Overview of the situation of biodiversity data and information in the Mediterranean region

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Preparation of this document

The analysis presented in this document was undertaken within the framework of the preparatory actions towards building a Mediterranean Biodiversity Platform (MBP), which is being developed by the IUCN Centre for Mediterranean Cooperation, with the support of the regional government of Junta de Andalucia, as a tool for sharing knowledge about the state of biodiversity and its trends in the region. Being the first step towards building the MBP, this analysis could serve as a preliminary baseline on the availability, access, coverage and management of data upon which to identify strategic lines and possible partners for the MBP.

The Mediterranean Wetland Observatory (MWO) contributed to this task and prepared the first drafts of this study, focusing on the Mediterranean region, and especially on those countries of the eastern and southern basin. In this context, the MWO based the study on the results of a survey of 60 interviews with site managers, NGOs, experts, decision-makers and funding agencies of 16 countries[1]. The study is qualitative, based on a limited number of questionnaires, although relatively comprehensive, designed to cover general biodiversity and environmental issues. The document was then reviewed and completed by the IUCN Centre for Mediterranean Cooperation.

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[1]Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, France, Greece, Israel, Jordan, Lebanon, Morocco, Palestinian Authority, Spain, Syrian Arab republic, Tunisia and Turkey. For some components, the MWO collected also some information from Italy, Slovenia and FYR of Macedonia.

Acronyms

ACCOBAMS	Agreement on the Conservation on Cetaceans of the Black Sea, Mediterranean Sea, and Contiguous Atlantic Area
AEWA	African-Eurasian Waterbird Agreement
AFD	French Development Agency
BISE	Biodiversity information System in Europe
CBD	Convention on Biological Diversity
CEPF	Critical Ecosystems Partnership Fund
CIDA	Canadian International Development Aid
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COP	Conference of Parties
DPSIR	Driver-Pressure-State-Impact-Response model
EEA	European Environment Agency
EMECO	European Marine Ecosystem Observatory
EU	European Union
EUROBATS	Agreement on the Conservation of Populations of European Bats
FAO	Food & Agriculture Organization
FFEM	Fonds Français pour l'Environnement Mondial
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICZM	Integrated Coastal Zone Management
IBA:	Important Bird Areas
IFA	Important Forest Areas
IPA	Important Plant Areas
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	International Union for Conservation of Nature
LIFE	EU's financial instrument supporting environmental and nature conservation projects throughout the EU
LPI	Living Planet Index
MAP	Mediterranean Action Plan
MBP	Mediterranean Biodiversity Platform
Med-INA	Mediterranean Institute for Nature and Anthropos
MEd POL	The marine pollution assessment and control component of the Mediterranean Action Plan
MDGs	Millennium Development Goals
MedPAN	Mediterranean Protected Areas Network
MedWet	Mediterranean Wetlands initiative of the Ramsar Convention
MoU	Memorandum of Understanding
MWO	Mediterranean Wetlands Observatory
NGO	Non-Governmental Organization
OECD	Organization for Economic Cooperation and Development
OSS	Observatory of Sahel and Sahara
PAP/RAC	Priority Actions Programme/ Regional Activity Centre
RAC/SPA	Regional Activity Centre for Specially Protected Areas
SAPBIO	Strategic Action Programme for the conservation of biological diversity in the Mediterranean Region
SEBI	Streaming European 2010 Biodiversity Indicators
STRP	Scientific and Technical Review Panel of Ramsar
TdV	Tour du Valat
ToR	Terms of Reference
UNCCD	United Nation Convention to Combat Desertification
UNFCC	Climate Change Convention
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WB	World Bank

WCMC	World Conservation Monitoring Centre
WDPA	World Database on Protected Areas
WI	Wetlands International
WWF	Worldwide Fund for Nature

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Executive Summary

This document is an initial step towards the development of a Mediterranean Biodiversity Platform (MBP), an initiative to assess the state of biodiversity, forecast trends and measure the success of biodiversity policy in the Mediterranean basin. It contains a detailed analysis of existing tools and systems for biodiversity monitoring and evaluation in the region, with a special focus on Mediterranean countries located in the eastern and southern basin.

The Mediterranean basin, a biodiversity hotspot, is characterized by high species and habitat diversity, as well as a high rate of endemism. In general terms, over the last decades there has been a clear decline in Mediterranean biodiversity, although a deep analysis would require detailed information that currently is not available for many Mediterranean areas, habitats or species. One of the most striking trends concerning Mediterranean biodiversity observed in the last decades is the increasing number of non-indigenous species reported in terrestrial, freshwater and marine environments. Changes in biodiversity have been mostly driven by anthropogenic factors, in addition to natural forces.

Considering the current policy framework related to biodiversity data collection and monitoring in the region, this study found it is characterized by diversity and a relative fragmentation of the use of legislative instruments and tools. Whereas in southern and eastern Mediterranean countries, international agreements are influential in terms of biodiversity protection, in EU and Balkan countries in the process of EU accession, EU policies are the most efficient driving forces. National policies are also key instruments in non-EU countries. Numerous international and regional initiatives exist that are related to data collection of particular relevance for Mediterranean biodiversity, either implementation instruments that require such information or information systems themselves.

A more detailed analysis reviewed the links and discrepancies between some major international environmental conventions and protocols (policy level) impacting Mediterranean biodiversity and what is really implemented (implementation level) and monitored (monitoring level). Since 1990, biodiversity is taken into account at international and regional levels, with relatively good coherence between policy, implementation and monitoring. The main gaps found concern habitat, water issues, and cross-cutting issues that cause biodiversity changes (governance, pollution, poverty, etc.). A more close-up look at biodiversity monitoring systems in southern and eastern Mediterranean countries revealed as the main strength the availability of committed people in each country. The main weaknesses identified are related to data integration, communication and feedback of data and results, the unbalance of topics covered, monitoring outside protected areas, data access and sharing, data quality control and finally data analysis and interpretation to inform decision making.

The document concludes with a tentative road map for the MBP. In order to be useful, the MBP should capture the interest of potential users by providing an added value and avoiding duplication of effort. A series of gaps to be addressed regarding existing biodiversity-related tools in the region are identified. These are followed by some recommendations related to targeting potential users, data harmonization, improving communication, potential for added value, information gaps to be addressed, and networking, as well as priority areas for biodiversity data and information communication. Finally, it delves into the institutional setting and partnerships that ought to be considered.

Resumen ejecutivo

Este documento es un paso inicial para el desarrollo de una Plataforma de Biodiversidad Mediterránea, una iniciativa para evaluar el estado de la biodiversidad, realizar pronósticos y medir el éxito de las políticas sobre biodiversidad en la cuenca mediterránea. Contiene un análisis detallado de las herramientas y sistemas existentes que realizan un seguimiento y evaluación de la biodiversidad en la región, prestando especial atención a los países mediterráneos que se encuentran en el este y sur de la cuenca.

La cuenca del Mediterráneo, un punto caliente de biodiversidad o “hotspot”, se caracteriza por una gran diversidad de especies y hábitats, así como una elevada tasa de endemismo. En términos generales, a largo de las últimas décadas ha habido un clara pérdida de biodiversidad en la cuenca del Mediterráneo, aunque un análisis en profundidad requeriría información detallada que no se encuentra disponible actualmente para muchas zonas, hábitats, o especies del Mediterráneo. Una de las tendencias más llamativas observadas en las últimas décadas en cuanto a la biodiversidad mediterránea es el número creciente de especies no autóctonas que se han observado en el medio ambiente terrestre, así como en aguas dulces y marinas. Los cambios en biodiversidad son debidos mayormente a factores antropogénicos, además de influencias naturales.

En cuanto al marco político actual relativo a la adquisición de datos y el seguimiento de la biodiversidad en la región, este estudio ha encontrado que se caracteriza por su diversidad y una relativa fragmentación del uso de instrumentos y herramientas legislativos. Mientras que en países del sur y el este del Mediterráneo los acuerdos internacionales tienen influencia en cuanto a la protección de la biodiversidad, en países pertenecientes a la UE y en países de los Balcanes en proceso de adhesión a la UE, las políticas de la UE son las fuerzas impulsoras de mayor eficacia. Las políticas nacionales son asimismo instrumentos clave en países no pertenecientes a la UE. Existen numerosas iniciativas internacionales y regionales relacionadas con la adquisición de datos que son de especial importancia para la biodiversidad en la cuenca mediterránea, ya sea instrumentos de implementación que requieren esa información o bien sistemas de información en sí mismos.

Se han analizado en mayor profundidad las conexiones y las discrepancias entre algunos de los convenios y protocolos internacionales más importantes sobre medio ambiente (nivel de políticas) que afectan la biodiversidad mediterránea, lo que realmente se implementa (nivel de implementación) y el seguimiento que se realiza (nivel de seguimiento). Desde 1990, se tiene en cuenta la biodiversidad a nivel internacional y regional, con una coherencia bastante óptima entre políticas, implementación, y seguimiento. Las principales lagunas que se han encontrado tienen que ver con hábitats, cuestiones relacionadas con el agua, y cuestiones transversales que dar lugar a cambios en la biodiversidad (gobernanza, contaminación, pobreza, etc.) Un examen más minucioso de los sistemas de seguimiento de biodiversidad en países del sur y el este del Mediterráneo revela como principal fortaleza la disponibilidad de personas comprometidas en cada país. Las principales debilidades identificadas están relacionadas con la integración de datos, la comunicación y retroalimentación de datos y resultados, la falta de uniformidad en cuanto a los temas estudiados, el seguimiento fuera de las zonas protegidas, el acceso a los datos y su distribución, y finalmente el análisis de datos y su interpretación para informar la toma de decisiones.

El documento concluye con una hoja de ruta tentativa para la Plataforma de Biodiversidad Mediterránea. Para ser de utilidad, la Plataforma de Biodiversidad Mediterránea debe capturar el interés de posibles usuarios proporcionando un valor añadido y evitando la duplicación de esfuerzos. Se han identificado una serie de lagunas en cuanto a las herramientas relacionadas con la biodiversidad que existen en la región. A continuación se ofrecen una serie de recomendaciones relacionadas con la orientación hacia posibles usuarios, la coordinación de datos, mejora de la comunicación, el potencial de ofrecer un valor añadido, lagunas de información a subsanar, y establecimiento de una red de contactos, así como áreas prioritarias para la comunicación de datos e información sobre biodiversidad. Finalmente, se profundiza sobre el marco institucional y los socios que deben considerarse.

Introduction

In the Mediterranean Basin, the existing knowledge about the status of biodiversity and its trends is heterogeneous and in some cases difficult to access. The available information is incomplete; undertaking studies on regional biodiversity requires consulting several different sources of information and statistical data. This represents a major challenge for the Mediterranean region, as mentioned in the publication of the State of the Environment and Development in the Mediterranean (UNEP/MAP Plan Bleu, 2009).

To address this issue, IUCN-Med is developing a system intended to assess the state of biodiversity through indicators valid for multiple regions, and to forecast trends and measure the success of biodiversity policy. The Mediterranean Biodiversity Platform (MBP) has three main objectives:

- Consolidate and share existing data and information on biodiversity components, pressures and the legal framework at the Mediterranean regional level,
- Develop a robust web platform to promote interoperability and interconnectedness
- Build a multidisciplinary network of institutions, organizations and people from Mediterranean countries engaged in the conservation of biodiversity.

A detailed analysis of the existing tools and systems for biodiversity monitoring and evaluation in the region was needed as a priority step. Tour du Valat, through its Mediterranean Wetland Observatory (MWO) expertise, and as a key partner in this initiative, contributed with the first part of this study focused on Mediterranean countries, especially those of the eastern and southern basin. While the study analyses most components of biodiversity (in the sense of the Convention on Biological Diversity (CBD)), the assessment provides information on the monitoring and evaluation of wetlands, marine and terrestrial ecosystems in the region.

This work is based on different sources of information, including results of recent studies carried out by the Mediterranean Wetlands Observatory.

Following a first report, the information was revised and completed with further information and data in order to widen its scope.

This work contributes to the first step towards building a MBP, as mentioned in a working document prepared in 2011 “Developing a Mediterranean Biodiversity Platform” (chapter 4.2., page 19; IUCN Med 2011, *unpublished)*.

This report will also serve as a tentative roadmap for the implementation of the MBP.

1. Mediterranean Biodiversity: key characteristics

With 2,085,292 km^2 and around 5,000 islands, the Mediterranean region is the second largest of the 34 biodiversity hotspots in the world and the largest of the world's five Mediterranean-climate regions (CEPF, 2011). It stretches across more than 20 countries, including major terrestrial habitats such as forests, maquis, garrigue, pasture, wetlands, coastal areas and transitional areas to desert zones. The marine portion of the Mediterranean hotspot includes 2,500,000 km^2 of the Mediterranean Sea with a high diversity of habitats: seamounts, submarine canyons, sea grass meadows, maërl beds and coralligenous communities.

1.1 Biodiversity in the Mediterranean Basin

The Mediterranean basin is characterized by high levels of species diversity and endemism. Two main circumstances have contributed to the high diversity in the Mediterranean: (i) its location at the intersection of two major landmasses, Eurasia and Africa, and (ii) huge topographical diversity and altitudinal differences ranging from the Dead Sea (420 meters below sea level) to 4,165 metres in the west (Morocco) and 3,756 m in the east (Turkey). Its climate is unique, characterized by cool, wet winters and hot, dry summers.

In terms of plant diversity, the Mediterranean basin is the third richest biodiversity hotspot in the world (*Mittermeier et al., 2004*). Around 10% of the world's vascular plants (25,000) are found in the Mediterranean basin, which represents only 1.6% of the earth's surface. About half of these species (13,000) are endemic to this zone, found nowhere else on Earth. Despite this, precise data on the distribution and status of plants are frequently not sufficient, out of date or absent, particularly in the south and east of the region.

The Mediterranean also hosts one of the most diverse marine environments in the world: with less than 1% of the world's ocean area, the Mediterranean is home to nearly 8% of known species. A study published in 2010 by Coll et al. revealed that approximately 17,000 species occur in the Mediterranean Sea. Of these, at least 26% are prokaryotic (Bacteria and Archaea) and eukaryotic

(protists) marine microbes. However, the data available for Bacteria, Archaea, and protists is very limited, so these estimates have to be treated with caution, as well as the data for several invertebrate groups (such as Chelicerata, Myriapoda and Insecta). Within the Animalia, the greater proportion of species records are from the subphylum Crustacea (13.2%) and phyla Mollusca (12.4%), Annelida (6.6%), Plathyhelminthes (5.9%), Cnidaria (4.5%), the subphylum Vertebrata (4.1%), the phyla Porifera (4.0%) and Bryozoa (2.3%), the subphylum Tunicata (1.3%), and the phylum Echinodermata (0.9%). Other invertebrate groups encompass 14% of the species, and Plantae includes 5%. Besides, available information shows that the highest percentage of endemic species is in Porifera (48%), followed by Mysidacea (36%), Ascidiacea (35%), Cumacea (32%), Echinodermata (24%), Bryozoa (23%), seaweeds and seagrasses (22%), Aves (20%), Polychaeta (19%), Pisces (12%), Cephalopoda (10%), and Decapoda (10%) (Coll et al. 2010).

In terms of endemism, among animals, freshwater fishes (about 400 species) and amphibians (108 species) have the highest rate of endemism with 253 species (63%) and 76 species (70%) respectively. Reptiles (349 species), including two resident marine turtles, have a 48% (168 species) rate of endemism with a high proportion of lizards (65%) and snakes (30%). Mammals include 297 species, 30% of which are terrestrial endemic species, including a great number of rodents, shrews, moles and hedgehogs. As for marine mammals, there are eight resident cetaceans and one endemic pinniped (the Mediterranean monk seal). The avifauna includes about 600 species with around 500 bird species known as being permanent and breeding within the Mediterranean neighbouring countries (Nadin, 2008).

