMFF measure 6.2 is relevant.

Relevant targets and indicators: CY141-CY146, CY2, CY3 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

Non-indigenous species (D2)

The GES definition of the marine waters of Cyprus with respect to NIS (D2) is as follows.

- The marine environment of Cyprus is considered to be in good environmental status if:
- Invasive non-indigenous species (IAS) do not dominate the abundance/biomass of their taxonomic group/functional group within a predominant habitat type, and especially in Marine Protected Areas (including Sites of Community Importance),
 - The introduction of primarily-introduced invasive non-indigenous species (PIIAS), i.e. species introduced directly into Cyprus waters (and excluding secondary dispersal) by human activities such as shipping, aquaculture, and the aquarium trade, is minimized,
 - PIIAS are not established outside high-risk areas of impact, such as harbors, marinas, aquaculture facilities etc., while their abundances in high-risk areas are minimized.

Gaps and needs

The assessment conducted during the 2012 reporting phase concluded that the marine waters of Cyprus are not in GES with respect to NIS. A more detailed analysis of various aspects of NIS presence in Cyprus was performed as part of the revision of the 2012 reporting, and indicated that the vast majority (103 of 129) may have entered through the Suez Canal, a man-made structure whose construction and operation is not the responsibility of Cyprus.

Monitoring programmes are focusing on macroalgae on hard and soft substrates, and fish and crustaceans monitored during MedITS, but do not address molluscan and crustacean epibiotic PIAS (hard substrates) in high-risk areas and MPAs. Measures must be considered to minimize the introduction of PIAS. The established Cyprus MSFD monitoring programmes do not address the lack of quantitative data for several NIS, and especially IAS, in high-risk areas and MPAs. Additionally, there is a lack of explicit inventories of native species (NAS) for the common taxonomic groups of NIS. Therefore, there is a need for sufficient information to evaluate the appropriate demographics indicators and set reasonable targets.

Based on the existing scientific knowledge and literature, the Suez Canal can be identified as a priority pathway concerning its contribution in the increase of NIS in the Mediterranean, while acknowledging the inherent difficulties in addressing it in order to prevent NIS introductions. Prevention measures are not feasible since this mega-structure pathway is not under EU or any single member-states' control and therefore any decided action-measure cannot be undertaken at such level. Moreover, proposition of such measures and their estimated effectiveness and impacts is a matter of a long-lasting and still ongoing scientific debate between experts from various countries. Research effort is needed in order to increase knowledge on the behavior of NIS in the Mediterranean environment, on their impacts on indigenous species and on the marine ecosystems in order to estimate the possibility of their management. The management of the other pathways of introduction (aquaculture, ballast waters and hull fouling) is feasible and already addressed.

Based on the above-mentioned (for more detailed justification see *Appendix III*), Cyprus considers that D2 – NIS (and specifically the Lessepsian immigrants) falls under **MSFD Article 14 (a)**, where the environmental targets or GES cannot be achieved through measures taken by affected Member States, since they are not responsible nor able to take such measures. For this reason, the impact of **D2 –NIS / Lessepsian immigrants is not addressed in the CY PoMs.**

Existing measures

26. Restriction of alien species use in aquaculture

Control and/or restriction of the use of alien species in aquaculture through the implementation of Regulation 708/2007).

Relevant targets and indicators: CY2.3 (Appendix I)

Type of measure: 1, 2, 3 (See Appendix II)

27. Monitoring of *Lagocephalus* sp.

Monitoring of *Lagocephalus* sp. through intensive collection programme

Relevant targets and indicators: CY2.11, CY2.14, CY2.17, CY2.19 (Appendix I)

Type of measure: 6, 7 (See Appendix II)

28. *Lagocephalus* sp. population reduction programme

Initiation of a *Lagocephalus* population reduction programme by selective removal/extraction based on the results of previous monitoring and collection efforts. EMFF measure 1.18 is relevant.

Relevant targets and indicators: CY2.11, CY2.14, CY2.17, CY2.19 (Appendix I)

Type of measure: 1, 6, 7 (See Appendix II)

New measures

29. Reduction of NIS populations through selective extraction methods

Design and testing of selective extraction methods to reduce the populations of invasive species (e.g., *Lagocephalus*, *Fistularia*, *Pterois*, *Siganus*) that have demonstrably adverse effects on commercially important stocks

Relevant targets and indicators: CY2.11-20 (Appendix I)

Type of measure: 1, 6, 7 (See Appendix II)

30. Alien species monitoring programme

Establishment of an alien species monitoring programme, especially in coastal waters. EMFF measure 6.3 is relevant.

Relevant targets and indicators: CY2.1-20 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

Commercially important stocks (D3)

The GES definition of the marine waters of Cyprus with respect to CIS (D3) is as follows.

- The marine environment of Cyprus is considered to be in good environmental status if:
- All CIS are exploited such that fishing mortality (F) is below or equal F_{msy} (or its proxy $F_{0.1}$),
 - All CIS have a total biomass at or above B_{msy} ,
 - All CIS have a spawning stock biomass (SSB) at or above a level capable of providing MSY,
 - All CIS have a biomass index that exhibits a stable or positive trend,
 - All CIS contain a high percentage of adult fish, as indicated by the proportion of fish larger than the mean size of first sexual maturation and the 95th percentile fish length, and these indicators exhibit stable or positive trends.

Gaps and needs

Sufficient information is collected through the Data Collection Framework of the Common Fisheries Policy, including MedITS and the collection of métier- and stock-related variables. Based on existing data, the analysis conducted during the 2012 reporting phase concluded that the marine waters of Cyprus are not in GES with respect to several CIS. Therefore, measures must be considered to improve the conditions of several CIS

Existing measures for Commercially Important Stocks

31. Reduction of the small scale fishing fleet

Reduction of the small scale fishing vessel fleet/fishing licenses to moderate fishing capacity.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 6, 7 (See Appendix II)

32. Reduction of undersize catches

Setting of minimum mesh size openings of set nets to 38 mm to reduce undersize catches (National legislation). Increase of trawl net opening

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 7 (See Appendix II)

33. Restriction of monofilament net use

Restrictions on the use of monofilament nets in terms of length of nets and mesh size (National legislation)

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 7 (See Appendix II)

Purse-seining bycatch reduction

Reduction of purse-seining by-catch by enforcing the landing obligation for trawlers

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 7 (See Appendix II)

34. Trawling prohibition in selected areas

Restriction of two areas from fishing with trawl nets on a rotational basis (northwest part of Cyprus from 8 November – 15 February, southeastern part from 16 February – 31 May every year).

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

35. Seasonal fisheries restrictions in the Lara-Toxeftra MPA

Restriction of fisheries in the Lara-Toxeftra MPA during turtle-mating and nesting season

Relevant targets and indicators: CY142.1-5, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

36. Trawling restrictions

Five month closed period for trawling between 1st June to 7th November in all territorial waters of the Republic of Cyprus (National Legislation)

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

37. Fisheries prohibition in ARAs

Prohibition of all fisheries in 6 artificial reef areas (ARAs) to support the recovery of local fish stocks.

