UNITED NATIONS

EP

UNEP(DEPI)/MED WG.411/Inf.7

UNEP

UNITED NATIONS
ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN

18 March 2015
Original: English

Meeting of the Integrated Monitoring Correspondence Group

Athens, Greece, 30 March - 1 April 2015

1st Report of the Informal Online Working Group on Biodiversity and Non-Indigenous Species

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In accordance with the decision taken at the 4th EcAp Coordination Group meeting held in Athens in October 2014, an on line expert group on Biodiversity and Non-Indigenous Species (**NIS**) was established by the contracting parties with the volunteer leadership of Greece, with support from the Secretariat.

Based on the specific recommendations of the ECAP Correspondence Group on Monitoring (**CORMON**) Biodiversity and NIS, on Ecological Objectives 1 and 2 UNEP(DEPI)/MED WG.411/Inf.5), and on the specific Terms of References of the Biodiversity and NIS online working group (the Biodiversity Working Group), the experts aimed to:

- deliver environmental and background assessment criteria based on data availability for some common indicators related to Ecological Objective 1 and 2;
- address key outstanding issues which are necessary to start a quantitative monitoring of biodiversity in the region, noting the "de minimis" principle- ie the aim is to set the minimum common ground, which is applicable regionally and feasible to follow all over the region;
- address sub-regional specifics and raise attention to data gaps, research needs and look at alternative, cost effective monitoring methodologies related to biodiversity and NIS monitoring

Following consultations and joint work, the on line group delivered the first report represented under. The report addresses the following issues:

- review the draft species and habitats lists (as presented in Annex I);
- review the available data and other challenges in relation to biodiversity and NIS monitoring;,
- geographical and temporal differences and
- different scenario for thresholds and baseline values considerations.

The following points will specify key discussions and recommendations formed by the Biodiversity Working Group.

Definition of Biodiversity

Biodiversity is defined as the collection of genomes, species, and ecosystems occurring in a geographically defined region. The most critical (current or potential) contributors to changes in marine biodiversity are now recognized to be the following: fishing and removal of the ocean's invertebrate and plant stocks, many of which are overexploited; chemical pollution and eutrophication; physical alterations to coastal habitat; invasions of exotic species; and global climate change, including ocean acidification, increased ultraviolet radiation and potentially rising temperatures, resulting in possible changes to ocean circulation (and thus nutrient supply and distribution). These sources of stress to the marine environment have affected and may yet affect life from the intertidal zone to the deep sea (National Research Council US, 1995).

Recommendations on the listed species / habitats

The Biodiversity Working Group discussed that there is the need of a common and short list of species and habitats for monitoring, along with their associated protocols, to ensure consistency in the biodiversity assessment in order to be applicable regionally and feasible to follow all over the region.

The Biodiversity Working Group proposes a list on specific functional taxa and predominant habitat types taking in account key issues on the composition and functioning of the marine environment in the Mediterranean. Further development of detailed individual species lists (e.g. invertebrates etc.), may provide a limited coverage and may be not representative of the wider environment at regional level, however might be better suited for the inter-comparison at further levels of sub-division (i.e. sub-regional, national). Monitoring at a finer scale may be established at a national level in base of the funding opportunities, the taxonomic expertise etc.

Annex I (see excel file) includes the habitats and species lists proposed for biodiversity monitoring in the Mediterranean.

These have been listed according to the following criteria:

(a) predominant/priority seabed habitats with a functional role (e.g. habitat forming species);

(b) high representation in terms of abundance or covered area enabling the comparability between Contracting Parties (CPs);

(c) representation of a functional taxon; (d) indicators that reflect the impact of human activities to the environment / sensitivity to human pressures (noise, litter etc);

(e) habitats or species already included in existing operational monitoring programmes (i.e. WFD, MSFD);

(f) remarkably dynamic species of NIS altering biodiversity and ecosystem functioning (e.g. the Lionfish *Pterois miles etc*); Other key habitats modifying biodiversity might be considered, i.e. *Caulerpa cylindracea, Lophocladia lallemandii,* and *Fistularia comersonii.*

g) other gaps and needs (coastal fish assemblages were also included since the information is very limited).

During discussions of the Biodiversity Working Group members, it was also highlighted that the ecosystem processes and functions should act as a filter to further prioritise taxa and habitats to be monitored, so that to comply with the Ecosystem Approach.

Furthermore, it was mentioned, that next to the proposed habitats and species lists (Annex I) some taxa that are included in Annex II of Decision IG.21/3 may be very useful as specific indicators, e.g. in relation to marine litter and fisheries impacts, thus adding more information to the assessment of the biodiversity status, such as monitoring of stranded or by-caught leatherback sea turtles, other species of marine birds and sea mammals;

Further development of monitoring on key oceanographic features, such as gyres, upwelling areas, large corridor areas of oceanographic connectivity, etc., or jellyfish population dynamics and blooms, and Harmful Algal Blooms was also recommended.

Another point emerged from the discussions was that we are only addressing species and ecosystems diversity while the molecular level of the biological organization (e.g. genes) is totally missing. Molecular level diversity must be taken also in account since the genetic diversity is a key issue also for the Mediterranean.

Overall, it is recommended to select the sound and more easily applicable indicators used or proposed for the implementation of the WFD and MSFD to be used in the whole Mediterranean. A few habitats

and taxa are recommended to start the monitoring, not because the others are less important, but because the starting of the monitoring process itself is the most important activity for the time being.

Specific recommendations regarding monitoring capacity

Regarding the monitoring data compilation from countries answers to UNEP/MAP request, the information extracted is too general, no geo-referenced, providing limited information on the existing operational or institutional monitoring in the Mediterranean (see excel file monitoring capacity).