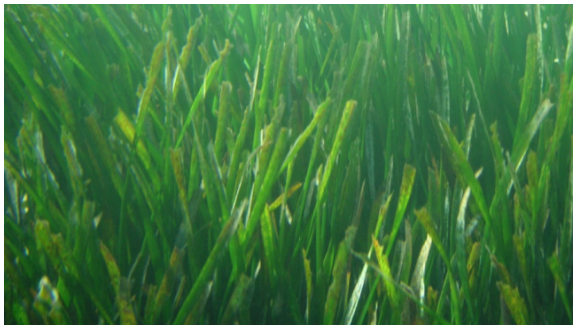
The Mediterranean region is also of major importance for migrating birds. The mild winter, combined with the availability of peaceful wetlands and other habitats provide an ideal refuge for the millions of birds who migrate to or through the region every year. It is estimated that up to two billion birds migrate to, or through, the Mediterranean region every year. Some are merely stopping over for a few days or weeks to refuel before their long journey across the Sahara, others come down to spend the winter here to escape the cold weather further north. Table 1 shows the number of known species of flora and fauna in some non-European Mediterranean countries.

Table 1. Number of known species found in southern and eastern Mediterranean countries (Nadin, 2008).

Country	Flora	Mammals	Birds	Reptiles	Amphibians	Fish	Invertebrates	of which insects	Sum
Algeria	4 287	107	336	70	12	300	2 716	1 900	7 828
Egypt	4 284	132	514	90	8	766	7 899	7 324	13 693
Israel	2 238	105	210	105	7	1 154	30 300	30 000	34 119
Jordan	2 834	77	418	89	5	1 026	n.a.	n.a.	4 449
Lebanon	1063	65	338	48	5	382	1540	n.a.	3441
Morroco	6 990	113	317	98	11	1 189	17 893	13 461	26 611
Occupied Palestinian territory	2 493	95	470	93	7	284*	127	n.a.	3 569
Syria	641	125	360	127	16	452	1 500	1 500	3 221
Tunisia	2 924	78	362	63	8	336**	334	n.a.	4 105

Note: * marine species only; **: freshwater species only

Considering the marine environment, the Mediterranean Sea has a high rate of endemism as well as many emblematic species of conservation concern, such as turtles, cetaceans and the Critically Endangered Mediterranean monk seal (*Monachus monachus*). There are several unique and endangered habitats, including the seagrass meadows of the endemic *Posidonia oceanica*, vermetid terraces built by the endemic gastropod *Dendropoma petraeum*, coralligenous assemblages, and deep-sea and pelagic habitats that support unique species and ecosystems. Many sensitive habitats exist within the coastal ecosystems.



1.2 Species conservation status in the Mediterranean Basin

Based on data from the IUCN Red List of Threatened Species™ , there are currently 413 regionally threatened[2] species in the Mediterranean region (Table 2).

Table 2: Conservation status of some taxonomic groups in the Mediterranean region, according to the IUCN Red List.

Group of species	Critically Endangered	Endangered	Vulnerable	Total
Aquatic plants	15	22	36	73
Dragonflies	4	11	13	28
Cartilaginous fishes (Chondrichthyes)	14	9	8	31
Bony fishes (Osteichthyes)	1	4	7	12
Freshwater fish (endemic)	45	46	51	142
Amphibians	4	14	14	32
Reptiles	13	22	11	46
Mammals (non marine)	9	15	25	49
Total	105	143	165	413

Regarding terrestrial and freshwater fauna, data on the conservation status of mammals, birds and amphibians are easily available as, for example, all mammal species have been assessed for the IUCN Red List of Threatened Species. Avifauna is relatively well monitored and constitutes the strongest element of the current biodiversity indicators, including the Living Planet Index. Within this group, there are 14 threatened migratory bird species occurring in the Mediterranean basin (according to BirdLife International, 2009). As to freshwater fish they represent the group of vertebrates most at risk with 56% of endemic species threatened with extinction. Centres of endemism include the Italian, Greek and Iberian peninsulas as well as western Turkey and some parts of the Middle East (IUCN, 2011). Moreover, there is a number of species assessed as Data Deficient, especially the marine fishes, which highlights the lack of information on the conservation status of many species at the regional level and which may include a significant proportion of threatened species.

[2] IUCN Red List defines three separate categories for threatened species, depending on the degree to which they are threatened: Vulnerable, Endangered and Critically Endangered species (increasing risk of extinction). A fourth category (Data Deficient) includes species whose conservation status cannot be accurately assessed because poor or no information is available.

About 550 plant species in the Mediterranean Basin have been assessed against the IUCN Red List criteria. Moreover, some Mediterranean plants occurring in European countries have been included in the European Red List of vascular plants (Bilz et al., 2011). Also in 2011, IUCN, PlantLife and WWF updated the Important Plant Areas (IPAs) for conservation in the south and east Mediterranean region. A total of 888 Important Plant Areas have been identified so far. Seventy-five percent of IPAs contain locally endemic species found only within one country and 60% contain species with a very restricted range. Overgrazing of pastoral lands is the most significant threat to the IPAs, affecting 67% of sites. Deforestation (largely due to firewood harvesting or cutting wood for charcoal production), tourism development, intensification of farming activities and unsustainable harvesting of plants affect over one third of the IPAs analysed. Bush fires are also an important factor impacting plant populations in the Mediterranean region (Radford et al., 2011).

1.3 Trends in the status of Mediterranean biodiversity

Generally speaking, a clear decline in Mediterranean biodiversity has been observed during the last decades. For example, more than 50% of wetlands were reported to have disappeared over the past century, and their decline and deterioration continue. For the marine environment there is a general decrease in biodiversity from north-western to south-eastern regions following a gradient of production with some exceptions, however. Marine biodiversity is also generally higher in coastal areas and continental shelves, and decreases with depth. Local species depletions and extirpations mostly occurred among large species, including marine mammals, birds, turtles and commercial fish and invertebrates.

However, significant differences in biodiversity trends can be seen between the Mediterranean sub-regions and also between groups of habitats or species. For many groups, while the trend at the Mediterranean level shows a relative stability, some of their populations at sub-regional or local levels were reported to decrease drastically.

In fact, only a general analysis can be made concerning Mediterranean biodiversity trends, since a deeper analysis would require a data detail level that currently is not available for many Mediterranean areas, habitats or species. Despite the data scarcity, many initiatives have been undertaken to analyse trends for some species assemblages and populations. In this context, recent evaluations led to declare that some populations of cetacean species have decreased in the Mediterranean by at least 30% over the past years. Other assessments showed that 31 freshwater taxa (mostly molluscs and fishes), previously present within the region, are now Extinct at the global level.

One of the most striking trends concerning Mediterranean biodiversity observed in the last decades is the continuous increasing number of non-indigenous species reported in terrestrial, freshwater and marine environments.

1.4 Causes of changes in Mediterranean biodiversity

Changes in biodiversity are mostly driven by anthropogenic factors, in addition to natural forces. In 2011, the Regional Activity Centre for Specially Protected Areas of the UNEP (PNUE/RAC/SPA, 2011) identified 149 threats to the Mediterranean coastal and marine biodiversity. These could be grouped into the following main categories:

- Pollution
- Impact of natural resource use
- Uncontrolled expanding tourism, urban development and construction of infrastructure
- Invasive species
- International trade of endangered species
- Global warming, sea level rise, and ultraviolet radiation
- Changes in land use
- Uncontrolled recreational activities
- Scarcity of fresh water

Obviously, while there are general similarities in terms of their impact on all ecosystems, these threats have varied effects on one ecosystem or another. Therefore, the main causes of degradation are not the same for all ecosystems. For wetlands, while the exploitation of water resources is the threat that has the largest impact, there is growing added pressure from urban development, public infrastructure, and tourism. These human impacts reduce wetland functions and services, making them less able to contribute to sustainable human development. The situation of wetlands is only one example of the possible effects that short-sighted economic development models can have on biodiversity. The division of stakeholders into conservationists and developers, as well as global changes are factors that exacerbate the situation.

In the marine environment, fishing impacts, habitat loss and degradation, pollution, climate change, eutrophication, and the establishment of alien species are the most important threats. They affect a great number of taxonomic groups, especially top predators such as the Atlantic bluefin tuna, which is classed as Endangered by the IUCN Red List. Harvesting stands out as the most important factor. It indeed causes or contributes to 93% of depletions and 100% of local extinctions or extirpations due to an increase in the efficiency of existing fishing gear (e.g. the otter trawl) and the introduction of new ones (such as mid-water pelagic trawls, hydraulic dredges, and iron-toothed dredges). Commercial fishing has severe impacts on species, habitats, and ecosystems.

In the terrestrial environment, habitat loss is the main concern affecting Mediterranean biodiversity. It is mainly caused by urban development and intensive agricultural practices. Furthermore, inadequate policies for water resource management and forest harvesting are causing, in many countries, significant damages to habitats and species. These are also impacted by droughts and forest fires, although Mediterranean ecosystems have developed a relatively high level of resilience to such threats. Biological invasions by non-indigenous species are also reported as a threat in the terrestrial environment in many Mediterranean countries.

In most southern countries, overgrazing in arid zones, land abandonment and degradation of productive lands are among the main factors contributing to desertification.

2. Overview of the policy framework related to data collection and monitoring in the Mediterranean

2.1 Current drivers of the policy framework related to biodiversity and ecosystems in the Mediterranean basin

First of all, the current biodiversity and ecosystem policy framework in the Mediterranean basin is characterized by diversity and a relative fragmentation of the use of legislative instruments and tools.

- **In southern and eastern Mediterranean countries, supra-national agreements, conventions, and protocols** are influential mechanisms for environmental and biodiversity protection, harmonization and coordination in the Mediterranean. The CBD, the Ramsar Convention, the Barcelona Convention and its associated protocols, the World Heritage convention, the Millennium Development Goals (MDGs), the Man and Biosphere (MAB) Programme and EU policies have mutually reinforcing effects, locally and nationally. Furthermore, these influential conventions tend to enhance biodiversity protection by integrating more and more environmental, economic and social matters under the concept of sustainable development.

- **In EU and Balkan countries in the process of EU accession, EU policy and its operational tools** (i.e., Habitat, Birds and Water Directives, Natura 2000 network, etc.) are the most efficient driving forces benefiting the protection of biodiversity and natural ecosystems. They speed up the designation of protected areas and drive states towards more sustainable water management.

- **In non-EU countries of the Mediterranean Basin, national biodiversity policy and strategic frameworks** are the key policy instruments for biodiversity and ecosystem protection. Most of these countries have established national policies, strategies and actions plans for biodiversity, as well as national environmental policies and laws, and agricultural and forestry legislation. Furthermore, about half of them have updated protected areas policies and laws, with Morocco and Algeria being the countries with most updated legislation (2011) on this matter. However, except for forests and ecosystems that are vulnerable to desertification under the UNFCCD, no special strategy or plan has been developed for particular habitats in any of these countries, neither for the terrestrial nor for the marine environment. While about 40% of these countries (Egypt, Israel, Turkey, Croatia, Jordan, Palestinian Authority) have established national wetland strategies or policy, less than half of them really implement it. Algeria, Morocco, Tunisia and Albania have also integrated wetlands into their broader biodiversity policies and Morocco and Algeria are preparing specific national wetland strategies since 2010. In contrast, the FYR of Macedonia, Syria, Lebanon, Montenegro and Bosnia and Herzegovina do not have a strategy on wetlands. Finally, while national socio-economic development plans (five-year plans and annual plans), are important potential frameworks to consider biodiversity in sector based planning and implementation, usually environmental and biodiversity issues are minor considerations, except for Morocco, Israel and Croatia, where they are considered to some extent.

In addition to conservation oriented mechanisms, the Mediterranean biodiversity policy framework also comprises national and regional policies related to the use of natural resources. Many countries have developed their national strategies and/or plans for the use of water resources, marine living resources, etc., along with regional consultation/coordination mechanisms for some type of natural resources. The General Fisheries Commission for the Mediterranean (GFCM) is one of these mechanisms. It provides a regional framework for the joint management of fisheries resources by undertaking common stock assessments and by setting common regulations regarding fishing effort. It is however important to notice that in some countries, notably non-EU

countries of the Mediterranean basin, the existing framework is often not enforced (notably in the case of water, hunting and fishing related policies and legislation) or it is enforced mostly in protected areas.

2.2 Biodiversity information needed for decision-making in Mediterranean countries

The availability of accurate and up-to-date information is among the main prerequisites for the successful implementation of biodiversity conservation programmes and local and national planning processes, in line with the CBD's Aichi targets for the 2011-2020 period (Goal 1, Target 2). It is thus required at various stages of the conservation process—from the initial decision-making to the continuous monitoring and use of indicators set for the evaluation of conservation measures—and concerns a broad range of actors at different governance scales. Users of biodiversity information in Mediterranean countries are:

- At the local level, local authorities, decentralized sector ministries, civil society and citizens involved in sustainable development. One of their main mechanisms is the Local Development Planning process currently supported by the international donor community (including the European Union through its Neighbourhood Policy, covering 16 Mediterranean countries). The process encourages the consideration of more biodiversity components in regional and human development, as well as in conservation planning.

- At the national level, land-use planners from ministries of the interior, ministries in charge of regional planning or planning commissions, as well as the urban, agriculture, fisheries, water, energy, industrial, public infrastructure and tourism sectors.

2.3. Legal and policy framework regarding data collection in the Mediterranean

The current legal and policy framework in the Mediterranean already requires countries to collect data at various levels. Information of relevance to biodiversity is needed to fulfil obligations towards multilateral agreements, the Barcelona convention, European Directives, and other international conservation and sustainable development frameworks

2.3.1. Multilateral agreements

As part of their obligations set by global and regional agreements relevant to biodiversity conservation and sustainable use, Mediterranean countries are requested to provide information on different aspects related to the implementation of the agreements and also to the status of biodiversity in their territories through reports and online data entry systems (see Annex 6).

2.3.2. The Barcelona convention

The Barcelona Convention system is the main regulatory instrument aimed at the protection of the Mediterranean marine and coastal environment. Seven Protocols address specific aspects of Mediterranean environmental conservation. Of particular importance for biodiversity is the Protocol concerning Specially Protected Areas and Biological Diversity. In order to further the progress in the implementation of the principles contained in some of the protocols, the Barcelona Convention system has produced policy instruments such as the Strategic Action Programme for the Conservation of Biological Diversity in the Mediterranean Region (SAPBIO). Within the context of UNEP's Mediterranean Action Plan for the Barcelona Convention, eight additional biodiversity oriented action plans have been adopted. Seven of these directly concern conservation for the most threatened and most emblematic species and sensitive habitats in the Mediterranean. These include the monk seal; marine turtles, especially the green turtle; cetaceans, especially the bottlenose dolphin; bird species like the Audouin's gull; cartilaginous fishes like the great white shark and the saw-shark; marine plants i.e. macrophytes and plant assemblages seen as natural monuments, like *Posidonia* barrier reefs; coralligenous and other calcareous bioconcretions, like

coralline algal frameworks. The eighth one concerns introductions of species and invasive species (UNEP/MAP 2012a).

Within the framework of the Barcelona Convention, monitoring is particularly encouraged through the implementation of an ecosystem approach, as decided by member states in 2008. This approach should take the form of a seven steps process[3] including tasks such as undertaking a preliminary assessment of the environmental condition of the Mediterranean and revising monitoring programmes for ongoing assessment, regular updating of targets, and guiding changes necessary for an ecosystem approach to management. The ultimate goal of the integrated monitoring is the assessment of trends towards good environmental status; thus a special effort will be made to build synergies with the monitoring programmes under the EU Marine Strategy Framework Directive as well as with other relevant monitoring programmes (common methodologies, data sharing, etc.).