Relevant targets and indicators: CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 6, 7 (See Appendix II)

38. Fisheries restrictions in Eratosthenes Seamount area

Trawling is prohibited over Eratosthenes Seamount area.

Relevant targets and indicators: CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

39. Large Pelagic fisheries restrictions

Large Pelagic fisheries restrictions as part of ICCAT recommendations

Relevant targets and indicators: CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

New measures for Commercially Important Stocks

40. Restrictions in bottom fisheries

Restrictions in bottom trammel and gill (set) net fisheries, including restrictions of use in waters shallower than 5 m, and the extension of prohibited period from June-September to May-October or longer.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

41. Further reduction of small scale fishing fleet

Further reduction of the fisheries fleet through reduction of licenses on the basis of schemes with funding through the European Maritime and Fisheries Fund

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 6, 7 (See Appendix II)

42. Regulation of rod and line fisheries

Regulation of rod-and-line fisheries by licensing amateur fishermen and through the introduction of regulations establishing catch limits

Relevant targets and indicators: CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

43. Evaluation of impacts of Recreational Fisheries

Collect data and then evaluate results with funding through the European Maritime and Fisheries Fund.

Relevant targets and indicators: CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 7 (See Appendix II)

44. Bycatch reduction methods

Design and testing of selective extraction methods to minimize bycatch in existing fishing activities.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1,2, 7 (See Appendix II)

45. Fishing pressures mapping from bottom trawling

Mapping of fishing pressures and abundance index mapping (from fisheries independent surveys), both professional in terms of locations, periods, species, scales, and any further management in fisheries.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

16. Studies for the establishment of new MPAs and FRAs (same as for Biodiversity)

Studies will be conducted for the establishment of new MPAs and FRAs:

- To protect nursery and spawning grounds of many commercially important species, in coordination with the Habitats Directive (92/43/EEC) and Regulation 1967/2006,
- To protect hard substrate, *Posidonia* meadows, sea caves, and offshore, deep-sea habitats,
- In association with new large-scale artificial reefs for the recovery of fish stocks and the reduction of pressure from natural reefs.
- As ecological corridors, in conjunction with the installment of new artificial reefs.

Relevant targets and indicators: CY143.1-11, CY146.1-12, CY146.3.1-6, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

23. Establishment of new ARAs and/or enrichment of existing ARAs and improve management and

This measure consists of a group of actions-projects related to ARAs, which will be funded by the *European Maritime and Fisheries Fund (EMFF) – Operational Programme for Cyprus 2014-2020*. The development of new ARAs and/or the upgrade and enrichment of the existing ones with new modules (including actions related to the preparation and implementation of management plans, monitoring and surveillance, public awareness, information and education) will further promote the protection and management of the coastal-marine biodiversity and ecosystems. EMFF measure 1.18 is relevant.

Relevant targets and indicators: CY143.1-11, CY3.1-6 (Appendix I)

Type of measure: 1, 2, 3, 4, 6, 7 (See Appendix II)

Eutrophication (D5)

The GES definition of the marine waters of Cyprus with respect to Eutrophication (D5) is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- Human-induced eutrophication is minimized and/or eliminated,
- Physicochemical indicators that may be adversely affected by eutrophication, especially water transparency, nutrient concentrations and ratios, and oxygen concentrations, are in line with prevailing physiographic, geographic and climate conditions throughout the water column,
- Phytoplankton abundance and/or Chlorophyll *a* concentration are in line with prevailing physiographic, geographic and climate conditions,
- Macroalgal populations are at abundance and density levels that are in line with prevailing physiographic, geographic and climate conditions,
- Perennial macroalgae are not adversely affected by eutrophication-related effects, such as low water transparency, and in good proportion to opportunistic macroalgae, as indicated by EEI-c values,
- *P. oceanica* populations are at abundance and density levels that are in line with prevailing physiographic, geographic and climate conditions, are not adversely affected by eutrophication-related effects, such as low water transparency, and in good condition, as indicated by PREI values.

Gaps and needs

The assessment of the marine waters of Cyprus, regarding eutrophication-impacted water column physicochemical characteristics, phytoplankton abundance/biomass (as indicated by Chlorophyll *a* concentrations as a proxy), and macroalgal and angiosperm indicators, based on data collected in the framework of WFD and MedPOL, indicated that Cyprus waters are in GES, in terms of eutrophication. The established Cyprus MSFD monitoring programmes provide a sufficient foundation on which to continue monitoring and assessing the marine waters of Cyprus for eutrophication phenomena, and will upgrade the ability of the DFMR to monitor water column habitats.

Existing measures for Eutrophication

46. Implementation of the WFD PoMs for the First River Based Management Plan

Implementation of the Programmes of Measures of the Water Framework Directive (2000/60/EC) as outlined in the first River Basin Management Plan to limit nutrient loading from land based sources, in all water bodies, including, among others, a special licensing system for discharges by industry in marine waters, including aquaculture facilities.

Relevant targets and indicators: CY5.1-7 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

47. Waste-water treatment implementation

Operation of tertiary wastewater treatment plants in all coastal areas, resulting in practically zero discharges to marine waters.

Relevant targets and indicators: CY7.3 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

48. Agricultural best practices implementation

Minimization of groundwater nutrient loading through the implementation of a national code of agricultural best practices. In addition, a number of wells is under a scheme of denitrification in sensitive areas (Nitrates Directive).

Relevant targets and indicators: CY5.1-7 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

49. Vessel waste management

Banning of on shipping/vessel discharges and the provision of reception facilities for vessel wastewater, marinas and fishing shelters for the minimization and/or elimination of pollution from vessels. In addition, implementation of MARPOL Guidelines for discharge of wastewater in the open sea.

Relevant targets and indicators: CY5.1-14, CY8.1-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

50. Open-sea aquaculture best practices policy

Implementation of a national policy for the positioning of sea-cage farms, including a mandated minimum water column depth of 35 m to minimize high sedimentation rates, and the ban of placement over *Posidonia* meadows.

Relevant targets and indicators: CY5.1-14, CY146.1.12, CY146.3.6 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

51. Implementation of the WFD PoM for the 2nd RBMP

Implementation of the Programmes of Measures of the Water Framework Directive (2000/60/EC) as outlined in the Second River Basin Management Plan to limit nutrient loading from land based sources, in all water bodies, including, among others, a special licensing system for discharges by industry in marine waters, including aquaculture facilities.

Relevant targets and indicators: CY5.1-7 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

New measures for Eutrophication

52. Improvements in aquaculture operations

Improvements in aquaculture operations to limit nutrient enrichment, including increased efficiency, nutrients management, and the promotion of closed systems. EMFF measure 2.3 is relevant.