Experts noted that more detailed information on the monitoring capacity can be found in the European projects DEVOTES and IRIS-SES. It has been also recommended to reform the questionnaires related to the monitoring capacity of biodiversity elements of the project IRIS-SES and send to the CPs.

Some recommendations, taking in account the inventory of IRIS-SES project on the monitoring capacity, highlighted that coastal areas in EU countries are better covered mainly for the WFD biological elements, while many other of the components commonly associated with marine biodiversity assessment and monitoring are not covered by operational monitoring systems (e.g. coastal fish, mammals etc). The offshore/open sea is poorly sampled as also the MPAs.

The PERSEUS project outcomes on the spatial coverage of oceanographic platforms (drifters, floats, gliders etc) and the under-sampled southern areas of the Mediterranean Sea were discussed.

Specific recommendations regarding indicators

A set of biotic and multimetric indices for benthic macroiinvertebrates (zoobenthos), angiosperms and macroalgae, already used in the implementation of WFD, tested and validated to discriminate the GES/ no GES in the MED GIG exercise have been proposed. The benthic biotic indices can be applicable in a wider scale and type of habitats, and are sensitive to changes due to anthropogenic pressures, such as eutrophication and dredging/dumping. Indices based on coralligenous assemblages are also developed in the framework of CIGESMED project.

Most current advances on methods for an integrative biodiversity assessment have been mentioned, such as the Baltic Sea-HELCOM Indicator based Tool for the assessment of Biodiversity Status (BEAT-2) developed under DEVOTES and HARMONY projects (Andersen et al., 2014) or the Marmoni Biodiversity Assessment Tool (http://www.sea.ee/marmoni/index.php).
However a large set of methods for Biodiversity Integrated assessment are compiled within SCALES & DEVOTES projects (Borja et al., 2014).

Fisheries were recommended as a resourceful provider for key data to be used for trophic level indices.

Specific recommendations regarding data availability

The lack of appropriate broad Mediterranean spatial datasets for most species and habitats has been stressed.

It was recommended to further build on data of the:

- EUSeaMap which recently produced seabed habitat mapping of European seabed including the western part of the Mediterranean and EUSeaMap2 that has the objective of updating the western Med map and producing the modelled benthic habitat for all the Mediterranean and the Black Sea and that is expected to be completed in 2016.

- The products of the EmodNet MedSea Checkpoint map key biodiversity elements in MPAs in the Mediterranean (also expected to be completed in 2016).

- The LifeWatch biodiversity database is now fast evolving in support of the research infrastructure needed for biodiversity assessment and monitoring in Europe.

Specific recommendations on biodiversity assessment areas

It is recommended to focus monitoring and assessment activities on pressured areas and the marine protected areas, especially SPAMIS in order to identify reference conditions and assess the management efficiency of the protected areas.

There is a need to monitor fish biodiversity, combined with other taxa, (visual census was suggested) on the coastal fish assemblages, since these areas are beyond the data collecting area obtained from fisheries.

Other key habitats such as lagoons, estuaries of the coastal zone have been proposed. Also the lack of knowledge of communities associated with seamounts and cold seeps have been stressed.

Specific recommendations regarding the key interlinkages between pressures and impacts

The pressures impacting the Mediterranean habitats should be identified with emphasis on the main ones (more detailed pressure analysis is available in PERSEUS and IRIS-SES projects).

Regarding policy-science interface strengthening, it was recommended to ensure closer cooperation, with a devoted body.

Specific recommendations and discussion on the need for a coordinating body for Biodiversity research, consultancy and sustainable use in the Mediterranean Sea

The seascape of the important players on the sustainable use and exploitation in the Mediterranean seems to be fragmented across many levels of the geopolitical administration: from local and national to international bodies, among which there exists only little coordination and collaborative effort. Local, regional (within countries) and national authorities in the northern countries deal with the implementation of the EU Directives, relevant to the biodiversity sustainable exploitation whereas in the southern ones the same authorities deal with the state's Acts and Laws.

At the international levels, EU authorities and the Barcelona Convention take the lead, with many organizations to be kept involved in synergies on the field of the sustainable use of the marine biodiversity such as CIESM (http://www.ciesm.org/about/index.htm), FAO (http://www.fao.org/home/en/), GFCM (http://www.gfcm.org/gfcm/about/en), next to UNEP (and UNEP/MAP) (http://www.unep.org/ and http://www.unepmap.org), to mention just a few. Each of these international, regional organizations have their own mission and mandate and defines the field of its action, accordingly.

Between the various bodies, who deal with marine biodiversity, action on the implementation of the international, regional and national legislation and planning is not easy to be coordinated and successfully implemented.

The Biodiversity Working Group experts suggested that there is a key need for one regional organization with clear specific mission on the coordination of the scientific knowledge, to support through its consultancy the implementation of the relevant legislation on marine biodiversity use to the Mediterranean Sea.

From a scientific point of view, an ideal model for such an organization would be that of the ICES (http://www.ices.dk/explore-us/who-we-are/Pages/Who-we-are.aspx), with a clear vision and

implementation plan on the field, backed up by the Convention on the Biological Diversity and the Barcelona Convention, and with signatory countries to shoulder responsibility for its development, functioning and performance, including funding.

One can propose many ways to reach to this point: (a) the Mediterranean countries individually joining ICES as full members thus to collaboratively establish MICES (the Mediterranean node of ICES, following the model of PICES in the Pacific); (b) establishing a new one, which can undertake this huge task to coordinate effort made by all international and national organizations and develop collaborative plan of work, funded by the signatory countries, (c) choose one of the existing international organizations to play this role, the closest being CIESM; however, this would imply profound changes in the organization's current mission and mandate.

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