2.3.3. European Directives

Directives of relevance to biodiversity monitoring for members of the European Union include:

- The Habitats Directive (92/42/EEC) and The Birds Directive (79/409/EEC), with monitoring obligations set respectively under Articles 11 and 17 (in particular for natural sites that contain habitat types and species listed in the Directive's annexes), and Articles 10 and 12. Their main tool for the inventory of natural sites is the data-entry form for Natura 2000 which was designed to provide the necessary information to create the Natura 2000 network and to evaluate its effectiveness. Required information concerns the habitats in Annex I and the habitats of the species listed in Annex II of the Habitats Directive (92/43/EEC), as well as the habitats of the bird species listed in Annex I of the Birds Directives (79/409/EEC) and of other migratory bird species covered by the Directive. This inventorying exercise led to the elaboration of a descriptive database that includes information for all the Special Protection Areas (SPAs) established in accordance with the provisions of the Birds Directive and the Sites of Community Importance (SCIs) identified in application of Article 4.1 of the Habitats Directive. A subset of the database is available[4] in the Natura 2000 EUNIS database from the European Environment Agency (EEA) data service.

- The Water Framework Directive (2000/60/EC) which establishes requirements for monitoring in coastal and transitional waters under its Articles 5, 8 and 15. Member States are invited to ensure that all surface waters achieve a good status by 2015 at the latest (art 4) as well as to prevent any further degradation of their water bodies.

- The Marine Strategy Framework Directive (MSFD) (2008/56/EC): stressing that monitoring programmes must be established and implemented by 2014 and good environmental status (GES, defined as "the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive" in Article 3. Please refer to Annex 5 for more details) must be reached or maintained for all marine waters by 2020 at the latest. The GES should be assessed through quantitative descriptors based mainly on physical, chemical and biological features and parameters, including benthic and water column habitat types, mapping of special habitat types, structure of fish populations

[3]Here are the seven adopted steps for the Ecosystem approach process under the Barcelona Convention: 1) determining an overarching vision for the Mediterranean as a whole; 2) elucidating strategic objectives for achieving that vision; 3) undertaking a preliminary assessment of the environmental condition of the Mediterranean; 4) determining ecological objectives; 5) determining operational objectives and related targets and indicators; 6) revising monitoring programmes for ongoing assessment, regular updating of targets, and guiding changes necessary for an ecosystem approach to management; and 7) developing relevant action plans and programmes.

[4]Source : http://www.eea.europa.eu/data-and-maps/data/natura-2000-eunis-database

(abundance, distribution, age/size structure), etc. The proper implementation of the MSFD will therefore require a significant effort of monitoring and data collection on marine biodiversity and other elements of the marine environment and lead to the development of databases and other data storage, compilation and sharing systems.

Other directives also have a direct impact on biodiversity components such as the EU Common Agricultural Policy, EU Fisheries and aquaculture policies, the Integrated Maritime Policy, etc. In order to further promote sustainable development of coastal zones, the Commission adopted on the 12th of March 2013 a draft proposal for a Directive establishing a framework for maritime spatial planning and integrated coastal management. The proposed instrument will require Member States to establish coastal management strategies that build further on the principles and elements set out in the Council recommendation on Integrated Coastal Zone Management of 2002 and the Protocol to the Barcelona Convention on Integrated Coastal zone Management, ratified by the EU in 2010[5].

2.3.4. Other international conservation and sustainable development frameworks

In addition to reporting under multilateral agreements (see Annex 6), the Barcelona Convention system and European Union regulations, Mediterranean countries report to other agreements that directly or indirectly involve biodiversity issues and monitoring: the Convention concerning the Protection of the World Cultural and Natural Heritage (Unesco, 1972), the eight Millennium Development Goals (MDG, 2000); the United Nations Convention to Combat Desertification (1994); the World Summit on Sustainable Development (2002); the UN Framework Convention on Climate Change (UNFCC, 2002); etc.

Sector based initiatives, such as Global Forest Resources Assessments, produced by FAO at 5 year intervals, are based on well-established processes of data collection, processing, validation, compilation and analysis (FAO 2010). Assessing, monitoring and reporting on biological diversity are important activities part of sustainable forest management. In 2013 the FAO produced the first State of Mediterranean Forests report (FAO 2013), using already available data, an opportunity to analyze data gaps and suggest improvements for future data collection; the intention is to produce similar reports at five year intervals.

In the realm of implementation, information on biodiversity at different scales is required by various plans, strategies, instruments and programmes covering the Mediterranean region (the following is not an exhaustive list):

At the international level

- Global Environment Facility, a financial mechanism serving some of the conventions
- UNESCO Man and the Biosphere (MAB) Programme
- Critical Ecosystem Partnership Fund (CEPF);

At the regional level

- UNEP's Mediterranean Action Plan for the Barcelona Convention (MAP, 22 countries). One of MAP's Regional Activity Centres addresses Specially Protected Areas (RAC/SPA);
- European Neighbourhood and Partnership Instrument (European Commission);
- Emerald Network (Council of Europe under the Bern Convention);
- Mediterranean Basin Hotspot (Conservation International);

At the national level

- Protected areas (parks, reserves, etc);

[5]Source: http://ec.europa.eu/environment/iczm/

- National budgets;
- Management plans in protected areas;
- Local development plans (outside protected areas).

2.4. Existing information systems of relevance for Mediterranean biodiversity

In addition to the systems and mechanisms set at the national level to collect, compile and make available information related to biodiversity, there are several biodiversity information initiatives at the regional level. Some of them are official initiatives adopted by governments. The one best adapted to the Mediterranean context is the system for inventorying sites of conservation interest under the Barcelona Convention. Its legal basis is provided by Article 15 of the earlier mentioned Protocol concerning Specially Protected Areas and Biological Diversity of the Barcelona Convention which stipulates that each Party to the protocol shall compile comprehensive inventories of:

- areas over which they exercise sovereignty or jurisdiction that contain rare or fragile ecosystems, that are reservoirs of biological diversity, that are important for threatened or endangered species;
- species of fauna or flora that are endangered or threatened.

Pursuant to this article the Mediterranean countries elaborated and adopted a Standard Data-Entry Form (SDF) for inventorying, at the national level, natural sites of conservation interest. The identification of the natural sites to be inventoried is made according to a common reference list of habitats.

Part of the Mediterranean region is also covered by the Natura 2000 system, which includes sites having a special natural heritage interest and located in countries that are members of the European Union. The main objective of establishing the Natura 2000 network is to conserve biodiversity while taking into account the economical, social, cultural and local requirements for sustainable development.

The implementation of these two site inventorying systems generated a significant amount of ecological, legal and institutional information on the inventoried sites.

As part of this study, the following systems for data collection and/or compilation of particular relevance for Mediterranean biodiversity were identified.

At the international level

- Global Environmental Outlook (UNEP); a global environmental assessment process that produces periodic reviews of the state of the world's environment;
- Living Planet Index (WWF);
- Red List Index (IUCN);
- Ecological Footprint related data (Global Footprint Network);
- Water footprint related data (Water Footprint Network);
- The Clearing-House Mechanism of the CBD;
- The Global Biodiversity Information Facility, a data and information portal that arose from an OECD committee;
- The Global Register of Migratory Species (GROMS) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS);
- The World Database on Protected Areas (WDPA), produced by UNEP-WCMC and the IUCN ;
- The Intergovernmental Platform on Biodiversity and Ecosystem services (IPBES);
- Biodiversity Observation Network (GEO BON), developed by the Group on Earth Observations, a partnership of national governments and other organizations;
- OECD Environmental Outlook and Biodiversity indicators;
- Global Wild Bird Index (Birdlife International);

- Ramsar National reports prepared for the COP;
- Key Biodiversity Areas (IUCN and other organizations);
- UN MDG indicators, including environmental/biodiversity targets, coordinated by UN Statistics Division;
- FAO statistical databases (fishes, land, agriculture, forestry, etc.).

The Living Planet Index, Red List Index, and Global Wild Bird Index are part of the CBD-mandated Biodiversity Indicators Partnership, a global initiative to promote and coordinate development and delivery of biodiversity indicators in support of the CBD, Multilateral Environmental Agreements (MEA), IPBES, national and regional governments and a range of other sectors.

At the regional level

- Streamlining European 2010 Biodiversity Indicators (SEBI); the Biodiversity Information System for Europe (BISE) web portal is the main platform for data and information sharing, serving as the Clearing House Mechanism for the EU within the context of CBD;
- MEDGIS Database of the Regional Activity Centre for Specially Protected Areas (RAC/SPA);
- The Mediterranean Clearing House Mechanism coordinated by RAC/SPA;
- The Mediterranean Protected Areas Network (MedPAN) Database of Marine Protected Areas (MapaMed);
- The marine pollution assessment and control component of the Mediterranean Action Plan (MED POL), responsible for the follow up work related to the implementation of the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (Barcelona Convention);
- BIOMARE (Implementation and networking of large scale, long term marine biodiversity research in Europe);
- Wings Over Wetlands;
- Mediterranean Wetlands Observatory;
- Eurostat;
- EMECO (European Marine Ecosystem Observatory - EMECO is a consortium of agencies and institutes with responsibility for both monitoring and assessment of marine ecosystem threats and status, and also for improving understanding through research in Europe).

At the national level

In southern and eastern Mediterranean countries, there are no real nature and environmental monitoring frameworks institutionalized within the government structure at the national scale. In fact, national monitoring takes usually place within the framework of international commitments (CBD and Ramsar national reporting, national monitoring of MDG environmental goal and targets, etc.), and in association with the preparation or update of biodiversity and environmental policies or laws. National assessment can also take place within a project or initiative supported by international funding agencies. Some institutions and organizations working in this part of the Mediterranean are listed later in this document.

Many Mediterranean countries established National Clearing House Mechanisms (CHM) in application of the CBD provisions. The CHMs provide useful information about biodiversity as well as the legal and institutional frameworks governing, at national level, the conservation and sustainable use of biodiversity. A rapid survey made within the framework of this study showed that most of the CHMs of Mediterranean countries are not regularly updated.

Below is a list of links to the national CHMs of Mediterranean countries[6]

[6] Source: The CHM Network of the CBD http://www.cbd.int/chm/network/#tab=2

Country	CHM website
Egypt	www.egyptchm.org
France	biodiv.mnhn.fr
Italy	www.minambiente.it
Lebanon	biodiversity.moe.gov.lb
Malta	www.mepa.org.mt
Morocco	ma.chm-cbd.net
Slovenia	chm.zrsvn.si
Spain	www.mma.es/conserv_nat/biodiv
Tunisia	www.chm-biodiv.nat.tn
Turkey	www.cbd.gov.tr

The European Union, as a Party to the CBD has developed its CHM integrated within the Biodiversity Information System for Europe mentioned earlier, which is available on the Internet (eea.chm-cbd.net).

An overview assessment undertaken in the framework of this study showed that there is a clear lack of national information systems relevant to biodiversity in the southern countries of the Mediterranean region. The information available allowed assessing the situation regarding information systems on biodiversity only for the following southern countries: Algeria, Egypt, Morocco and Tunisia.

Algeria

In Algeria there is no national information system about biodiversity, however the Forest Authority holds databases for wetlands and forest areas. These are not available to the public and are not regularly updated. An effort to collect the biodiversity data available within universities and research centres is needed. As part of the second phase of the UNEP/GEF Project, the Ministry in charge of Environment (MATET) prepared a Clearing House Mechanism for biosafety. This CHM is not yet available on the Internet.

Egypt

The Nature Conservation Sector of the Egyptian Environment Affairs Agency (EEAA) developed a comprehensive Clearing House Mechanism that covers the terrestrial, wetland and marine environments of the country. The national CHM of Egypt is accessible on the Internet (http://www.egyptchm.org). It includes the following categories and subcategories of information:

- Egypt's biodiversity: ecosystems and habitats, species, national genetic resources, protected areas network
- Implementation of the CBD in Egypt: National Biodiversity Action Plan, CBD national reports, CBD thematic programs, CBD cross-cutting issues, biodiversity related legislation
- Case studies: Biosafety Clearing House report, Egyptian expertise, Egypt's biodiversity profile

As part of the BioMap Project, the EEAA developed an extensive GIS database of the distribution of species across Egypt.

Morocco

In Morocco, the CHM is the most comprehensive initiative to collect and compile information about biodiversity in the country. It was established through three main steps:

- Collection of existing information of relevance to biodiversity at the national level and design and development of the national CHM;

- Consultation with the National Committee on Biodiversity about the CHM structure, its content and the issue of copyright related to the data to be included in the CHM. The first release of the national CHM of Morocco was made available on the Internet in April 2004;
- Further work on the national CHM structure and improvement of its user friendliness, and inclusion of a module for downloading documents and a new platform for content management.

The main difficulties encountered in establishing the national CHM of Morocco were related to (i) the lack of awareness of the importance of the CHM, (ii) limited access to existing data, (iii) difficulties to update available data and (iv) the deficiency of computer equipment.

Morocco's CHM is available on the Internet (http://ma.chm-cbd.net) in three languages (Arabic, English and French). It is composed of the following main categories and subcategories of information:

- Biodiversity: fauna and flora, cultural values, agrobiodivesity, ecosystems, genetic resources, access and benefit sharing;
- Management and conservation: protected areas; national strategies, action plans and programmes; projects; education and awareness raising; research; legal and institutional framework; business and biodiversity, ecotourism;
- Cooperation: multilateral cooperation, bilateral cooperation;
- Information and links: useful links, experts, bibliographic resources.

Tunisia

Tunisia's national CHM was developed within the framework of an UNDP/GEF Project, with the following objectives:

- To encourage and facilitate scientific and technical cooperation in Tunisia and with other countries;
- To establish a comprehensive mechanism to collect, compile and exchange information of relevance for biodiversity conservation and make it available at all levels;
- To create a framework for liaising and exchanging information with scientists and other experts in all fields related to biodiversity conservation.

The CHM of Tunisia is available on the Internet (www.chm-biodiv.nat.tn) and includes the following information categories:

- Biological diversity in Tunisia
- Institutional and legal framework
- Conservation and management
- Scientific research and universities
- Education and awareness raising
- Synergy between the three Rio Conventions
- Technical and financial cooperation
- Useful links.

The Ministry in charge of environment in Tunisia has developed a database on wild species: Registre National des Espèces Sauvages (REGNESS). It is an information system on the occurrence, biology, ecology, distribution and conservation status of wild fauna and flora species of Tunisia. REGNESS is being developed with funds of the ministry in charge of environment with the participation of a network of scientists from universities and research institutes.

2.5. Stakeholders involved in biodiversity data collection and monitoring processes

The identification of stakeholders involved in biodiversity data collection and monitoring processes considered firstly the international and regional levels, and secondly the grouping of countries into southern and eastern Mediterranean countries, and EU countries.

International level

At the international level, several international organizations are involved in centralizing, controlling, assembling and reporting biodiversity data collected through their decentralized offices or national networks. WWF (Living Planet Index), IUCN (Red List, species conservation status, Key Biodiversity Areas), Birdlife (Wild Bird Index), PlantLife (Important Plant Areas), Wetland International (Waterbird population estimates and International Waterbird census), etc.

The United Nations offices (UNEP centres, FAO (Forestry, Land, Food, Fisheries), UNESCO (World Heritage, Man and the Biosphere)), the World Bank, the OECD and other multilateral organizations also collect or centralize and analyze national statistical and some biodiversity related data, directly or through specialized institutions (i.e. World Conservation Monitoring Centre (WCMC) for UNEP, Biodiversity Indicators Partnership (BIP) for the CBD, the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) established in 2012 for multilateral, regional and national agreements, and Wetland International for Ramsar).

Also, before their conferences of parties, the CBD and Ramsar conventions receive national reports that monitor progress against targets, including biodiversity. The national reports are prepared by the national focal points of the conventions in consultation with the relevant stakeholders. Some world biodiversity information mechanisms such as the Global Biodiversity Information Facility (GBIF) and the Biodiversity Observation Network (GEO BON) have been established to facilitate and share biodiversity data worldwide.

Regional level

At the Mediterranean level, the decentralized offices of some international organizations (WWF Med Po (Roma and Barcelona), IUCN West Asia (Jordan), Europe (Switzerland, Belgium, United Kingdom and Serbia) and Mediterranean (Spain), Wetland International (France)) or, in some cases their national representatives (i.e. Birdlife and its national network of NGOs) centralize Mediterranean environmental data and information, including biodiversity. The Barcelona Convention, through the Plan Bleu Regional Activity Centre and the Specially Protected Areas Regional Activity centre are also collecting data; they organize periodic regional studies covering the 22 Mediterranean contracting parties of the convention. In the European Union, monitoring takes place in line with biodiversity related directives' frameworks and mechanisms, as described in section 2.3.3.