Relevant targets and indicators: CY5.1-14, CY8.1-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

Hydrographical changes (D7)

The GES definition of the marine waters of Cyprus with respect to hydrographical changes (D7) is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- Man-made permanent structures and thermal and saline discharges do not adversely affect marine ecosystems,
- Changes in habitats, functional/species groups, species, and physicochemical parameters due to such structures and discharges are limited to areas directly occupied by them.

Gaps and needs

The current assessment indicates that man-made permanent structures and discharges are concentrated in specific urban/industrial areas. While the percentage of the coastline and volume of water occupied by these is not significant within each littoral cell (as defined in the Initial Assessment, DFMR, 2012c), they have a pronounced presence within these urban/industrial areas. However, their impacts and the spatial extent of those impacts are unknown.

The established Cyprus MSFD monitoring programmes will address the extent of spatial occupation of man-made permanent structures and discharges, but not necessarily the area affected and/or impacted by them. Therefore, they do not sufficiently address the needs emerging from the GES definition. No specific plans exist to address gaps in knowledge, with regards to their impacts and the spatial extent of those impacts. Such knowledge is necessary to evaluate the appropriate indicators for a satisfactory status assessment and the establishment of quantitative targets.

Existing measures for Hydrographical changes

53. Desalination brine disposal controls

Permitting/licensing of the discharge mechanisms of desalination-produced brine, including the positioning and design of brine discharge, to protect special habitats, and to maximize dispersal of disposed brine.

Relevant targets and indicators: CY144.1.1-2, CY7.1-3 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

Contaminants pollution (D8)

The GES definition of the marine waters of Cyprus with respect to pollution by contaminants (D8) is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- The concentrations of contaminants **in water in high activity areas**, sediments and biota do not exceed levels for annual averages and/or maximum allowable concentrations that are either regulatory (legally defined) or, if not, based on reference values for Cyprus marine sediments and biota,
- The concentrations of contaminants in sediments and biota do not result in acute pollution or contamination events and their subsequent effects,
- The number of spills and illegal discharges is minimized.

Gaps and needs

The assessment of the marine waters of Cyprus, regarding contaminants in sediments and biota, based on data collected in the framework of WFD and MedPOL, and past numbers and trends in spills and illegal discharges, indicated that Cyprus waters are in GES. The established Cyprus MSFD monitoring programmes provide a sufficient foundation on which to continue monitoring and assessing the marine waters of Cyprus for contaminants in sediment and biota. Since the number of spills and illegal discharges is not expected to change, there is not a discernible need for specific measures in that direction

Existing measures

49. Vessel waste management (same as for Eutrophication, D5)

Banning of and/or restrictions on shipping/vessel discharges and the provision of reception facilities for vessel wastewater and oil in harbors, (implementation of MARPOL) marinas and fishing shelters for the minimization and/or elimination of pollution from vessels.

Relevant targets and indicators: CY5.1-14, CY8.1-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

54. Contaminant loading restrictions

Limitation of contaminant loading through the implementation of the limits outlined in the National Fisheries Regulations and the Programmes of Measures of the Water Framework Directive (2000/60/EC) as outlined in the first River Basin Management Plan, including a special licensing system for discharges by industry in marine waters and the establishment of a Committee for the management of oil spill accidents

Relevant targets and indicators: CY8.1-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

55. Hydrocarbon exploitation activity regulations

Regulation of hydrocarbon exploration and extraction activities by Strategic Impact Assessments and Environmental Impact Assessments as well as the Offshore protocol of the

Barcelona Convention.

Relevant targets and indicators: CY8.8-11, CY11.1-2 (Appendix I)

Type of measure: 1, 2, 3, 4, 5, 7 (See Appendix II)

56. Accident management planning

Requirement for a satisfactory emergency contingency plan by industry to manage accidents that may result in pollution events in the framework of the Offshore Protocol of the Barcelona Convention.

Relevant targets and indicators: CY8.10-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 5, 7 (See Appendix II)

57. Hydrocarbon pollution national contingency plan

Establishment of a national contingency plan for the combat of hydrocarbon pollution in territorial waters.

Relevant targets and indicators: CY8.8-11 (Appendix I)

Type of measure: 1, 2, 3, 4, 5, 7 (See Appendix II)

51. Implementation of the WFD PoM for the 2nd RBMP (same as for Eutrophication, D5)

Implementation of the Programmes of Measures of the Water Framework Directive (2000/60/EC) as outlined in the Second River Basin Management Plan to limit nutrient loading from land based sources, in all water bodies, including, among others, a special licensing system for discharges by industry in marine waters, including aquaculture facilities.

Relevant targets and indicators: CY5.1-7 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

Contaminants in seafood (D9)

The GES definition of the marine waters of Cyprus with respect to contaminants in seafood (D9) is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- The concentrations of contaminants in seafood do not exceed levels for annual averages and/or maximum allowable concentrations that are regulatory (legally defined) or, if not, based on reference values for Cyprus seafood.

Gaps and needs

The assessment of the marine waters of Cyprus, regarding contaminants in fish, based on data collected in the framework of WFD and MedPOL, indicated that Cyprus waters are in GES. The established Cyprus MSFD monitoring programmes provide a sufficient foundation on which to continue monitoring and assessing the marine waters of Cyprus for contaminants in fish/seafood.

Existing measures

58. Seafood quality standards

Establishment of seafood quality standards by independent legislation; no new measures are needed in the framework of the MSFD (2008/56/EC).

Relevant targets and indicators: CY8.5.1-2, CY8.6.1-2, CY8.7.1-4, CY8.8.1-2, CY8.9.1-2, CY9.1.1-2, CY9.2.1-2 (Appendix I)

Type of measure: 2, 4, 5 (See Appendix II)

Marine litter (D10)

The GES definition of the marine waters of Cyprus with respect to marine litter (D10) is as follows.

The marine environment of Cyprus is considered to be in good environmental status if:

- The amount of marine litter on beaches and on the seafloor is minimized and, if possible, is effectively eliminated,
- Mortality of *Caretta caretta* individuals due to entanglement and impedence by marine litter, and subsequent stranding is minimized and, if possible, is effectively eliminated.

Gaps and needs

The 2012 reporting (and its 2014 revision) highlighted a lack of sufficient information to evaluate the current status regarding marine litter and its effect on biota. The established Cyprus MSFD monitoring programmes will address the lack of quantitative data for marine litter on beaches and on the seabed, as well as mortality of one species of marine turtle due to litter.

Existing measures for Marine Litter

59. National Action Plan on marine litter

Establishment and implementation of a National Action Plan on marine litter in the framework of the Common Implementation of the MSFD in the Mediterranean.

Relevant targets and indicators: CY10.1-8 (Appendix I)

Type of measure: 1, 2, 3, 4, 7 (See Appendix II)

New measures for Marine Litter (CAM Measures)

60. Launch and encourage participation by all contracting parties to a Mediterranean Coastal clean up day (regional scale- UNEP-MAP)

Launch a Mediterranean clean-up day by UNEP-MAP, where Cyprus as all Mediterranean MS will support the initiative and promote participation.