Other organizations also collect biodiversity information (components, pressures, threats, etc.) directly or indirectly. Some of these have been mentioned earlier when mentioning the information systems they are involved in. The following organizations may carry out activities involving data collection or monitoring programmes concerning biodiversity, covering either part of or the whole of the Mediterranean region:

- MedPan association (on marine and coastal areas);
- Tour du Valat research centre (on wetlands);
- MedWet (Ramsar Regional initiative, wetlands inventory);
- Mediterranean Wetland Observatory (MWO), an initiative of Tour de Valat, MedWet, and others, dealing with wetland biodiversity and ecosystem integrity, pressures, ecosystem services);
- Sahara and Sahel Observatory (OSS, on desertification, agriculture, food security and drought in Africa), etc. Medasset (Mediterranean Association to Save the Sea Turtles);
- MedMaravis (International association dealing with the study and conservation of Mediterranean coastal habitats and marine avifauna);
- MedCoast (Coastal and marine conservation in the Mediterranean and Black Seas);
- CIHEAM (International Centre for Advanced Mediterranean Agronomic studies created in 1962, with four Mediterranean Agronomic Institutes in France, Italy, Spain and Greece and

collaborating with Tunisia, Egypt, Algeria, Morocco, Malta, Albania and Lebanon – including environmental and biodiversity education modules and studies);

- Euronatur (Foundation working in the Balkan region on species and habitat protection);
- Friends of the Earth Middle-East (Climate change and environmental issues in Jordan, Israel and the Palestinian Territories);
- National or sub-national platforms (i.e. REDIAM Environmental Information Network of Andalusia), Ecorem (Exchange platform to share and exchange resources on education and sustainable development in the Mediterranean), Med-O-Med **(**initiated to make up for the shortage of funds available for conserving biodiversity and natural and cultural heritage in the south and east of the Mediterranean basin and in the Middle East).

Currently, regular national biodiversity monitoring is undertaken by the ministry or by the authority in charge of protected areas, based on data collected in some protected areas that count with equipment and staff, which are usually the ones of international importance. This system is in place in almost all countries, but monitoring frameworks remain very narrow and there is poor integration between different biodiversity components; also, they do not incorporate data analysis and cross-cutting issues explaining trends. These systems are poorly implemented in countries such as Syria, Lebanon, Albania and Libya. Natural park monitoring frameworks are usually more operational, as it occurs in Morocco, Algeria, Tunisia, Egypt, Israel, Croatia and Serbia.

Southern and eastern Mediterranean countries[7]

At the country level, trained rangers, site managers, biodiversity experts, and decentralized line ministries' staff are the key persons involved in conducting monitoring activities. Other stakeholders include researchers, students, NGOs, associations, volunteers and experts either individually or as part of public and private companies. The proportion of rangers and site managers involved in monitoring is higher in countries with relatively centralized governance (Egypt, Algeria, Libya, Syria), while the proportion of different types of stakeholders involved in monitoring increases with decentralized governance (Europe, some Balkan countries, Lebanon and Israel). In the Balkans, some countries such as Slovenia, Croatia and partially in Bosnia and Herzegovina, a state institute acts as the monitoring agency of the ministry in charge of environment and biodiversity. A similar system also exists in Tunisia with the ANPE (Agence Nationale de Protection de l'Environnement). The monitoring role undertaken within the framework of some research and conservation projects should also be mentioned, supported by international assistance. These activities are especially useful in countries without a real national monitoring system or no capacity to monitor such as Bosnia and Herzegovina, Syria and Lebanon. Internationally supported projects ensure at least some periodic biodiversity updates. In these countries, most data collected through NGOs and universities are neither used beyond the site nor directly transferred to international organizations (i.e. BirdLife, Wetland International, PlantLife) for analysis.

In these countries, the person ultimately in charge of the official environmental/biodiversity monitoring processes is most of the time (i.e. in 42% of cases for freshwater ecosystems) the head of the department/authority in charge of environment. In about a quarter of these countries, this task is divided between different ministries, without real integration and analysis of the entire monitoring results. Monitoring is also organized at the decentralized government level, with consolidation at the central level (i.e., in Spain) or without central consolidation (i.e., in Bosnia and Herzegovina). About 15% of countries report no real monitoring or at best short-term project-based monitoring, either in protected or not protected areas (Bosnia and Herzegovina, Syria, Lebanon and Albania).

[7] Based on a study carried out in Morocco, Algeria, Tunisia, Egypt, Syria, Lebanon, Israel, Albania, Bosnia and Herzegovina and Croatia.

EU countries

In the EU, biodiversity data collection and monitoring processes are more harmonized thanks to the EU legislative framework (especially directives related to birds, habitat and water); each country tends to align its efforts with that framework. International targets are also incorporated into European targets and then into each member country's biodiversity programme. The Natura 2000 Network has been the most efficient recent instrument to speed up the study of biodiversity and increase the extent of protected/managed areas in EU countries.

Stakeholders involved in data collection and monitoring are much more diverse and complementary compared to the situation in southern and eastern countries due to their longer involvement in environmental actions, governance that enables the development of civil societies, and the availability of financial and human resources to develop this expertise. The main stakeholders involved in biodiversity monitoring are national, sub-national and local ministries, departments, offices and agencies in charge of environmental monitoring; national and regional parks and reserves, universities and specialized institutes, researchers, NGOs, national, regional and local observatories, volunteers, and citizens at large.

3. Evaluation of biodiversity data collection in the Mediterranean

Knowledge about Mediterranean biodiversity still suffers from significant gaps, in particular regarding the geographical distribution of species and habitats, genetic diversity, ecosystem functioning and socioeconomics (notably in the case of wetlands or in the marine environment, especially in several eastern and southern regions of the Mediterranean basin). The UNEP 2012 report on the state of the Mediterranean marine and coastal environment identified additional gaps in terms of the ecology and environmental status offshore areas, understanding the impacts of human activity on marine and coastal biodiversity, and mapping available data (UNEP/MAP 2012a).

3.1. Links and discrepancies between some major international and regional environmental conventions and protocols (policy level) impacting Mediterranean biodiversity and their implementation on the ground

An analysis of vertical coherence was conducted between policy, implementation and monitoring instruments available at international and regional (Mediterranean) levels which also deal or have an impact on Mediterranean biodiversity (See Annex 4). The analysis includes a review of linkages/discrepancy between 14 major international and regional environmental and development conventions and protocols[8] (policy level), 15 implementation plans and facilities[9] directly or indirectly covering or impacting on Mediterranean biodiversity and ecosystems (implementation level), and eight existing monitoring initiatives[10] (monitoring level). The study aimed to analyze the coherences and discrepancies between what is expected by the international and regional political or strategic level and what is really implemented, monitored and assessed. The study also analyses the level of harmonization in approaches and logic of assessment/evaluation between international and regional agreements adopting a global approach and the ones that are more theme-specific.

When considering all international and regional instruments together (from international conventions to monitoring systems), the study found that these instruments integrate their core environmental themes within some cross-cutting and development issues. These provide a list of 22 environmental sub-themes, 4 policy levels of influence, 9 economic and 8 social sub-sectors and 18 cross-cutting issues (see Annex 4 for more details). However, new conventions and tools created since the early 1990s tend to have a more global approach with better integration of cross-cutting and development dimensions, as compared to previous tools.

On the environmental side, water and biodiversity are the most common sub-themes among the different types of international and regional agreements and tools, with high coherence between the policy and monitoring levels. Coherence is also good for ecosystems (including coastal zones and forests) and land use; however, there is less interest among partners compared to water and biodiversity components. The general environment and species are high in the agenda of conventions and protocols and relatively well monitored, but there is a deficit in the implementation of plans and programmes. Issues concerning habitat are mentioned by 43% of conventions and

[8] Ramsar Convention, Convention on the Biological Diversity, Cartagena Protocol on Bio safety, Millennium Development Goals, United Nations Convention to Combat Desertification, Bonn Convention on Migratory Species of Wild Animals, Stockholm Convention, World Summit on Sustainable Development, Climate Change Convention, Cultural Diversity Convention, Bern Convention, Arhrus Convention, Barcelona Convention, African-Eurasian Waterbird Agreement.

[9] Mediterranean Action Plan, Global Environment Facility, Blue Plan, European Neighbourhood and Partnership Instrument, Union for the Mediterranean, Life +, UE IICO MED, EU Water Framework Directive, UE SMAP, Natura 2000, ICZM Protocol, Man and Biosphere, Mediterranean Basin Hotspot Conservation International, Mediterranean Ecoregion, IBA Birdlife

[10] Global Environmental Outlook, Living Planet Index – Ecological Footprint, Streaming European 2010 Biodiversity Indicators, Red List, Millennium Ecosystem Assessment, Wings Over Wetlands, GlobWetlands, Eurostat.

protocols but implementation and monitoring is poor. Wetlands are in the agenda of only a few conventions and protocols, but programme implementation and monitoring are already taking place in Mediterranean plans, strategies and tools. Urban and rural areas are not part of the primary regional approach of the conventions and protocols analysed. Nevertheless, plans and monitoring tools are more developed in this context. Watersheds are not well covered neither by environmental conventions/protocols, nor by the environmental and monitoring tools, except in EU countries (where the EU Water Framework Directive is in place). Marine ecosystems and species are covered in the Mediterranean by three regional agreements (Barcelona Convention, GFCM and ACCOBAMS). They are also covered by EU Directives (e.g., the Habitats Directive, the Water Framework Directive and the Marine Strategy Directive) and policies (The Common Fisheries Policy).

The policy level is in the agenda of more than 60% of each of the three categories of tools (policy, implementation and monitoring), confirming their common interest in helping and influencing decision-making at the policy level.

Among the cross-cutting issues, transfer/communication of results is a shared priority of more than 50% of each category of tools, showing a strong interest in knowledge sharing. However, transfer/communication lines are usually bottom-up designed with poor top-bottom feedback to data collectors and local level users.

Climate change and pollution are also in all the agendas, but pollution is still not well monitored. Poverty, traditional knowledge, cultural values, partnership and access to technologies are mentioned by 50% or more conventions, protocols and plans, but they are almost not taken into account in the environmental tools and monitoring systems. Governance, democracy, gender issues and capacity building, mentioned by more than one third of conventions and protocols, have a low priority in most plans, environmental tools and monitoring systems.

Among development issues, agriculture is the main economic sector taken into account at all levels with a strong monitoring effort. There is also high coherence between conventions, plans and monitoring tools regarding the energy, transport, industry, health and education sectors. However, while tourism is poorly integrated in conventions and protocols, plans and monitoring are relatively developed for it. Regarding wetlands, there is a lack of coherence and effort in terms of integrating and monitoring irrigation, water supply, ecosystem services and sewage.

The logical framework for the monitoring and assessment of each environmental theme may be very different between tools (conventions, protocols, plans, tools and monitoring systems) depending of their respective objectives and approaches (specific versus global approach). Consequently, for the example of freshwater ecosystems, the way their status and trends are monitored and assessed may vary depending on: i) the number and nature of indicators incorporated into the analysis of the situation; ii) the nature of the objectives that form the basis for data and indicator interpretation (sector development, theme specific, global environment, sustainable development, etc.); iii) spatial coverage (ecosystem, habitat, administrative boundaries, national, etc.).

As a general conclusion, it can be highlighted that since early 1990, biodiversity is taken into account at international and regional levels, with relatively good coherence between policy, implementation and monitoring. The relatively high importance of the communications agenda and the interest in policy provide policy-relevant information to supranational instruments. Cross-cutting issues are foreseen in “new” conservation conventions in order to integrate biodiversity into a larger context of sustainable development. However, the main gaps between “biodiversity” policy requirements and the implementation/monitoring reality concern habitat, water issues (mainly quality and a watershed approach) and some cross-cutting issues that can be called external causes of biodiversity changes (governance, pollution, irrigation, poverty issues, traditional knowledge, cultural values and access to technologies). Another key finding is the poor top-bottom feedback of biodiversity information and analysis from supranational instruments down to sub-national levels.

3.2. Biodiversity monitoring systems in southern and eastern Mediterranean countries

3.2.1. Main ecosystem monitoring themes

In the terrestrial environment, the main biodiversity monitoring programmes conducted in the Mediterranean region concern the invasion of non-indigenous plant and animal species and the monitoring of populations, assemblages and species of special concern such as those linked to island biodiversity or the fragile arid and sub-arid ecosystems.

Regarding freshwater ecosystems, except in a few sites (i.e. Ichkeul Lake in Tunisia, Prespa Lake in Greece, Hula wetland in Israel) and in some countries (i.e. Israel, Croatia), biodiversity monitoring systems are rather mechanical exercises not really connected to national policy review to improve subsequent planning. However, most countries tend to somehow follow or adapt their monitoring towards international biodiversity monitoring requirements, especially those of the CBD, Ramsar and UNESCO reporting systems. In summary, in most southern and eastern Mediterranean countries, biodiversity monitoring is more useful for international conventions than for the countries themselves. On the other hand, international targets and national commitments encourage countries to make efforts with a relative competition “effect” between neighbouring countries. This is clearly visible in the number of Ramsar sites proposed first by Algeria, and then by Morocco and Tunisia since 2000.

Considering the marine environment, several monitoring initiatives were launched during the last ten years, in particular to monitor the populations and habitats of endangered species (monk seal, turtles, some marine bird species, *Posidonia* meadows, etc.). Most of these initiatives are coordinated by international/regional organisations that provide assistance (training, funding, etc.) and facilitation (standardisation of monitoring methods, organisation of conferences and workshops, compilation of regional assessments). Furthermore, a special effort is being made in the Mediterranean to monitor invasive species, particularly in the areas most affected by biological invasions (eastern Mediterranean). In this context an early warning system is being established at the Mediterranean level to notify the occurrence of non Mediterranean species in marine protected areas.

Finally, in many Mediterranean countries, valuable monitoring data is also being collected within the framework of programmes that regularly monitor species that have the potential to affect the quality (toxicity, bacterial content) of living marine resources.

3.2.2. Overall strengths and weaknesses of monitoring systems

Within the existing monitoring systems in the conservation network of southern and eastern Mediterranean countries, the main identified strength is the availability of committed people in each country (within public institutions, universities, NGOs, associations, consultancies) willing to implement monitoring programmes and share results. In the northern side of the basin, the EU directives and legal frameworks require—or influence—national governments to make greater efforts to incorporate environmental and biodiversity monitoring within their development and conservation processes.

The main bottlenecks identified within the existing national biodiversity monitoring systems in the Mediterranean are outlined below.

1) <u>Lack of an integrated and impact-oriented monitoring framework to help decision-making</u>

Within countries, there is poor horizontal and vertical integration (between grassroots organizations and central level authorities) of biodiversity-related data collected and poor/no correlation with other national sectors and regional monitoring systems. The current national biodiversity

monitoring systems, rather sectoral and country/site specific, may not allow an easy comparison between countries and a good understanding of causes of trends in a broader context than the site or country level. This situation occurs especially in southern and eastern Mediterranean countries, and is more pronounced in countries using relatively top-down, sectoral governance and planning processes (Egypt, Libya and Syria).

Moreover, most biodiversity data collection and monitoring systems are component (species) or sub-component (birds) based. When there are several sub-components monitored in a site (such as birds, bats, water, dragonflies), almost none of the monitoring systems allow performing correlation analyses between them. Even fewer systems try to analyze all sub-components in larger geographic, socio-economic, national and policy contexts. These systems are then not aligned with the broader biodiversity concept developed by the CDB, OECD, EU and Ramsar, encompassing ecosystem services, drivers, pressures, impacts and responses (DPSIR model or adapted from DPSIR model).

Furthermore, based on the MWO study (2011), only 26% of institutions involved in wetland monitoring use a monitoring framework linking data collection with the results to be achieved, the conservation objectives and the vision of the institution. Yet about 17% of institutions have no monitoring framework and rely solely on component specific protocols defined by national or international organizations. In other words, there is a tendency to collect data for the sake of it, instead of collecting data linked to impacts and targeted results to be communicated to identified potential users. Consequently, about 85% of bird data collected within a country remains in computers without much valuation beyond the national conservation network (i.e. El Kala in Algeria, since 1977, and Ammiq in Lebanon, since 1992). Data analysis is also rarely performed but several field staff consulted (site managers, NGOs, experts) recognize that without integration of socio-economic and major cross-cutting dimensions (policy, governance, food security, etc.), ecosystem-related assessments and analyses remain too sectoral and poorly adapted to communication purposes. Consequently, this leads to a less efficient planning and ecosystem management.

2) Poor communication and feedback of the current monitoring data and results

Stakeholders have reported 30 ways of communicating their activities and results. Subject matter reports, internet/website and annual reports are the main supports in all countries (40% of the respondents), followed by meetings and conferences, brochures, leaflets, articles for the media, education/awareness, publications and newsletters. There are more diversified means of communication reported in EU and Balkan countries compared to the southern countries of the Mediterranean basin, with more pronounced efforts to produce conferences, TV programmes, media products, newsletters and tourist centres.

Stakeholders involved in environmental monitoring and influencing policies report 24 types of policy and strategic impacts. The most common impacts of their influence are related to awareness, ecotourism/economic services, site conservation, transfer of knowledge, wetland and water management, change of attitude and practices, planning processes and influence on infrastructure and industry projects. On the contrary, they have no or poor influence on agriculture practices, coordination, methodologies and protected sites identification. In some Balkan and Middle-East countries, NGOs are usually not recognized by government as potential players in national strategic and policy orientation.

For stakeholders other than ministries involved in monitoring, the main reported levels of policy influence are: central and local levels (28%), and national policy and strategic level for specific subject matter (water, pollution, etc.: 15%). This is done through the presentation of results in protected areas, projects, seminars and committees. The main inputs provided that are influencing policies are related to: data, advice, negotiation, follow-up, communication, committees, boards, expertise, planning, capacity building, advocacy, networking, strategic and policy orientation, expert opinion, letters to government and international bodies (Ramsar, CBD, European

Commission), campaigns, consultations, studies, success stories, methodology, guidelines, presentations in workshops and seminars.

Yet, communication and feedback of monitoring data and results remains low in many countries of the region. While most data collection and processes are bottom-up, systematic feedback from headquarters to data collectors is very rare and is reported in less than 12% of the cases. In North Africa and Middle-East countries, there is poor dissemination of collected data due to restrictions to data access outside the collecting institution, poor or no analysis and feedback of biodiversity data and monitoring results, and restricted dissemination within their network. This finding, together with data analysis and interpretation, is seen as one of the main weaknesses of current monitoring systems. The insufficient feedback does not encourage data collectors to improve their efforts and to deliver information further down to field staff.

In some countries (i.e. Croatia, France, Spain, Israel, Egypt, Morocco), the lessons learned have been clearly incorporated into the design or revisions of environmental and biodiversity national strategies or action plans. In the EU and Balkan regions, civil society is more developed and organized to disseminate messages, even if more efforts are still needed. The monitoring results are somehow made available for decision making at the planning level, due to a more conducive governance and institutional set-up towards vertical sharing of information from local to central levels.

Finally, an analysis by sub-region shows that in the EU and Balkan countries there is a higher proportion of information shared vertically between central and local governments, as well as with the general public, compared to southern countries of the Mediterranean basin. In North Africa and the Middle-East, inter-sectoral committees are the main means used to share information (when these committees are operational). In some countries like Egypt, Tunisia, Morocco and Albania, the environmental thematic groups and the environmental donor group meetings (established in line with the Paris Declaration) are also means to share environmental information between government and the donor community. This analysis shows that the means for policy influence are more diversified in more democratic countries, especially in the EU and Balkan regions. In the EU and Balkan countries involved in the EU accession process, the European Commission—and somehow UNESCO (MAB and World Heritage)—are seen as efficient means to report complains and to influence national decisions. On the contrary, NGOs indicate there is insufficient feedback from international conventions such as the CBD and Ramsar conventions. In less decentralized countries, civil society is less—or even not—encouraged to participate in policy and strategic discussion processes.

3) Concerning monitoring systems
    a) There is an important unbalance in terms of the topics covered, for instance the deficit of data on ecosystems and habitats, on biodiversity beyond birds, on socio-economic aspects, and on pressures on biodiversity and habitats from development sectors such as agriculture, urban and infrastructure expansion, tourism, etc.

In some environments, the lack of information is such that it has been suggested that the relative species richness of different taxa by sector of the Mediterranean is a better indicator of the level of research effort than of true species richness (Coll *et al*. 2010). This is particularly true of deep sea areas, which are among the less surveyed zones in the Mediterranean. The available data in the literature provide mainly descriptive information on the physical features of the seabed, on habitat types and on species, while significant gaps exist regarding the information on the geographical distribution of habitats and species. An assessment undertaken in 2008 by the General Fisheries Commission for the Mediterranean (GFCM) (Raïs 2008) concluded that the research and surveying campaigns in the Mediterranean deep sea zones are often short in time and geographically very limited. Undertaking research activities in these zones is logistically complex and requires important financial resources that are not usually available for marine research in most Mediterranean countries. Furthermore, deep sea zones are often located in areas beyond the national jurisdiction of any country, which make the required administrative arrangements for

research more complex. The same GFCM assessment showed that the main gaps in scientific data concerned the functioning of the Mediterranean deep sea ecosystems, species populations and biomass evaluation.

Regarding the terrestrial environment, the Global Forest Resources Assessment recognises proxy measures of biological diversity appropriate for specific purposes. The variables measured in the Global Forest Resources Assessment 2010 with relevance to forest biological diversity include the area of primary forests, the forest area designated primarily for conservation of biological diversity, the area of forests in protected areas, and tree species composition of forests. The first report on The State of the World's Forest Genetic Resources, published in 2014 contributes to the definition of additional indicators for monitoring forest biological diversity and the effectiveness of conservation measures (FAO 2014).

b) Poor biodiversity monitoring outside terrestrial and marine protected areas, especially in non EU countries

In southern and eastern Mediterranean countries, institutionalized monitoring takes place mainly in nationally protected areas (parks, reserves, etc.), with a particular focus on internationally recognized, large and attractive sites, and sites with particular biodiversity and endemism or facing serious biodiversity threats. World Heritage, MAB and Ramsar sites are in average better monitored compared to other protected sites because of their biodiversity, international recognition, landscape, and eco-tourism attraction. Outside protected areas, there are very few examples of biodiversity monitoring, except through international projects and national censuses, or in the case of an emblematic species using or crossing a habitat located outside protected areas (i.e. flamingos).

In marine and coastal areas, monitoring takes place mostly in Specially Protected Areas of Mediterranean Importance (SPAMI), established though the Protocol concerning Specially Protected Areas and Biological Diversity (Barcelona Convention), marine sanctuaries, etc., with partners such as RAC/SPA, MedPAN, IUCN, WWF and national institutes. Monitoring programmes cover also critical habitats of endangered species even if they are not located in protected areas. For example, all known nesting beaches of marine turtles in the Mediterranean are surveyed during the nesting season to monitor nests and hatchlings. Some of the monitored sites are organised as a network designed to ensure a balanced geographical coverage.

For freshwater ecosystems, about 85% of countries reported regular wetland related monitoring activities (MWO, 2011). All of them implement activities in protected areas (national and regional parks, reserves), mostly in some large and internationally important wetlands with a certain designation, such as Ramsar, MAB and World Heritage sites, representing in average less than 1% of the national terrestrial territories. In the case of other wetlands inside and outside protected areas, some monitoring takes place in European Union countries, in line with Natura 2000 network processes, the requirements of EU directives and the environmental legal framework associated with development sectors (agriculture, urban development, water, etc.). Balkan countries (Croatia, Macedonia, Albania, etc.) are influenced by these EU directives and apply EU instruments including the ecological network concept to identify future Natura 2000 sites. In developing countries such as Egypt, Algeria and Albania, environmental monitoring activities outside protected areas only take place in response to specific issues reported by other sectoral ministries, or following a complaint issued by civil society (Croatia, Turkey, Lebanon).

c) Poor data access and sharing

The survey respondents (MWO, 2011) reported a total of 14 methods of data access, including public sources (15.6% of cumulated responses), web sites (14.3%), NGOs (13.1%), universities (9%), researchers (8.5%), experts (8.5%), reports (7.8%) and personal contact (7.8%). Only one third of the institutions surveyed have organized or are part of a formal and open network of stakeholders for data collection and access, while 29% have a restricted network (internal or upon

request). The remaining 27% of institutions have not developed a formal network of stakeholders to access and share collected data.

Most national NGOs in the Mediterranean Basin have developed an internal and relatively open system and network to access and share monitoring data and information. Most public institutions, especially in North Africa and the Middle-East, have a more restricted network and system (within public services), a network under construction or no network at all. About 60% of the respondents to the survey are not satisfied or not completely satisfied with the efficiency of these systems and the level of data that they can access.

While systems and networks developed by NGOs are reported to be the most efficient (MWO, 2011), the use of biodiversity beyond scientific networks is often inadequate for several reasons, including historical, institutional and regional causes. While some are known and somehow addressed progressively, others causes still remain relatively significant.

One of the initial root causes of the poor use of biodiversity data outside scientific and conservation networks is historical. In the 1800's, data collection and "monitoring" in the natural environment started by passionate ornithologists and other taxa experts. The primary goal of data collection was knowledge and scientific research, to be shared among scientific networks. When the international conservation movement started around 1950, the research and conservation networks were two separate worlds. Politicians and those involved in economic development were also in separate and distant circles from scientific and conservation networks. Still today, even if all of these networks are involved, directly and indirectly in "sustainable development" in similar areas, each network keeps some of its former heritage. Consequently, the primary objective of biodiversity monitoring may still be internal to the biodiversity network; they use their own wording and methodology which are hardly understandable by outsiders. Therefore, most biodiversity data are not collected with the purpose of sharing them with policy-makers, social scientists, economists and financial agencies. The Economics of Ecosystems and Biodiversity (TEEB) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) are recent international initiatives intending to translate the results of scientific monitoring into a format and language that are relevant to policy making.

On the institutional side, there are still important divides at the country level between environmental and socio-economic institutions (public, private, civil society and financial agencies). They often meet at meetings, seminars and workshops, but on a daily basis, each network tends to keep its "own understanding" of sustainable development: its methods, approaches, planning, and sectoral targets in line with their objectives. Since early 1990, international and regional conventions and agreements are much more comprehensive in their approach, compared to national governance of conservation and development. Consequently, in most countries, the use of information and monitoring results is still not automatically shared between different types of stakeholder networks, or it is shared using wording or logic that is not understandable or adequate for potential outside users. For example, most of the time, parties from sectors that have an impact on biodiversity (agriculture, industry, construction, urban development, public infrastructure, energy, etc.) do not understand scientific or conservation papers or cannot relate the issues mentioned to their own agenda.

There is still a rather high partition of networks, methods, policy and legal frameworks between protected and not-protected areas, especially in non-EU countries. While protecting an area has been one of the first and key instruments for biodiversity and habitat conservation, based on national and international targets, the implementation process has created a divide of stakeholders. At the beginning, with a more authoritarian protection governance and "conservationist" approach, these protected areas were managed without much consideration of local communities. In non-protected areas, on the contrary, developers did not always consider the natural environment and biodiversity as important pillars when elaborating sustainable development options. Each one tended to keep control over their area of expertise. With demographic growth, more land and water is required to meet human needs, and with the development of more decentralized and democratic governance, there is an increasing and urgent

need to speed-up the harmonization of conservation and development. Unfortunately, there are still not enough pro-active actions at the national level to bridge these two networks and to value their respective expertise in each other's areas. Consequently, these networks realize their "mistakes" often when conflicts arise between the conservation network and local communities, as observed in Tunisia (at the beginning of the Arab Spring; also in El Kala, Algeria, etc.).

The issue of data ownership is one of the most important hindrances to data exchange and availability, in particular concerning raw data about biodiversity components. However, there are examples of networking initiatives in the Mediterranean where this issue was resolved through the adoption of deontological rules for the use of data.

d) Insufficient data quality control, harmonization and storage

Overall, conservation stakeholders involved in monitoring activities in terrestrial areas report that data collected has good to medium quality, depending on the capacity and time of the human resources involved and also on the component to be monitored. Data quality is perceived as good enough to be used in the case of biodiversity (species) and water components, but sometimes the quality is questionable in the case of habitat and ecosystem data. Furthermore, some respondents indicated that in fact, the quality of the data collected is good for some protected areas only, or good but not regularly collected, or not in sufficient quantity for adequate interpretation and use. The analysis by sub-region shows that in countries with important participation of civil society (i.e. EU countries, Croatia, Israel, Turkey) good quality data are collected by a wide range of stakeholders, including NGOs and private experts and institutes. In Lebanon, the environmental sector remains segmented between public institutions, NGOs and universities that are still working in parallel, with a project based approach and with different methods, being largely financed by international organizations. It is then difficult to know if these data are quality-controlled and if comparisons can be made between sources. In less democratic countries, NGOs are not always recognized by public institutions (government and universities) for the quality of their data collection. This is partly the consequence of the governance system not enabling civil society and the private sector to develop their expertise and professionalism, in particular in countries like Egypt, Algeria and Syria.

Data quality control is not systematic and depends of three main factors: 1) the level of interest and usefulness at national level; 2) the level of professionalism of institutions involved in data collection; and 3) the governance system allowing civil society and the private sector to make contributions. Institutes and universities are usually recognized for their serious quality control. In southern and eastern Mediterranean countries, site managers and ecologists assigned to protected areas are usually involved, amongst other duties, in some data quality control for the most sensitive elements such as water, land tenure/use and experimental programmes.

Secure storage of data is usually a serious issue in several developing countries in Africa and Asia. Based on the MWO study, historical and current data are usually stored and available in Mediterranean countries, but often using different formats and software and then it is often difficult to make comparisons, analyze and establish correlations. For birds and plants, it is sometimes easier to get the consolidated and controlled data from international organizations outside the country (Birdlife, Wetland International, PlantLife) than from within the country. Regarding qualitative information, data are more secure in well established and stable institutions like universities, research institutes and NGOs compared to public institutions, where staff may change along with political changes. Data may also be kept by motivated individuals, ensuring historical memory notwithstanding changing institutions, until an institution takes over the responsibility of following-up (Algeria, Bosnia & Herzegovina, Syria, Egypt, Albania). Additional studies would be needed to assess data storage systems and their possible improvement.

e) Poor and low/medium quality of data analysis and interpretation to inform decision-making

In southern and eastern Mediterranean countries, communication of monitoring data may follow different lines. A common one is the delivery of data from a protected site (protected areas with a permanent team) to a central level authority. Another line goes from NGOs to international organizations (Birdlife, Wetland International). However, although the main results and research documents are usually available at NGO websites, the data collected and monitoring work done by several NGOs and universities are intentionally not communicated for policy uses. Likewise, government information is public in less than 30% of cases, due to a lack of a website (Albania, Syria, Bosnia and Herzegovina) or to websites that are not working or are not updated (Egypt, Algeria).
Raw data and databases are usually not available outside of the internal NGO networks and the government networks producing the data. They can sometimes be obtained upon request or under a contract agreement. The discrepancy between raw data collection and the usefulness of these data for decision-making purposes is a real problem in conservation. While the objectives of researchers and scientists are often to collect data to produce scholar degrees, articles and papers, site managers and decision-makers need timely data for management and guidance. During the long-time consuming research and publication period, data are rarely available and when made public, they usually come too late for timely decision-making purposes. In particular, this situation does not help development and regional planners that need annual data and data analysis for subsequent planning.

A majority of government staff influencing conservation decision-making and involved in monitoring (i.e. 76.5% in the case of wetlands ecosystems) also participate in national or sub-national cross-sector planning processes. Their involvement may include a national planning exercise, while in some cases, they only have an influence on the protected area planning. This connection between monitoring and planning is seen as very favourable to incorporate lessons learned in subsequent conservation planning process (this is a key issue in the programme cycle for the efficiency of monitoring and evaluation exercises).