This measure is an outcome of the EU MED Support Project for MSFD (Phase II, CAM 2, Madrid), with the participation and agreement of the representative of UNEP-MAP.

Relevant targets and indicators: CY10.1-2 (Appendix I)

Type of measure: 4, 5, 8 (See Appendix II)

61. Promote awareness with collaboration with Municipalities for cleaning activities in riverbanks (river mouth area), where ecologically appropriate.

Promoting awareness in cooperation with the CY River Basin Management Authorities, targeting Municipalities and other local authorities with the aim to intensify the cleaning activities in riverbanks. This measure will contribute to the reduction of the riverine input of litter in the coastal-marine areas.

This measure is an outcome of discussions within the EU MED Support Project for MSFD (Phase II, CAM 2, Madrid).

Relevant targets and indicators: CY10.1-2 (Appendix I)

Type of measure: 4, 5, 8 (See Appendix II)

62. Encouragement and Implementation the “fishing for litter”

Encouragement and Implementation to the extent possible the “fishing for litter” environmentally sound practices to facilitate clean up the seabed from marine litter caught incidentally and/or generated by fishing vessels in their regular fishing activities including derelict fishing gears.

This measure is an outcome of discussions within the EU MED Support Project for MSFD (Phase II, CAM 2, Madrid). Measure 1.17 of the EMFF is relevant.

Relevant targets and indicators: CY10.3-8 (Appendix I)

Type of measure: 5, 8 (See Appendix II)

63. Promote awareness by informing professional and amateur fishermen about marine litter to reduce littering from fishing activities

Promoting awareness of the professional and amateur fishermen during issuing their fishing licenses (and later on during their fishing activities), on the marine litter problem, is expected to contribute to the reduction of littering during the fishing activities.

Relevant targets and indicators: CY10.1-8 (Appendix I)

Type of measure: 5, 8 (See Appendix II)

64. 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

Initiatives to promote public awareness and participation will be considered and launched through some type of beach adoption or other similar practices. This will also contribute to the cleaning of beaches but as well to promote a public culture against littering.

This measure is an outcome of discussions within the EU MED Support Project for MSFD (Phase II, CAM 2, Madrid), (measure included in UNEP-MAP Action Plan and OSPAR).

Relevant targets and indicators: CY10.1-8 (Appendix I)

Type of measure: 4, 5, 8 (See Appendix II)

Noise (D11)

Gaps and needs

During the revision of the 2012 reports on the first phase of the MSFD implementation in Cyprus (DFMR, 2014b) it was reiterated that the existing information was insufficient to address GES conditions with respect to the two underwater noise indicators in the area. Therefore, GES was not defined. The MSFD monitoring programme on underwater noise currently under implementation will provide information with which to reevaluate a GES definition with respect to noise as well as any additional data collection needs.

The 2012 reporting (and its 2014 revision) highlighted a lack of sufficient information to evaluate the current status regarding underwater noise. The established Cyprus MSFD monitoring programmes will address the lack of quantitative data for underwater noise in the marine waters of Cyprus and may provide sufficient information for the determination of GES and establishment of appropriate targets in 2018.

Existing measures

55. Hydrocarbon exploitation activity regulations

Requirements of soft-start/slow-start conditions during offshore hydrocarbon exploration and exploitation as defined in SIAs and EIAs as well as the Offshore protocol of the Barcelona Convention.

Relevant targets and indicators: CY8.8-11, CY11.1-2 (Appendix I)

Type of measure: 1, 2, 3, 4, 5, 7 (See Appendix II)

Cross-cutting issues

Existing measures

65. SIA and EIA procedures implementation

Ongoing implementation of SIA and EIA procedures in as many kinds of developments as possible according to the provisions of the relevant legislation.

Relevant targets and indicators: All (Appendix I)

Type of measure: 1, 2, 3, 4, 5, 6, 7 (See Appendix II)

66. Marine environment information database

Creation of an integrated Cyprus marine environment information database. EMFF measure 6.2 is relevant.

Relevant targets and indicators: All (Appendix I)

Type of measure: All (See Appendix II)

New measures

67. Administrative support

Strengthening of the departments responsible for the implementation of the MSFD in terms of personnel and any resources/capacity needed for this implementation, including the better enforcement of existing and new measures. EMFF measure 6.2 is relevant.

Relevant targets and indicators: All (Appendix I)

Type of measure: 4 (See Appendix II)

68. Integrated Coastal Zone Management

Drafting of a Strategy and Action Plan for Integrated Coastal Zone Management. EMFF measure 6.3 is relevant.

Relevant targets and indicators: All (Appendix I)

Type of measure: All (See Appendix II)

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Appendix I – Cyprus MSFD GES definitions, targets and indicators, and current assessment

This appendix summarizes the results of the first phase of MSFD implementation in Cyprus by presenting the GES definitions, environmental targets and indicators and the current assessment of the marine environment of Cyprus. The source for this summary is the revision of the 2012 reports by the Republic of Cyprus (DFMR, 2014b).

GES definition	Environmental indicators	Environmental targets
Descriptors 1, 4 and 6 – Biodiversity: Birds		
<ul style="list-style-type: none"> • Bird species continue to occur in all their natural habitats, in line with prevailing physiographic, geographic and climate conditions, • Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity, and that allow them to achieve and maintain a favourable conservation status, • Their populations are in good condition, as indicated by breeding success and survival levels. 	CY141.1.X Distributional range	No set target
	CY141.2.X Distributional pattern within range, where appropriate	No set target
	CY141.3.X Population abundance	No set target
	CY141.4.X Population density within distributional range	No set target
Descriptors 1, 4, and 6 – Biodiversity: Mammals and reptiles		
<ul style="list-style-type: none"> • Marine mammal and reptile species continue to occur in all their natural habitats, including suitable breeding and nesting sites, • Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity, and that allow them to achieve and maintain a favourable conservation status, 	CY142.1.X Distributional range	No set target
	CY142.2.X Distributional pattern within range, where appropriate	No set target
	CY142.3.X Population abundance	No set target
	CY142.4.X Survival rate	No set target
	CY142.5.X Distribution of nesting sites	No set target

GES definition	Environmental indicators	Environmental targets
<ul style="list-style-type: none"> Their populations are in good condition, as indicated by breeding success and survival levels. 		
Descriptors 1, 4, and 6 – Biodiversity: Fish and cephalopods		
<ul style="list-style-type: none"> Fish and cephalopod species continue to occur in all their natural habitats, in line with prevailing physiographic, geographic and climate conditions, Their populations are at abundance and density levels that ensure the long-term abundance of the species and the retention of their full reproductive capacity, Their populations are in good condition, as indicated by sex ratios, population size and age structure, and diversity indices. 	CY143.1.X Species number	No set target
	CY143.2.X Species diversity – Pielou’s Evenness-J’	Coefficient of variance < 0.50
	CY143.3.X Species diversity – Shannon-Weaver- H’	Coefficient of variance < 0.50
	CY143.4.X Population abundance	Coefficient of variance < 0.50
	CY143.5.X Population biomass	No set target
	CY143.6.X Population sex ratio	No set target
	CY143.7.X Body size structure	No set target
	CY143.8.X Age structure	No set target
	CY143.9.X BOI index	No set target
	CY143.10.X Proportion of fish larger than the mean size of first sexual maturation	No set target
CY143.11.X 95 th -percentile fish length	No set target	
Descriptors 1, 4, and 6 – Biodiversity: Water column habitats		
<ul style="list-style-type: none"> Temperature, salinity, pH, water transparency, nutrient concentrations and ratios, and oxygen are in line with prevailing physiographic, geographic and climate conditions throughout the water column, The abundance and biomass of phytoplankton and zooplankton are normal and in line with 	CY144.1.1 Water column temperature (°C)	No set target
	CY144.1.2 Water column salinity (g/kg)	No set target
	CY144.1.3 Water column pH	No set target
	CY5.1 Water column NO ₃ ⁻ concentration (µmol L ⁻¹)	< 0.62
	CY5.2 Water column NO ₂ ⁻ concentration (µmol L ⁻¹)	No set target
	CY.5.3 Water column NH ₄ ⁺ concentration (µmol L ⁻¹)	< 0.55

GES definition	Environmental indicators	Environmental targets
prevailing physiographic, geographic and climate conditions, and at levels capable of ensuring their long-term abundance.	CY.5.4 Water column PO ₄ ³⁻ concentration (μmol L ⁻¹)	< 0.07
	CY.5.5 Water column Si ₄ ⁴⁻ concentration (μmol L ⁻¹)	No set target
	CY.5.6 Water column N:P	No set target
	CY.5.7 Water column N:Si	No set target
	CY.5.8 Water column Chlorophyll <i>a</i> concentration (μg L ⁻¹)	No set target
	CY.5.9 Water column Chlorophyll <i>a</i> fluorescence (FU)	No set target
	CY.5.11 Water column photosynthetically available radiation (PAR) depth at 1 % of surface value (m)	No set target
	CY.5.12 Turbidity (NTU)	No set target
	CY5.13 Water column dissolved oxygen (mg L ⁻¹)	No set target
	CY5.14 Water column dissolved oxygen (% saturation)	No set target
	CY144.2.1 Phytoplankton abundance (individuals L ⁻¹)	No set target
	CY144.2.2 Trend in phytoplankton abundance (individuals L ⁻¹ y ⁻¹)	No set target
	CY144.2.3 Trend in water column Chlorophyll <i>a</i> concentration (μg L ⁻¹ y ⁻¹)	No set target
	CY144.2.4 Trend in water column Chlorophyll <i>a</i> fluorescence (FU y ⁻¹)	No set target
	Descriptors 1, 4, and 6 – Biodiversity: Seabed habitats	
<ul style="list-style-type: none"> Macroalgal, benthic macroinvertebrate and angiosperm species continue to occur in all their 	CY146.1.1 Macroalgal species number	No set target
	CY146.1.2 Macroalgal species diversity – Pielou’s Evenness,	Divergence ≤ 50 % from

GES definition	Environmental indicators	Environmental targets								
<p>natural habitats, in line with prevailing physiographic, geographic and climate conditions,</p> <ul style="list-style-type: none"> • Their populations are at abundance and density levels that ensure the long-term presence of the species, and are in good condition, as indicated by diversity indices, • Seabed habitat integrity is at a level that ensures that the structure and function of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected. 	J'	reference conditions								
	CY146.1.3 Macroalgal species diversity – Shannon-Weaver, H'									
	CY146.1.4 Macroalgal abundance (%)									
	CY146.1.5 Macroalgal biomass (g m ⁻²)									
	CY146.1.6 Abundance of perennial macroalgae (ESG IA) (% areal coverage)									
	CY146.1.7 Biomass of perennial macroalgae (g m ⁻²)									
	CY146.1.8 Abundance of shade-adapted, slow growing calcareous macroalgae (ESG IC) (% areal coverage)									
	CY146.1.9 Biomass of shade-adapted, slow growing calcareous macroalgae (g m ⁻²)									
	CY146.1.10 Abundance of opportunistic macroalgae (ESG IIA) (% areal coverage)									
	CY146.1.11 Biomass of opportunistic macroalgae (g m ⁻²)									
	CY146.1.12 EEI-c (Macroalgae)	Divergence ≤ 25 % from reference conditions								
	CY146.2.1 Benthic macroinvertebrate species number	No set target								
	CY146.2.2 Benthic macroinvertebrate species diversity – Pielou's Evenness, J'	Divergence ≤ 50 % from reference conditions								
	CY146.2.3 Benthic macroinvertebrate species diversity – Shannon-Weaver, H'									
	CY146.2.4 Benthic macroinvertebrate abundance (individuals m ⁻²)									
CY146.2.5 BENTIX (Benthic macroinvertebrates)	Divergence ≤ 25 % from									

GES definition	Environmental indicators	Environmental targets
		reference conditions
	CY146.3.1 Distributional range of <i>P. oceanica</i>	No set target
	CY146.3.2 Distributional pattern of <i>P. oceanica</i>	No set target
	CY146.3.3 Habitat area of <i>P. oceanica</i> (m ²)	Divergence ≤ 50 % from reference, expert judgment
	CY146.3.4 <i>P. oceanica</i> abundance (shoots m ⁻²)	No set target
	CY146.3.5 <i>P. oceanica</i> biomass (dry leaf mass, g m ⁻²)	No set target
	CY146.3.6 PREI (<i>Posidonia</i>)	Divergence ≤ 25 % from reference conditions
Descriptor 2 – Non-indigenous species (NIS)		
<ul style="list-style-type: none"> • Invasive non-indigenous species (IAS) do not dominate the abundance/biomass of their taxonomic group/functional group within a predominant habitat type, and especially in Marine Protected Areas (MPAs, including Sites of Community Importance), • The introduction of primarily-introduced invasive non-indigenous species (PIIAS), i.e. species introduced directly into Cyprus waters (and excluding secondary dispersal) by human activities such as shipping, aquaculture, and the aquarium trade, is minimized, • PIIAS are not established outside high-risk areas of impact, such as harbors, marinas, aquaculture facilities etc., while their abundances in high-risk areas are minimized. 	CY2.1 Established NIS abundance (number m ⁻² or km ⁻² or m ⁻³) and/or biomass (g m ⁻² or km ⁻² or m ⁻³)	No set target
	CY2.2 Trend in established NIS abundance/biomass (CY2.1 y ⁻¹)	No set target
	CY2.3 Number of NIS introduced in Cyprus waters via human-mediated pathways	No set target
	CY2.4 Number of established IAS in Cyprus waters	No set target
	CY2.5 Number of established PIIAS in Cyprus waters	No set target
	CY2.6 Number of established IAS in Cyprus waters (per taxonomic group)	No set target
	CY2.7 Number of established PIIAS in Cyprus waters (per taxonomic group)	No set target
	CY2.8 Number of NAS in Cyprus waters (per taxonomic group)	No set target
	CY2.9 Ratio of established IAS (CY2.4) to NAS (CY2.8) in Cyprus waters (per taxonomic group)	No set target
	CY2.10 Ratio of established PIIAS (CY2.7) to NAS (CY2.8) in Cyprus	No set target