However, the ministries/authorities in charge of environmental protection (ministries of environment, agriculture, national parks) are usually not the final authorities in charge of land-use planning and management decisions. Higher rank authorities may include the Prime Minister's Office, the Ministry of Interior, the Council of Ministers, a planning ministry or commission or a ministry of physical planning. However, in about 29% of countries, they can be part of the decision-making process through an inter-ministerial committee. This result indicates a potential discrepancy between the recommendations shared vertically within the ministry in charge of conservation and their incorporation in subsequent land use/management planning in other sectors or in local planning processes.

In protected areas, management plans are a practical tool to implement conservation activities. However, these management plans concern only a small portion of the protected areas. Protected areas cover about 7% of the national territories in average in the Mediterranean basin, ranging from 0.3% (Bosnia and Herzegovina) to 25-28% (France, Italy).

In most countries, the Ministry of Interior, local governments, the ministry in charge of planning, the Ministry of Finance and the Prime Minister's Office are the key authorities with a horizontal mandate over sectoral ministries in charge of land, planning and budgeting issues. In Croatia and partially in Bosnia and Herzegovina, the Ministry of Environment is also responsible for regional planning, which facilitates "institutional" environmental integration at the planning stage. In decentralized countries, municipalities, local governments, *wilayas, mouhafaza, caza*, etc., have their own authority over land-use and distribution. In some southern countries such as Algeria, Morocco and Lebanon, farmers, landlords, tribal committees, religious groups and local traditional management systems (Hima (Lebanon), Touiza (Algeria)) may also have decision-making responsibilities. In Lebanon, religious confessions linked to politics are also influential in land use and protection/development decisions. Furthermore, in developing countries, funding agencies

may also be influential through their conditions to access aid. The influence of rangers, local authorities and police is also strong in some countries such as Egypt and Algeria.

In conclusion, there are reported institutional and coordination discrepancies within the decision-making process between sectoral ministries and their decentralized offices (vertical) in charge of protected areas, and horizontal ministries in charge of land, planning and finance. These discrepancies may reduce the efficiency of monitoring in the sense that the lessons learned and shared vertically may not influence the horizontal decision-making process.

In the case of ecosystems found in protected areas in eastern and southern Mediterranean countries, the poor or medium-poor quality of data analysis is due to several factors. Among them, the most common ones are:

1) the continued use of traditional result-based and sectoral monitoring systems not conducive to policy decision-making;
2) the lack of time and capacity of the human resources available;
3) the lack of appropriate monitoring and assessment frameworks;
4) the difficulty to analyze data without monitoring other important contextual elements (threats, socio-economic development, policy, regional context, etc.);
5) the approach followed, with assessments that are too sector based to allow a robust broader analysis and recommendations;
6) the lack of timely interpretation and analysis, which usually happens too late to be considered in real action and decision-making;
7) the prioritization of data collection instead of their interpretation and valuation, when human resources are limited.

An analysis by sub-regions of the Mediterranean shows that data analysis and interpretation are adequate to a certain extent in EU and Balkan countries, mainly due to the availability of financial and human resources, counting on the experience of experts, university staff and sometimes NGOs. In Maghreb countries, the people involved in monitoring indicated that data analysis is usually limited due to a fragmented approach. Furthermore, there are not enough human resources and time available for data analysis, partly due to the fact that there is little encouragement for civil society to be part of the process and help the public sector in this task.

The MWO study (2011) clearly revealed that out of the eight categories of persons involved in the assessment and analysis of biodiversity data identified, NGOs, experts, universities/institutes and public agencies are recognized for their expertise (76% of resources for assessment and analysis).

The quality of data assessment and analysis regarding species (especially birds) is reported to be medium. However, the assessment and analysis of data are far from being regular and usually take place within a project framework or special event.

4. Conclusions and suggestions for the Mediterranean Biodiversity Platform

Overall, while current international and regional policy frameworks are rather comprehensive, coordinated, and broad in terms of biodiversity, strategic and operational instruments including monitoring tools remain more sector-based or do not always include cross-cutting issues into the analysis of biodiversity. The **regional biodiversity monitoring platform could address this discrepancy by bridging gaps between the international policy framework and monitoring and evaluation requirements.**

In order to be **efficient and useful**, the Mediterranean Biodiversity Platform should capture the **interest of potential users by providing an added value** to the existing instruments, and by

avoiding the duplication of activities and products. In particular, mains gaps to be addressed regarding existing biodiversity-related tools in the region are:

1. Harmonized biodiversity monitoring and evaluation frameworks linking policy, impact and results;
2. Interpretation and analysis of existing biodiversity data in a broad sense similar to the DPSIR model (driving forces, pressures, states, impacts and responses);
3. Additional monitoring of indicators to better explain the status and trends of biodiversity, and to identify solutions based on drivers and expected impacts instead of solutions to address consequences (status and pressures);
4. Country and regional contribution to the CBD targets and goals for 2011-2020;
5. Timely communication of biodiversity results and analysis at national and local levels beyond scientific and conservation networks. For example, the combination of ecosystem services and livelihood models, as elaborated by the Ramsar Convention, is an efficient model to communicate biodiversity messages to decision-makers and citizens, as this is adapted to their agenda and socio-economic reality;
6. More effort into monitoring and evaluating biodiversity outside protected areas, as a mechanism to influence better integration of environmental and biodiversity issues in regional and human development planning. Conservation stakeholders could use and integrate existing socio-economic development tools and committees such as the local development planning tool and the environmental national and donor committees established after the Paris Declaration in 2005;
7. Adapt and develop existing international composite indicators to the Mediterranean region, such as the Living Planet Index (LPI). The LPI can be calculated at the national level, by habitat or by group of species;
8. More efforts into monitoring habitats and ecosystems are important to protect species, including their integrity and connectivity;
9. Facilitate the public availability of biodiversity data and studies currently kept within NGO, universities, government, etc;
10. Encourage a more harmonized monitoring of water quality, invasive species, pollution, species and habitats (terrestrial, freshwater and marine).

Further considerations relate to, on one hand, the importance of taking into account ongoing efforts in the Mediterranean region with overlapping objectives in terms of assessing the state of biodiversity and trends, such as those involved in the application of the ecosystem approach to the management of human activities in the Mediterranean by the parties to the Barcelona Convention (UNEP/MAP 2012a). On the other hand, assessments done as part of the implementation of the ecosystem approach have noted that a systematic and optimized monitoring program should not only look at environmental quality or ecological status but also management effectiveness. In other words, information should also be obtained on what sort of management exists, whether regulations are being enforced, and the level to which there is compliance with regulations (UNEP/MAP 2012b). This type of information should be part of biodiversity assessments, in particular, given that one of the purposes of monitoring biodiversity is to measure the success of biodiversity policy.

4.1. Strategic lines for building a Mediterranean Biodiversity Platform

The strategic lines, priorities and road map to operate the MBP would certainly be shaped based on the financial and human resources available. At this stage, the following recommendations, based on the above mentioned assessment, should be taken as possible elements and as a checklist of important steps in the process.

Prospects and opportunities for a Mediterranean Biodiversity Platform

The following dimensions could be considered for the launching of a Mediterranean Biodiversity Platform:

- Targeting potential users

The MBP should help in further valuing existing biodiversity data, and in disseminating information beyond the conservation networks. The potential users identified for the MBP (Ref Page 21, IUCN MBP document, October 2011) are country, regional and local authorities, NGOs, universities and research units, entrepreneurs and the general public.

- Harmonisation and complementarity of data at national and regional levels

The Mediterranean Biodiversity Platform should encourage the standardisation of protocols for data collection and monitoring, taking into account the existing systems. In particular, it should promote connectivity and complementarity between exiting relevant information systems.

- Improving communication of data and information

The MBP should provide timely biodiversity information that can be understood and used by all potential users, including non biodiversity scientists. The platform can serve as a scientist-policy and scientist-citizen interface to facilitate data and information transfer and use.

Communication products could include biodiversity data, case studies including success stories and solutions that may be useful for decision-makers and the replication of successful experiences.

Communication products could also be packaged taking into account Mediterranean sub-regional analyses of biodiversity. This level of disaggregation could be useful for countries having similar eco-climatic zones and could easily adapt successful experiences obtained in these zones.

At the national and local levels, it is important to consider appropriate languages such as French, English and Arabic, with possible summaries in other languages, especially in the Balkan countries and Turkey.

- Added value of Mediterranean biodiversity information

Given the multitude of local, national, regional and international biodiversity related initiatives, it is important to identify the most interesting strategic “niche” for the MBP. Based on the strengths and weaknesses identified in current biodiversity monitoring and evaluation systems in the region, the main potential added value could be:

- Value existing biodiversity monitoring data by providing analysis and assessment in a broader policy, strategic and sustainable development contexts;
- Improve the linkages and synergies between international, regional and national biodiversity monitoring and evaluation frameworks, instruments, methods and indicators;
- Enhance current monitoring systems based on the status of biodiversity and biodiversity inventories, to obtain monitoring systems based on an assessment and understanding of biodiversity trends;
- Develop impact-based monitoring and evaluation frameworks and indicators, including the relationship between causes and consequences in terms of biodiversity changes.
- Harmonize, centralize, group and establish correlations considering biodiversity data by country and cluster of countries, including biodiversity data kept by different sectors, in different locations and in individual databases and thus not available for use by targeted users.

- Biodiversity information gaps to be addressed

Several scientific reports on biodiversity (BirdLife, PlantLife, IUCN, WWF, UNEP, RAC/SPA, etc.) mention gaps in knowledge and up to date information for several marine, terrestrial and freshwater taxa and habitats. While it is important to collect these additional data, priority biodiversity gaps to be addressed are expected to be of a broader nature (in the sense of the CBD and the Millennium Ecosystem Assessment) that is, considering a DPSIR framework and ecosystem services. Based on the results and analysis described earlier, the main gaps perceived by decision-makers and citizens are:

- Analysis of direct factors leading to changes in biodiversity (human development, pressures, threats, etc.) and root causes of changes (policy, governance, law enforcement, development model, demographic growth, security, climate change, etc.);
- Lack of reliable and comprehensive data on habitats (terrestrial and marine);
- Poor integration of biodiversity issues with socio-economic development;
- Lack of integrated approaches to address the relationship between biodiversity and water;
- Lack of integration of the notion of ecosystem services in policies.

- Networking

Active networking may take time. It is important to start a successful networking cooperation with limited existing networks willing to effectively contribute and use the platform, and to gradually include other networks later. Existing national or regional platforms and observatories may provide input to the biodiversity framework of the MBP. Existing and new national platforms and observatories may be "labelled" as part of the MBP, as national focal points to liaise with national and local stakeholders. This 'labelled" network would facilitate efficient vertical communication, including their internal social networks and ensuring communication in their national languages.

4.2. Priority areas for biodiversity data and information communication

Priority ecological zones

Based on the opinion of many stakeholders involved in biodiversity conservation and/ or management, Mediterranean coastal areas are priority zones for enhanced biodiversity protection. This priority is consistent with high demographic, urban, tourism and industrial developments, that need to be well planned to ensure the sustainable development and protection of both coastal and marine ecosystems. Regarding coastal areas, fragile ecosystems such as sand dunes, wetlands and *Posidonia* meadows are considered as key priorities. The identification of priority coastal areas could help, and could be facilitated by the institutionalization and implementation of Integrated Coastal Zone Management or ICZM. Other priority areas are valleys and Mediterranean desert fringe areas with relative high development (dam, agriculture, public infrastructures) and demographic (urban development) pressures.

Priority countries

It is difficult to select priority countries or groups of countries for information gathering and monitoring, since biodiversity issues concern all countries.

For practical and financial reasons, countries with partners willing to contribute to the initiative and EU countries may be in a better situation to help in the preparatory phases and the beginning of the MBP. However, other Mediterranean countries should be involved in the discussion since the beginning in order to ensure that they follow the process and align with the initiative.

In terms of short term responsiveness and usefulness of this initiative outside EU countries, Croatia, Morocco, Tunisia, Lebanon, Israel and Turkey could be priority candidate countries

because of their conducive governance and working relationship with civil society, and their involvement with regional and international cooperation at policy and operational levels.

In terms of biodiversity threats (drivers and pressures), especially in coastal areas, Egypt, Morocco, Turkey, Albania, Bosnia & Herzegovina, Libya, Syria, Cyprus, Malta and Lebanon may come first as priority countries. The main threats are linked to demographic growth, trends in ecological footprint, freshwater overexploitation (surface and groundwater), urbanization, agriculture and tourism development. Hydropower and water abstraction trends are high in countries like Turkey; seawater desalinization is or will be an issue in Spain, Malta, Cyprus, Israel and Algeria. Underground water abstraction is an issue in south Algeria and Morocco, Egypt, Libya and Syria.

Identification of priority sites to protect the stock of biodiversity

To maintain the highest richness of species and habitat diversity, priority sites to consider for enhanced monitoring are Key Biodiversity Areas (IPA and IBA), Ramsar, Man and the Biosphere and Word Heritage sites in terrestrial, freshwater and marine environments. Monitoring should be associated with updating the zoning for protection and management, an adequate level of protection, and integrated management plans implemented by the ministries in charge of protected areas and sectors impacting on natural capital.

Priority sites requiring more biodiversity expertise for sustainable development

Non protected areas cover more than 80% of Mediterranean countries. In these areas, environmental and biodiversity expertise is less available and even absent in land use planning, the design of socio-economic development options, and sustainable development initiatives. Consequently, several components of biodiversity may disappear with socio-economic development without even reference to their existence.

While it is not the purpose of a biodiversity platform to directly address this issue, it is important to make greater efforts to collect and share biodiversity data and information from these non protected areas, sometimes available from different sources: public sector studies, impact assessment reports, land use planning studies, etc. Priority monitoring could take place in the most fragile and threatened ecosystems such as dry forest, garrigues and maquis prone to fire and urban development, sand dunes, coastal areas, riparian and small wetlands, arid areas, etc.

Priority biodiversity monitoring themes

For freshwater ecosystems, the MWO has identified the following priority monitoring and evaluation themes for the Mediterranean region (Mediterranean Wetlands Outlook 2012):

- Water quality;
- Drivers and pressures impacting on wetlands;
- Socio-economic development in wetland areas;
- Ecosystem services provided by wetlands;
- More effort to monitor non-bird taxa such as fishes, amphibians, reptiles and insects.

For marine and coastal ecosystems, based on RAC/SPA and SAPBIO documents, monitoring priority should be given to:

- Species targeted for fishing;
- Drivers and pressures impacting on marine areas (including all types of pollution, invasive species, fishing and water management);
- Knowledge and updated inventory and mapping of taxa, including genetic diversity;

- Fragile habitats such as *Posidonia* meadows and coralligenous beds, deep-sea coral communities, underwater caves, rocky coasts, small islands, dune areas, coastal forests, coastal wetlands and lagoons.

For terrestrial ecosystems, based on IUCN, WWF and Plantlife documents, the following priority monitoring and evaluation themes for the region are:

- In priority IPA sites, to update, develop and map knowledge on habitat and plant species;
- Pressures on plants, including overgrazing, deforestation, agriculture and tourism, and initial causes of these pressures;
- Assess the conservation status of plant species occurring in the IPA.

Priority biodiversity monitoring and evaluation of threatened sites

The following threatened sites constitute a priority in terms of biodiversity monitoring:

- Coastal areas, valleys and developed arid areas with high demographic and development pressures, and high seasonal migration of persons;
- Small and peripheral wetlands where biodiversity is declining which are losing their Mediterranean character;
- Fragile terrestrial and marine ecosystems where the impact of threats may be high for biodiversity, Mediterranean typicality and endemism;
- Non-protected areas where environmental and biodiversity expertise is lacking to identify and plan sustainable development options.
- Attractive terrestrial, freshwater and marine protected areas where sustainable tourism could be developed (economic advantage) and associated with awareness and education programmes (social advantage). This is a strategic choice, aiming at valuing the cultural services of these areas, developing the value chain of actors involved (local communities, private sectors, etc.) and promote the protection and sustainable management of these natural and semi-natural ecosystems.