GES definition	Environmental indicators	Environmental targets
	waters (per taxonomic group)	
	CY2.11 Abundance (number m ⁻² or km ⁻² or m ⁻³) and/or biomass (g m ⁻² or km ⁻² or m ⁻³) of established IAS (per taxonomic group)	No set target
	CY2.12 Abundance (number m ⁻² or km ⁻² or m ⁻³) and/or biomass (g m ⁻² or km ⁻² or m ⁻³) of established PIIAS (per taxonomic group)	No set target
	CY2.13 Abundance (number m ⁻² or km ⁻² or m ⁻³) and/or biomass (g m ⁻² or km ⁻² or m ⁻³) of NAS (per taxonomic group)	No set target
	CY2.14 Trend in abundance/biomass (CY2.11 y ⁻¹) of established IAS (per taxonomic group)	No set target
	CY2.15 Trend in abundance/biomass (CY2.12 y ⁻¹) of established PIIAS (per taxonomic group)	No set target
	CY2.16 Trend in abundance/biomass (CY2.13 y ⁻¹) of NAS (per taxonomic group)	No set target
	CY2.17 Ratio of abundance and/or biomass of established IAS (CY2.11) to NAS (CY2.13) (per taxonomic group)	No set target
	CY2.18 Ratio of abundance and/or biomass of established PIIAS (CY2.12) to NAS (CY2.13) (per taxonomic group)	No set target
	CY2.19 Trend in the ratio of abundance and/or biomass of established IAS to NAS (CY2.11 to CY 2.13 y ⁻¹) (per taxonomic group)	No set target
CY2.20 Trend in the ratio of abundance and/or biomass of established PIIAS to NAS (CY2.12 to CY2.13 y ⁻¹) (per taxonomic group)	No set target	
Descriptor 3 – Commercially Important Stocks (CIS)		
<ul style="list-style-type: none"> All CIS are exploited such that fishing mortality (F) is below F_{msy} (or its proxy F_{0.1}), 	CY3.1 Fishing mortality (F)	Reference F _{0.1} and F _{msy}
	CY3.2 Spawning Stock Biomass (SSB)	Stable or positive trend

GES definition	Environmental indicators	Environmental targets
<ul style="list-style-type: none"> All CIS have a total biomass at or above B_{msy}, All CIS have a spawning stock biomass (SSB) at or above a level capable of providing MSY, All CIS have a biomass index that exhibits a stable or positive trend, All CIS contain a high percentage of adult fish, as indicated by the proportion of fish larger than the mean size of first sexual maturation and the 95th percentile fish length, and these indicators exhibit stable or positive trends. 	CY3.3 Total biomass	Reference B_{msy}
	CY3.4 Biomass index	Trend-based baseline
	CY3.5 Proportion of fish larger than the mean size of first sexual maturation	Trend-based baseline
	CY3.6 95th percentile fish length observed in research vessel surveys	Trend-based baseline
Descriptor 5 – Eutrophication		
<ul style="list-style-type: none"> Human-induced eutrophication is minimized and/or eliminated, Physicochemical indicators that may be adversely affected by eutrophication, especially water transparency, nutrient concentrations and ratios, and oxygen concentrations, are in line with prevailing physiographic, geographic and climate conditions throughout the water column, Phytoplankton abundance and/or Chlorophyll <i>a</i> concentration are in line with prevailing physiographic, geographic and climate conditions, Macroalgal populations are at abundance and density levels that are in line with prevailing physiographic, geographic and climate conditions, Perennial macroalgae are not adversely affected by eutrophication-related effects, such as low water transparency, and in good proportion to opportunistic macroalgae, as indicated by EEI-c values, 	CY144.1.1 Water column temperature (°C)	No set target
	CY144.1.2 Water column salinity (g/kg)	No set target
	CY144.1.3 Water column pH	No set target
	CY5.1 Water column NO_3^- concentration ($\mu\text{mol L}^{-1}$)	< 0.62
	CY5.2 Water column NO_2^- concentration ($\mu\text{mol L}^{-1}$)	No set target
	CY.5.3 Water column NH_4^+ concentration ($\mu\text{mol L}^{-1}$)	< 0.55
	CY.5.4 Water column PO_4^{3-} concentration ($\mu\text{mol L}^{-1}$)	< 0.07
	CY.5.5 Water column Si_4^{4-} concentration ($\mu\text{mol L}^{-1}$)	No set target
	CY.5.6 Water column N:P	No set target
	CY.5.7 Water column N:Si	No set target
	CY.5.8 Water column Chlorophyll <i>a</i> concentration ($\mu\text{g L}^{-1}$)	Divergence \leq 25 % from reference conditions
	CY.5.9 Water column Chlorophyll <i>a</i> fluorescence (FU)	
CY.5.10 Water transparency depth (Secchi disc) (m)		
CY144.2.1 Phytoplankton abundance (individuals L^{-1})	No set target	

GES definition	Environmental indicators	Environmental targets
<ul style="list-style-type: none"> <i>P. oceanica</i> populations are at abundance and density levels that are in line with prevailing physiographic, geographic and climate conditions, are not adversely affected by eutrophication-related effects, such as low water transparency, and in good condition, as indicated by PREI values. 	CY.5.11 Water column photosynthetically available radiation (PAR) depth at 1 % of surface value (m)	No set target
	CY.5.12 Turbidity (NTU)	No set target
	CY146.1.6 Abundance of perennial macroalgae (ESG IA) (% areal coverage)	Divergence \leq 50 % from reference conditions
	CY146.1.7 Biomass of perennial macroalgae (g m ⁻²)	
	CY146.1.10 Abundance of opportunistic macroalgae (ESG IIA) (% areal coverage)	
	CY146.1.11 Biomass of opportunistic macroalgae (g m ⁻²)	
	CY146.1.12 EEI-c (Macroalgae)	Divergence \leq 25 % from reference conditions
	CY146.3.4 <i>P. oceanica</i> abundance (shoots m ⁻²)	No set target
	CY146.3.5 <i>P. oceanica</i> biomass (dry leaf mass, g m ⁻²)	No set target
	CY146.3.6 PREI (<i>Posidonia</i>)	Divergence \leq 25 % from reference conditions
	CY5.13 Water column dissolved oxygen (mg L ⁻¹)	Divergence \leq 25 % from reference conditions
CY5.14 Water column dissolved oxygen (% saturation)		
Descriptor 7 – Hydrographical changes		
<ul style="list-style-type: none"> Man-made permanent structures and thermal and saline discharges do not adversely affect marine ecosystems, Changes in habitats, functional/species groups, species, and physicochemical parameters due to such structures and discharges are limited to areas directly occupied by them. 	CY7.1 Marine area occupied by man-made structures (km ²)	No set target
	CY7.2 Length of coastline occupied by man-made structures (km)	No set target
	CY7.3 Area of habitat affected by man-made structures and/or discharges (km ²)	No set target
Descriptor 8 – Contaminants		

GES definition	Environmental indicators	Environmental targets
<ul style="list-style-type: none"> The concentrations of contaminants in sediments and biota do not exceed levels for annual averages and/or maximum allowable concentrations that are either regulatory (legally defined) or, if not, based on reference values for Cyprus marine sediments and biota, The concentrations of contaminants in sediments and biota do not result in acute pollution or contamination events and their subsequent effects, The number of spills and illegal discharges is minimized. 	CY8.1 Concentration of Pb in sediment (mg kg ⁻¹)	Divergence ≤ 25 % from reference conditions
	CY8.2 Concentration of Cd in sediment (mg kg ⁻¹)	
	CY8.3 Concentration of Hg in sediment (mg kg ⁻¹)	
	CY8.4 Concentration of (PAH) in sediment (mg kg ⁻¹)	No set target
	CY8.5.1 Concentration of Pb in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target
	CY8.5.2 Concentration of Pb in <i>Boops boops</i> sp. (mg kg ⁻¹)	
	CY8.6.1 Concentration of Cd in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target
	CY8.6.2 Concentration of Cd in <i>Boops boops</i> sp. (mg kg ⁻¹)	
	CY8.7.1 Concentration of Hg in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target
	CY8.7.2 Concentration of Hg in <i>Boops boops</i> sp. (mg kg ⁻¹)	
	CY8.8.1 Concentration of (PCB) in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target
CY8.8.2 Concentration of (PCB) in <i>Boops boops</i> sp. (mg kg ⁻¹)		
CY8.9.1 Concentration of (PAH) in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target	
CY8.9.2 Concentration of (PAH) in <i>Boops boops</i> sp. (mg kg ⁻¹)		
CY8.10 Number of spills and illegal discharges (y ⁻¹)	No set target	
CY8.11 Amount of (contaminant) released (kg or L y ⁻¹)	No set target	
Descriptor 9 – Contaminants in fish		
The concentrations of contaminants in seafood do not exceed levels for annual averages and/or maximum allowable concentrations that are regulatory (legally defined) or, if not, based on reference values for Cyprus seafood.	CY8.5.1 Concentration of Pb in <i>Mullus</i> sp. (mg kg ⁻¹)	Targets determined by Commission Regulation (EC) 1881/2006
	CY8.5.2 Concentration of Pb in <i>Boops boops</i> (mg kg ⁻¹)	
	CY8.6.1 Concentration of Cd in <i>Mullus</i> sp. (mg kg ⁻¹)	
	CY8.6.2 Concentration of Cd in <i>Boops boops</i> (mg kg ⁻¹)	
	CY8.7.1 Concentration of Hg in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target
CY8.7.2 Concentration of Hg in <i>Boops boops</i> (mg kg ⁻¹)		
CY8.7.3 Concentration of Hg in <i>Thunnus alalunga</i> (mg kg ⁻¹)		
CY8.7.4 Concentration of Hg in <i>Xiphias gladius</i> (mg kg ⁻¹)		
CY8.8.1 Concentration of (PCB) in <i>Mullus</i> sp. (mg kg ⁻¹)	No set target	

GES definition	Environmental indicators	Environmental targets
	CY8.8.2 Concentration of (PCB) in <i>Boops boops</i> (mg kg ⁻¹)	
	CY8.9.1 Concentration of (PAH) in <i>Mullus</i> sp. (mg kg ⁻¹)	
	CY8.9.2 Concentration of (PAH) in <i>Boops boops</i> (mg kg ⁻¹)	
	CY9.1.1 Concentration of ¹³⁷ Cs in <i>Mullus</i> sp. (Bq kg ⁻¹) CY9.1.2 Concentration of ¹³⁷ Cs in <i>Boops boops</i> (Bq kg ⁻¹) CY9.2.1 Concentration of ⁴⁰ K in <i>Mullus</i> sp. (Bq kg ⁻¹) CY9.2.2 Concentration of ⁴⁰ K in <i>Boops boops</i> (Bq kg ⁻¹)	
Descriptor 10 – Marine litter		
<ul style="list-style-type: none"> The amount of marine litter on beaches and on the seafloor is minimized and, if possible, is effectively eliminated, Mortality of <i>Caretta caretta</i> individuals due to entanglement and impedece by marine litter, and subsequent stranding is minimized and, if possible, is effectively eliminated 	CY10.1.X Number of items of [X=type of beach litter] larger than > 2.5 cm per 100 m of coastline	-
	CY10.2.X Trend in the number of items of [X=type of beach litter] larger than > 2.5 cm per 100 m per y	Decreasing trend
	CY10.3.X Number of items of [X=type of seafloor litter] per km ² of seafloor	-
	CY10.4.X Weight (kg) of items of [X=type of seafloor litter] per km ² of seafloor	-
	CY10.5.X Trend in the number of items of [X=type of seafloor litter] per km ² of seafloor per y	Decreasing trend
	CY10.6.X Trend in weight (kg) of items of [X=type of seafloor litter] per km ² of seafloor per y	Decreasing trend
	CY10.7 Number of stranded <i>Caretta caretta</i> individuals that are entangled in fishing gear in a calendar year	-
	CY10.8 Trend in number of stranded <i>Caretta caretta</i> individuals that are entangled in fishing gear per y	Decreasing trend
Descriptor 11 – Underwater noise		
There is currently no GES definition for underwater	CY11.1 Proportion of days and their distribution within a	No set target

GES definition	Environmental indicators	Environmental targets
noise in the marine waters of Cyprus	calendar year over areas of a determined surface, as well as their spatial distribution, in which anthropogenic sound sources exceed levels that are likely to entail significant impact on marine animals measured as Sound Exposure Level (in dB re 1µPa ² .s) or as peak sound pressure level (in dB re 1µPa peak) at one metre, measured over the frequency band 10 Hz to 10 kHz	
	CY11.2 Trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1µPa RMS; average noise level in these octave bands over a year) measured by observation stations and/or with the use of models if appropriate	No set target

Appendix II – Types of Measures (MSFD, Annex VI)

Measures are classified into the following types, as these were elaborated in Annex VI of the MSFD.