4.3. Institutional setting of the MBP

The following steps could be developed prior to MBP implementation, in order to work out a consolidated framework including objectives, targeted users, expected results, activities, organizational structure and implementation modalities:

1. Objectives and targets of the MBP;
2. Strategic lines to reach MBP objectives;
3. Vertical connection and synergies between local, national and international levels, including biodiversity goals and targets;
4. Priority biodiversity themes and information to consider (added value compared to existing information, and priority sites and biodiversity components compared to existing trends and pressures);
5. Identify and select information sources to be considered in the platform;
6. Logical MBP framework linking objectives, biodiversity themes, indicators and results. For a broad audience, indicators could be selected based on a hybrid monitoring and evaluation framework combining the DPSIR and livelihood models. The DPSIR model would be appropriate for the CBD and Ramsar conventions while the livelihood model is more appropriate to communicate with development sectors and institutions, as well as with citizens. The concept of ecosystem services is also to be considered in line with CBD goals and targets for 2011-2020, and in line with the IPBES initiative;
7. Identify and specify how to provide the main expected results from the MBP such as reporting on implementation of the CBD 2020 targets in the Mediterranean, synergies with

the MWO dealing with Mediterranean wetlands biodiversity, a regional report on Mediterranean biodiversity, and the biodiversity situation by country or group of countries;
8. MBP structure and partnership, including ToR and sharing of responsibility, and organization of a network of networks on biodiversity information;
9. Communication strategy and products targeted to general and specific users, including language and communication opportunities (timely for the planning process of the countries, national and international events, etc.);
10. Within the communication strategy, design of the MBP web platform, including mechanisms for interoperability, interconnection and sharing of information among countries.

The MBP could also foresee, in its structure, to possibly include:

- An early warning system on the situation of biodiversity status in general or by components, based on different indicators;
- A mechanism to timely inform national and local planers (linking biodiversity monitoring networks to development and conservation planning networks) on biodiversity results, lessons learned from monitoring and solutions, in order to influence subsequent planning processes in the fields of development and conservation.

Being implemented by IUCN, the MBP should benefit from the expertise available within IUCN commissions and programmes, as well as from the knowledge of the national and local contexts available from IUCN members in Mediterranean countries.

4.4. Partnerships

It is important to consider different types of partners for efficient networking, communication and mutual reinforcing effects

- *Technical partners:*

The selection of technical partners will depend on the biodiversity information needed and the type of relevant data packaging required (accessibility, searching system, languages, correlation of data and indicators, geographic scale, etc.) to produce the expected results. Data and information providers, scientific, conservation and development institutions may include: 1) international and regional partners such as IUCN, WWF, Tour du Valat, Plantlife, Birdlife, European Environmental Agency, RAC/SPA, FAO, UNICEF, UN Habitat, MWO; 2) national and local partners such as NGOs, universities, research institutes, public institutions and observatories involved in monitoring biodiversity and in monitoring sector development. Technical partners may also be institutional partners and end-users of the MBP.

- *Institutional partners*

The careful selection of the institutional partnership is key to ensure the MBP institutional sustainability, continued interest and active participation.

At the international level, technical partners may also be institutional partners. Other international institutions such as UNEP, WCMC, ensure linkages with international agreements such as the CBD, Ramsar, UNESCO, MDG, etc.

At the national and local level, institutional partners such as international agreement focal institutions, ministries in charge of biodiversity, key biodiversity NGO networks and institutes can play an important role in providing information at the regional and international levels, and to convey international and regional information in their countries. The MBP can play a role of interface between the international (IPBES, CBD COP, Ramsar COP and Scientific and Technical Review Panel (STRP) meetings) and national/local levels to harmonize biodiversity monitoring vertically at these different scales. Institutional partners may also be users of the MBP.

It is highly recommended to establish Memoranda of Understanding for cooperation with the Secretariats of the main regional relevant agreements (Barcelona Convention, ACCOBAMS, GFCM) with the view of defining common objectives and harmonising the work programme of the MBP with the data and information requirements of these regional agreements.

- *Financial partners*

One of the key issues for the MBP is its financial sustainability. It is then crucial to develop a financial partnership aiming at securing medium-term operation (minimum of 5 years, possibly more). Indeed, such platform needs long-term vision and strategies that cannot be easily maintained through short-term projects. While projects could finance specific results and components, institutional operation and continuity should be secured with more permanent staffing through a medium-term financial mechanism. Alternatively, the MBP, after setting its institutional structure and working framework, could define its priorities based on financial and human resources, and based on the share of implementation capacities among technical and institutional partners.

Some financial institutions active in conservation and environmental issues in the Mediterranean are: World Bank, European Commission, GEF, UNDP, UNEP, AFD, FFEM, GIZ, CIDA, Norwegian Aid, Japanese Aid, Italian and Spanish bilateral Aid, USAID, Swiss Cooperation, MAVA Foundation, Prince Albert II of Monaco Foundation, Total Foundation, African Development Bank, Quatar Funds, CEPF, etc.

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ANNEXES

ANNEX 1

Some important features about the Mediterranean region

The human factor

- Half a billion humans live in the 28 countries of the Mediterranean basin (7% of the world population); 135 million of them live on coastal areas.
- For the 22 Mediterranean countries of the Barcelona Convention, populations in the south and east have doubled between 1970 and 2000. They are expected to increase by another 96 million by 2025. In the north, population grew by 14% over the same period, and will increase by a mere 4 million by 2025.
- The massive seasonal influx of tourists (275 million international tourists per year, i.e., 30% of worldwide tourism, (390 million expected by 2025) is a very large consumer of living space and natural resources.

A huge and growing pressure on water resources

The combination of the north-south divide, globalisation, a relative economic decline, an increasing and dense human population, and the world's highest pressure from tourism, is creating unprecedented pressure on the Mediterranean's natural resources, especially water:

- 290 km^3 of water are used each year (i.e., half the exploitable, renewable resource; but much more in some countries), 40% of which is lost due to faulty equipment and inappropriate techniques;
- Irrigated surface areas have doubled between 1965 and 2005;
- In the south, 82% of the water is used for farming, generally with a low efficiency.

A hotspot for climate change

The Mediterranean region will be especially affected by the following climatic changes:

- Greater warming than the global average;
- Greater variability in rainfall and temperature;
- Heat peaks in summer;
- A higher frequency of extreme events such as droughts and floods.

ANNEX 2

Recent important events in the region

- *EU legislation has increasing influence on biodiversity.* There are now 9 Mediterranean EU members, and several other countries are getting prepared for EU accession in the Balkans, as well as Turkey. All are already implementing or at least influenced by relevant EU laws and instruments, in particular the water framework, habitat, birds, and nitrate directives, and the Natura 2000 and Ecological networks.

- *The financial and economic crisis,* which started in 2008, *has affected all Mediterranean countries*, particularly Greece and Portugal, and more recently Spain and Italy. This has involved severe budget cuts for the environment and the postponement of previous environmental commitments, (e.g., in Tunisia, Portugal, Spain, France, Italy, and Greece).

- *The revolutions in Arab states have opened, concerning environmental matters, a period of both opportunities for the long-term, and uncertainty in the short-term*. *S*tarting in Tunisia in January 2011, they have impacted several Arab states in the Mediterranean region, especially Egypt, Libya, and Syria, with various outcomes. In the short term, the conservation of some protected areas may have suffered, as reported in Tunisia. In the longer term, the new political agenda, governance, and participation of the civil society may affect wetlands positively.

- *The increase in oil and gas prices has financed major development programmes, impacting biodiversity and natural habitats.* Since 2007, oil and gas have provided increased revenues for Algeria, Libya, Syria, and Egypt. This has helped fund major programmes for the development of highways, large-scale residential developments, irrigated agriculture, desalination plants etc., often with a noticeable impact on biodiversity and water resources. Investments have slowed down in 2011 in Libya, Syria, and Egypt due to the revolutions.

- *Recent increases in agricultural intensification* may further *stress biodiversity, natural ecosystems and water resources.* In response to the 2007 World food security assessment, international funding agencies have been increasingly supporting efforts to boost global agriculture production. Effects are already visible in the Mediterranean (e.g., in Morocco, Turkey, and Egypt). Intensification through irrigation and drainage will likely further impact natural and semi-natural land and water resources.

- A few recent key global and regional decisions related to the environment may impact the future of global biodiversity. The Mediterranean Protocol on the Integrated Management of Coastal Zones, under the Barcelona Convention, was approved in 2008 and entered into force in March 2011. In October 2010, the Convention on Biological Diversity (CBD) approved its targets for 2020 in Nagoya (Japan). On the other hand, the outcomes of the Climate Change conferences (Copenhagen 2009, Cancun 2010 and Durban 2011) are less promising. The decision in June 2010 to create an Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), validated by both the UN and CBD the same year, may take several years to have an impact in the field.

- *The creation of the Union for the Mediterranean ("UfM")* in 2008 *aimed to re-launch the Barcelona process*. This initiative aims to reinforce collaboration between the EU and all Mediterranean countries, especially in the fields of energy, water, transport, and the environment. Due to the sensitive political issues at stake, concrete outcomes are still awaited. Nevertheless, the UfM has maintained an ongoing political dialogue between countries, and has promoted a number of sustainable development projects.

ANNEX 3

Main monitoring results of Mediterranean wetlands (MWO, 2011)

Status and trends of wetlands

- *Wetland extent: an ongoing downward trend. With 18.5 (± 3.5) million ha of wetlands,* the Mediterranean region hosts between 1% and 2% of the world's wetlands. This represents 1.7 to 2.4% of the total area of the 28 Mediterranean countries[11]. At least some 50% of the wetlands that existed in 1900 have been lost. These losses continue, although the rate has seemingly slowed down in the EU Mediterranean countries. The total area of wetlands now includes about 23% of artificial wetlands (MW0, 2011).

- Land-use changes: a decline in freshwater ecosystems has occurred due to the conversion of wetlands into urban areas and agricultural lands, and water management increasingly based on grey infrastructure—including dam construction—that have occurred during the last decades. These changes have heavily impacted wetlands, and the impacts can be measured through changes in bird communities. Many species adapted to seasonal Mediterranean wetlands have decreased in abundance, whereas a few generalists have dramatically increased, adapting quickly to the abundant resources which result from the eutrophication of wetlands, the intensification of agriculture/fisheries, and the great increase in artificial wetlands (MWO and IUCN Red List, 2011).

- Efficient conservation actions have been focused for decades on protecting waterbirds and the large water bodies that host them, especially in western Europe. However, other components of biodiversity are in decline. Trends in wetland biodiversity are particularly preoccupying in the eastern Mediterranean (MWO, 2011).

- About 34.7% of the 2259 Mediterranean freshwater species are threatened with extinction at the global level, with a further 7.7% assessed as Near Threatened and 12.8% as Data Deficient (IUCN Red List, 2011).

- 31 freshwater taxa (mostly molluscs and fishes), previously present within the region, are Extinct at the global level (IUCN Red list, 2011).

- More than 30 freshwater species are regionally extinct, but still exist in other parts of the world (IUCN Red List, 2011).

- Amphibians, freshwater molluscs and freshwater fishes all show a high degree of regional endemism, close to or above 50% (IUCN Red List, 2011).

Root Causes of changes

- Demographic growth, including seasonal tourist flows and associated investments, is particularly affecting coastal areas and river valleys where most of the remaining large wetlands occur, mainly through urban development, land reclamation and water abstraction.

- Wetlands are quite low on political agendas, despite their key role in a central strategic issue: water management. Moreover, conservation policies and strategies lack a long term vision and

[11] Portugal, Spain, France, Monaco, Italy, Malta, Cyprus, Greece, Turkey, Albania, FYR of Macedonia, Croatia, Bosnia & Herzegovina, Serbia, Bulgaria, Slovenia, Montenegro, Kosovo, Israel, Palestinian Authority, Lebanon, Jordan, Syria, Libya, Egypt, Tunisia, Algeria, Morocco.

impact-based orientation; short-term strategies are maintained, resulting in poor continuity in terms of implementation.

- Protection laws are poorly enforced, especially in eastern and southern Mediterranean countries, while effective conservation measures are benefiting water birds in the western part of the basin.

- There is still a lack of comprehensive and integrated water management policies and strategies in most countries.

- Fragmented regional planning process, addressing separately protected and non-protected areas, often lead to unsustainable environmental and human development options when plans are implemented.

- The institutional coordination and inter-sectoral mechanisms for wetland conservation and wise use are often inefficient, leading to poorly integrated and unsustainable development options.

- There is limited development of national wetland policies and strategies, and when they are elaborated and endorsed, they are generally implemented and monitored inefficiently, especially in southern and eastern Mediterranean countries, mostly because of insufficient financial and human resources.

Main direct pressures on wetlands (MWO, 2011)

- While agriculture is the sector that most impacts wetlands and water in absolute terms, urban development, public infrastructures and tourism show higher development trends, impacting natural and semi-natural ecosystems including wetlands, especially on coastal areas. Pressures from these economic sectors are likely to increase in the coming decades.

- Irrigated agriculture is the main water consumer in the Mediterranean (two-thirds of total consumption). Excessive abstraction of water in wetlands kills agriculture in some north African areas, although irrigated surface areas are now stabilizing in the EU, Israel, and Egypt.

- Overexploitation of groundwater is often underestimated, but is of urgent concern in steppe and desert areas, especially in Algeria, Egypt, Libya and Syria. It contributes to the drying up of natural and artificial wetlands, and leads to non-sustainable human settlements.

- Pollution (nutrients, pesticides, heavy metals) is also a major cause of species decline.

Main issues on Mediterranean freshwater biodiversity data collection and monitoring

- There has been a **slow improvement in terms of monitoring wetland biodiversity**. However, data collection on wetland habitats, and socio-economic and ecosystem services, the broad analysis and interpretation of these data, and the communication of results are the main bottlenecks in the monitoring process, limiting monitoring efficiency and its usefulness for decision makers (MWO, 2011).

- Priority protection and monitoring efforts are particularly needed in coastal zones, river valleys, and inhabited arid areas where wetlands are most threatened, especially small and seasonal ones (MWO, 2011).

- Inter-related efforts are needed to address the root causes of wetland loss and degradation as well as their biotic homogenisation. These include improved conservation governance, improved policy design, enforcement of existing protection laws, and increased implementation and coordination efficiency of actions taken in wetlands (MWO, 2011).

- A priority for the region is to reduce the current high number of species assessed as Data Deficient due to insufficient information on their current status and distributions. This requires new initiatives to conduct field surveys in the least known areas. This current lack of information on so many species represents a significant bottleneck in progress towards the effective management and conservation of wetland biodiversity in the region (IUCN Red List, 2011).

ANNEX 4

Review of main policy, operational agreements and monitoring tools involving biodiversity in the Mediterranean (focus on freshwater ecosystems)

I. Biodiversity-related commitments linked to international and regional conventions, protocols, summits and goals

The review and analysis of political commitments linked to 14 existing and running major international (10) and regional (4) conventions, protocols, summits and goals[12] impacting directly and indirectly on Mediterranean biodiversity shows a large variety of themes and cross-cutting issues monitored at policy, strategic and operational levels.

Altogether, the fourteen international and regional agreements cover 54 major subjects, including 3 policy, strategy and cooperation themes, 18 cross-cutting issues, 18 environmental, land use, habitats and species fields, 8 economic sub-sectors and 7 social sub-sectors.

Since the early 90's, there is a clear trend of strongly influential conventions at the international and regional levels (CDB, World Summit on Sustainable Development and MDGs) towards the integration of environmental, economic and social matters under a concept of sustainable development. Currently, Ramsar is the key convention for wetland protection, management and use, the Barcelona Convention is the key convention for regional harmonization of environmental and development processes in the Mediterranean region, while the MDGs, the CBD and the World Summit are the key international references for international sustainable development frameworks and monitoring efforts.