- (1) Input controls: management measures that influence the amount of a human activity that is permitted.
- (2) Output controls: management measures that influence the degree of perturbation of an ecosystem component that is permitted.
- (3) Spatial and temporal distribution controls: management measures that influence where and when an activity is allowed to occur.
- (4) Management coordination measures: tools to ensure that management is coordinated.
- (5) Measures to improve the traceability, where feasible, of marine pollution.
- (6) Economic incentives: management measures which make it in the economic interest of those using the marine ecosystems to act in ways which help to achieve the good environmental status objective.
- (7) Mitigation and remediation tools: management tools which guide human activities to restore damaged components of marine ecosystems.
- (8) Communication, stakeholder involvement and raising public awareness.

Appendix III – MSFD Article 14 (a) Implementation

Non-indigenous species (NIS) as defined by the EU funded project DAISIE (Stattersfield *et al.* 1998) are “*species, subspecies or lower taxa introduced outside their natural range (past or present) and outside their natural dispersal potential. This includes any part, gamete or propagule of such species that might survive and subsequently reproduce. Their presence in the given region is due to intentional or unintentional introduction resulting from human activities, or they have arrived there without the help of people from an area in which they are alien*”.

Invasive alien species (IAS) “*are a subset of established NIS and/or cryptogenic species (species of unknown origin which cannot be ascribed as being native or alien) which have spread, are spreading or have demonstrated their potential to spread elsewhere, and have an adverse effect on biological diversity, ecosystem functioning, socio-economic values and/or human health in invaded regions*” (Olenin *et al.*, 2010).

NIS in the Eastern Mediterranean

The Mediterranean Sea is sub-divided by the EU Marine Strategy Framework Directive (2008/56/EC) into 4 distinct areas. Based on this division 2 member states, Cyprus and Greece lie in the Eastern Mediterranean, which is made up of two main water bodies: the Aegean Sea and the Levantine Sea (and also the smaller Sea of Marmara). The Mediterranean and its Eastern Basin in particular, are one of the world’s most affected areas in terms of the numbers of NIS species detected (Costello *et al.* 2010) and the rate of introduction of new NIS (Zenetos, 2010). Alien marine invasions are brought about by the opening of the Suez Canal, fouling and ballast transportation along shipping lines, aquaculture and the aquarium trade (Streftaris *et al.*, 2005; Galil, 2009). Although at a global scale, shipping is considered as the most important vector for the transfer of NIS, in the case of the Eastern Mediterranean shipping and intentional/unintentional mariculture transfers are far less important pathways compared to the Suez Canal regarding the number of NIS introduced.

Eastern Mediterranean, due to its location to the crossroads of the Ponto-Caspian and the Indo-Pacific Ocean/Red Sea is particularly influenced by a substantial and continual flow of marine NIS. Especially in the Levantine, the most important pathway of NIS introduction is the Suez Canal (a manmade corridor of unintentional introduction). 82% of the biota introduced in the E. Mediterranean is of Indo-Pacific origin, entering through the Canal (EastMed, 2010). The level of relevant knowledge is deemed as substantial in the sub-region of the E. Mediterranean although this does not apply equally to all regions and countries.

The Suez Canal is one of the world's most important thoroughfares for trade and has been connecting the Mediterranean with the Red Sea and the Indo-Pacific Ocean since 1869, allowing the entrance of marine flora and fauna species. Por (1971) has proposed the term

“lessepsian immigrants” to describe the biota which entered the Mediterranean through the Canal (after the French engineer Ferdinand de Lesseps who supervised the construction of the Canal). A comprehensive report by Zenetos *et al.* (2010), gives an in-depth view of the dynamics and the hydrological conditions that may attract NIS and allow settlement. Apart from the proximity to the Suez Canal, the dense shipping patterns in this area assist in particular the spread of macrophytes and bivalves. Introduction rates of these lessepsian immigrants have been increased in the last decades and some of them have been proved to have serious ecological and socio-economic impacts in the Eastern Mediterranean. Some species have been expanded successfully as far west as Malta and Sicily and there are ongoing scientific discussions on the possibility of facilitation of such phenomena by the increase of the sea temperature due to climate change. According to the relevant literature, the most important impediment of the lessepsian migration was the salinity barriers along the newly-constructed Canal. The effect of these salinity barriers has long been neutralized and now the salinity is not very different from the adjacent sea. Another obstacle to invasion has been removed with the damming of the Nile at Aswan. Another important vector of invasion is the Canal’s depth: Deepened and widened several times the canal is now much wider and deeper than originally was. Each increase in volume decreased temperature fluctuations within the canal, while increasing depth has probably facilitated the passage of infralittoral species.

Furthermore today, Egypt plans to add an extra lane to the Suez Canal, so as to increase the number of ships using it daily. The Canal, which allows ships to travel from Europe to Asia without passing southern Africa, only provides for one-way traffic, and therefore a new 45-mile lane, would allow ships to travel in both directions for just under half of the canal's 101 miles. The project also includes deepening and widening of the Great Bitter Lakes by-passes and Ballah by-pass, with a total length of 37 km, (Total length of the project is 72 km) The project of the “New” Suez will reduce the time needed for the trip from one end of the Canal to the other, and will increase the numerical capacity of the waterway, in anticipation of the expected growth in world trade. The finalization of the project is expected to increase the daily average of transiting vessels to 97 ships by the year 2023, up from 49 ships at present. The impacts of this project on the NIS in the Mediterranean are easily predictable, e.g. according to literature any further increase in the Canal’s depth will facilitate even more the invasion and allow the entrance of new species.

NIS in Cyprus

Cyprus, due to its proximity to the Suez Canal, is highly susceptible to NIS and in particular Lessepsian immigrants. Katsanevakis *et al.* (2009) in collaboration with the Department of Fisheries and Marine Research of the Government of Cyprus carried out an inventory of alien marine species of Cyprus. In total, 126 alien marine species have been reported in Cyprus up to July 2009, 42 of which were molluscs, 28 fish, 19 polychaetes, 15 phytobenthic species, 12 crustaceans and 10 species from other taxa. In Cyprus some published articles classify as invasive aliens (based on evident ecological and/or economic impact) among others, the green alga *Caulerpa racemosa var. cylindracea*, the jellyfish *Rhopilema*

nomadica, the gastropod *Strombus persicus*, the crustacean *Charybdis helleri*, the fish *Lagocephalus sceleratus*, *Fistularia commersoni*, *Siganus luridus* etc.

Conclusion

Based on all the above-mentioned, **it is very important to identify Suez Canal as a priority pathway concerning its contribution in the increase of NIS in the Mediterranean, while acknowledging the inherent difficulties in addressing it in order to prevent NIS introductions.**

Prevention measures are not feasible since this mega-structure pathway is not under EU or any single member-states' control and therefore any decided action-measure cannot be undertaken at such level.