Themes covered by 14 major international and regional policy and strategic agreements (conventions, protocols, summits and goals) covering or impacting directly or indirectly on Mediterranean biodiversity in wetlands

(in percentage of agreements covering each theme).

Themes and sub-themes	Policy level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Policy and strategy	93%				
Economic and social cooperation	57%				
Legislative and regulatory instruments	71%				
Poverty		50%			
Food		43%			
Governance		36%			
Participation		50%			
Rights		7%			
Climate change		43%			
Security		14%			
Gender		36%			
Traditional knowledge and cultural values		50%			

[12] Convention on the Biological Diversity, Ramsar Convention, Cartagena Protocol on Bio safety, Millennium Development Goals, United Nations Convention to Combat Desertification, Bonn Convention on Migratory Species of Wild Animals, Stockholm Convention, World Summit on Sustainable Development, Climate Change Convention, Cultural Diversity Convention, Bern Convention, Arhrus Convention, Barcelona Convention, African-Eurasian Waterbird Agreement.

Themes and sub-themes	Policy level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Transfer and communication		100%			
Partnership		50%			
Private sector involvement		36%			
Access to technologies		57%			
Warning system		21%			
R&D monitoring		50%			
Capacity building		57%			
Pollution		57%			
Waste		43%			
Environment			57%		
Biodiversity			71%		
Ecosystem			43%		
Habitat			43%		
Sea			29%		
Wetlands			14%		
Coastal/littoral			36%		
Forest			43%		
Land use			43%		
Water			57%		
Urban			7%		
Rural			7%		
Protected areas			21%		
Watersheds			7%		
Species			64%		
Birds			14%		
Fishes			14%		
Invasive species			21%		
Agriculture				57%	
Irrigation				7%	
Fisheries				14%	
Energy				36%	
Industry				36%	
Transport				21%	
Tourism				14%	
Ecosystem services				21%	
Health					36%
Education					57%
Domestic and potable water					21%
Disease prevention					29%
Biodiversity for medicine					14%
Mobility					21%
Living conditions					21%

Almost all (93%) international and regional agreements intend to influence at the level of environment and development **policy**, including 93% at policy and strategic levels, 71% at the legislative level and 57% through economic and social cooperation.

All of them (100%) are committed to **transfer and communicate** knowledge and information to the targeted users and at least 50% of them include **poverty, participation, traditional knowledge and values, partnership, access to technologies, monitoring, capacity building and pollution as key cross-cutting issues.** However, the issues of governance, food, climate change and warning systems, considered important in biodiversity protection and management are included in less than 50% of international and regional agreements. Gender issues, very common in development agreements, remain a low priority in conventions and protocols related to the environment. Demographic pressures and density are not clearly mentioned by the conventions and protocols. However, this factor is usually included in the analysis of trends.

Environment

Out of the 18 **environmental** fields, environment, biodiversity, water and species are the most shared and monitored concerns. Other subjects, including the nature of the habitat are more agreement-specific and addressed by specialized conventions. Agreements linked to the World Summit on Sustainable Development cover the widest range of environmental subjects, followed by the Ramsar and Barcelona Conventions and then the Convention of Biodiversity. With less than 21% of international and regional agreements monitoring wetlands, watersheds, protected areas, urban and rural areas, there is a potential gap in harmonizing environment and development objectives using a watershed approach, in urban and rural development planning and in incorporating protected areas into local sustainable development planning.

Socio-economic aspects

The Millennium Development Goals constitute the first international agreement to integrate a broad set of social, economic and environmental objectives, targets and indicators. Only recent environment-related international and regional agreements such as the World Summit on Sustainable Development (2002) and the Climate Change Convention have included relatively broad economic and social dimensions. Previous environmental conventions, protocols and summits show poor integration with development matters. Nevertheless, some conventions such as Ramsar have created bridges with emerging conventions.

Among **economic** sub-sectors, only agriculture is considered by more than half of the international and regional agreements. Other sub-sectors relevant to Mediterranean wetlands are covered by less than 40% of them. Irrigation, tourism and fisheries are mentioned by less than 15% of the agreements, while they are important economic sectors in the Mediterranean basin.

Education is the most common **social** sub-sector taken into account by international and regional agreements (57% of them), followed by health (36%) and disease prevention (29%).

II. Commitments linked to international and regional plans, strategies and funds

The review and analysis of commitments linked to 15 existing and running major international (5) and regional (10) implementation facilities[13] impacting directly and indirectly on Mediterranean wetlands show a large variety of fields and cross-cutting issues monitored at policy, strategic and operational levels. All of them work in partnership and about 80% of them are attached to international or regional conventions, protocols and directives.

Altogether, the fifteen international and regional agreements cover 54 major subjects, including 3 policy, strategy and cooperation themes, 14 cross-cutting issues, 20 environmental, land use, habitats and species fields, 7 economic sub-sectors and 6 social sub-sectors.

[13] Mediterranean Action Plan, Global Environment Facility, Blue Plan, European Neighbourhood and Partnership Instrument, Union for the Mediterranean, Life +, UE IICO MED, EU Water Framework Directive, UE SMAP, Natura 2000, ICZM Protocol, Man and Biosphere, Mediterranean Basin Hotspot Conservation International, Mediterranean Ecoregion, IBA Birdlife.

Themes covered by 15 major international and regional implementation agreements (plans, operational strategies, facilities, funds, etc.) covering or impacting directly or indirectly on Mediterranean wetlands

(in percentage of agreements covering each theme).

Themes and sub-themes	Policy level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Policy and strategy	80%				
Economic and social cooperation	40%				
Legislative and regulatory instruments	47%				
Poverty		7%			
Food		14%			
Governance		14%			
Participation		40%			
Rights		0%			
Climate change		47%			
Security		27%			
Gender		14%			
Traditional knowledge and cultural values		27%			
Transfer and communication		54%			
Partnership		0%			
Private sector involvement		20%			
Access to technologies		0%			
Warning system		0%			
R&D monitoring		0%			
Capacity building		60%			
Adaptation to change		20%			
Pollution		67%			
Waste		40%			
Environment			0%		
Biodiversity			40%		
Ecosystem			27%		
Hotspot			14%		
Lanscape			20%		
Habitat			14%		
Mediterranean Sea			40%		
Wetlands			27%		
Coastal/littoral			60%		
Forest			40%		
Land use			20%		
Water			74%		
Soil			20%		
Air			20%		
Urban			34%		
Rural			20%		
Protected area			34%		
Watershed			20%		
River			20%		

Themes and sub-themes	Policy level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Lake			20%		
Species			20%		
Agriculture				47%	
Irrigation				14%	
Energy				40%	
Industry				27%	
Urban Management				40%	
Transport				40%	
Tourism				54%	
Health					34%
Education					27%
Domestic and potable water					14%
Sewage					7%
Mobility					20%
Living conditions					27%

The majority (80%) of international and regional plans and facilities intend to influence at the level of environment and development **policy**, including 80% at policy and strategic levels, 47% at the legislative level and 40% through economic and social cooperation.

Capacity building and transfer/communication are in the agenda of more than half of the plans and facilities, showing as a high priority the creation of national and local institutions that can take over responsibility as well as strengthening their performance. **Pollution** and waste management are subjects covered by 67% and 40% of the plans and facilities respectively, impacting soil, water, air, health, biodiversity, etc. Climate change is an emerging cross-cutting issue taken into account by 47% of the plans and facilities. However, there is a poor recognition in plans and facilities of the importance of poverty, food, governance and gender (these topics show up in less than 20% of plans and facilities). The Mediterranean Action Plan including the Blue Plan and ICZM Protocols are the most proactive in including these cross-cutting issues.

Environment

Out of the 20 **environmental** fields, water and coastal/littoral issues are the two major shared topics of concern monitored by 74% and 60% of plans and facilities respectively. Clearly, in the Mediterranean region, coastal fringe areas and water are considered the most sensitive areas to monitor, connecting inland areas with the Mediterranean Sea. This may be partially explained by the relatively new but widely accepted initiatives of integrated water resource management (IWRM), integrating river basin management (IRBM) and integrated coastal zone management (ICZM). The details show that almost all plans and facilities monitoring water and coastal zones also monitor pollution in the Mediterranean Sea (40% of plans and conventions). Biodiversity, forest, protected and urban areas are included in 30% to 40% of plans and facilities, while other themes such as wetlands, species, ecosystems, habitat, landscape, land use, soil, etc. are more specific and are a priority focus for less than 30% of plans and facilities.

This indicates a possible gap or coordination difficulty for carrying out assessments and analysing status and trends; whereas they would include causes and effects on wetlands (covered by 27% of plans and facilities) using water and coastal data from well implemented and monitored plans and facilities, watersheds, rural areas, rivers, lakes, species, soil, land use and habitat are the primary focus of less than 20% of plans and facilities. This fragmentation of themes that are implemented and monitored, explained by the specific mandate of several plans and facilities, requires an

important review of documents in order to carry out a global analysis of the status and trends of Mediterranean wetlands.

Socio-economic aspects

The **Mediterranean Action Plan, the Blue Plan and the ICZM Protocol** are the most global in their approach among those considered, including at least 6 priority economic and social issues in their implementation and monitoring objectives. UE SMAP and IBA Birdlife include 5 to 6 economic and social themes as cross-cutting issues while other plans and facilities are more specific and include between one and three themes or cross-cutting issues such as transport, energy, tourism, health and education.

Among **economic** activities, **tourism** is the only theme considered a priority focus by more than half (54%) plans and facilities, followed by **agriculture** (47%), energy (40%), urban management (40%), and transport (40%). Irrigation and industry are covered by less than 27% of plans and facilities, while fisheries, rural development and ecosystem services are not a priority focus for any of them. Considering the main drivers of Mediterranean development identified by the Millennium Ecosystem Assessment and other studies (Blue Plan, national studies, national MDG monitoring reports, etc.), agriculture, tourism, energy and urban management seem to be already relatively well covered by these plans and facilities, while in the case of drivers such as rural development, irrigation and public infrastructure there is a potential gap in bridging environmental and development initiatives and monitoring.

Social sub-sectors are taken into account as a primary focus by less than 34% of plans and facilities, including formal education (34%) health (27%), living conditions (27%) and mobility (20%). Domestic and potable water supply systems, linked to demographic pressure and urban development and implemented as a Millennium Development Goal, are considered by only 14% of plans and facilities. Considering the relatively well covered themes of urban development, water and coastal issues, the development of water supply systems may be under-estimated by several plans and facilities as a factor contributing to the trends that impact on wetlands. This impact may be at different levels: related to the use and management of water, to the water supply infrastructure, to the time saved due to using the water facility for other activities near wetlands, or to waste water treatment and sewage treatment.

III. Commitments linked to international and regional environmental tools

The review and analysis of 8 existing and newly completed international (5) and regional (3) environmental tools[14] impacting directly and indirectly on Mediterranean wetlands show a large variety of themes and cross-cutting issues monitored at policy, strategic and operational levels. All of them work in partnership and about 88% of them are attached to international or regional conventions, protocols and directives.

Altogether, the eight environmental tools cover 56 major subjects, including 2 policy and cooperation themes, 14 cross-cutting issues, 22 environmental, land use, habitats and species fields, 13 economic sub-sectors and 5 social sub-sectors.

[14] Global Environmental Outlook, Living Planet Index – Ecological Footprint, Streaming European 2010 Biodiversity Indicators, Red List, Millennium Ecosystem Assessment, Wings Over Wetlands, GlobWetlands, Eurostat.

Themes covered by 8 major international and regional environmental tools covering or impacting directly or indirectly on Mediterranean wetlands

(in percentage of agreements covering each theme).

Themes and sub-themes	Policy and institution level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Policy and strategy	77%				
Economic and social cooperation	11%				
Poverty		33%			
Food		33%			
Governance		22%			
Democracy		11%			
Participation		11%			
Rights		0%			
Institution building		11%			
Climate change		33%			
Security		11%			
Gender		11%			
Traditional knowledge and cultural values		11%			
Transfer and communication		66%			
Partnership		0%			
Private sector involvement		0%			
Access to technologies		0%			
Warning system		0%			
R&D monitoring		0%			
Capacity building		22%			
Adaptation to change		0%			
Pollution		33%			
Waste		11%			
Environment			22%		
Biodiversity			33%		
Ecosystem			22%		
Hotspot			0%		
Landscape			0%		
Habitat			22%		
Mediterranean Sea			22%		
Wetlands			33%		
Coastal/littoral			44%		
Forest			33%		
Land use			44%		
Water			44%		
Soil			33%		
Air			44%		
Urban			11%		
Rural			11%		
Protected area			11%		
Watershed			0%		
River			22%		
Lake			11%		

Themes and sub-themes	Policy and institution level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Estuaries			11%		
Peatlands			11%		
Underground water			11%		
Species			33%		
Genetic			11%		
Agriculture				55%	
Irrigation				22%	
Fisheries				33%	
Aquaculture				22%	
Energy				33%	
Industry				33%	
Urban Management				11%	
Transport				33%	
Tourism				22%	
Ecosystem services				22%	
Water (economic)				44%	
Employment				11%	
Ecological Footprint				22%	
Health					33%
Education					33%
Domestic and potable water					11%
Sewage					0%
Disease prevention					22%
Biodiversity for medicine					0%
Mobility					0%
Living conditions					33%

The majority (77%) of international and regional environmental tools intend to have an influence at the **policy level**, including 77% at policy and strategic levels and 11% through economic and social cooperation.

Transfer/communication is the only cross-cutting activity shared by more than half (66%) of the tools, showing, the same as it happened in the case of the conventions and plans earlier mentioned, the high priority placed on transferring knowledge and capacity towards national and local institutions. Poverty, food, climate change and pollution are cross cutting themes relatively well covered, being considered by one third of the tools, the same as it happened in the case of conventions and protocols. However, there is a persisting poor recognition of the importance of governance and gender. Surprisingly, participation, capacity building, security, traditional knowledge, cultural values, access to technologies and adaptation to changes have a very low priority, in comparison to conventions or plans. The Millennium Ecosystem Assessment and Global Environment Outlook are the tools that include a widest range of cross-cutting issues in their monitoring and analytical system, especially poverty, food, governance and climate change. Other tools include between one and three cross-cutting subjects.

Environment

Out of the 22 **environmental and land use** themes, none are shared by more than 45% of the studied tools. Water and coastal/littoral areas remain two major fields of concern, monitored by 44% of tools, together with land use and air (44%). Other sub-themes are more specific to certain

tools, such as biodiversity, wetlands, forest, soil and species (addressed by 33% of tools), environment, ecosystem, Mediterranean Sea, habitat and rivers (addressed by 22% of tools). Lakes, estuaries, peatlands and protected areas are covered by only 11% of tools, while watersheds and hotspots are not directly addressed by these tools.

Overall, tools are directly covering almost all environmental sub-themes (except for lakes, estuaries and peatlands) mentioned in the international and regional conventions or plans earlier mentioned. Monitoring takes into account some important cross-cutting issues such as poverty, food, climate change and pollution. However, their findings, interpretation and analysis may under-estimate external forces such as security and access to technology as well as internal forces such as participation, traditional knowledge and cultural values.

The Millennium Ecosystem Assessment, Global Environment Outlook and GlobWetland are the tools including the widest range of environmental sub-themes (11, 10 and 7 respectively) while other tools include a maximum of four sub-themes.

Socio-economic aspects

The **Global Environment Outlook** and the **Millennium Ecosystem Assessment** are the tools most global in their approach, including at least 11 priority economic and social issues in their monitoring system, followed by Eurostat (9) and Living Planet (7). On the contrary, the Red List, Globwetland and Wings Over Wetlands have almost no direct integration with socio-economic development themes.

Combined, the studied tools take into account a relatively wide range of economic sectors. Among **economic** activities, **agriculture** and **water** are the sub-sectors relatively well taken into account by tools (55% and 44% of tools respectively). This is consistent with the interests identified in convention and plans. Other economic sub-themes are tool specific. Fisheries and aquaculture are addressed directly by 33% of tools, while there is no related strategy and implementation recorded in conventions and plans. Energy, industry and transport are included in 33% of tools, as well as tourism. This is also in line with the development sub-sectors mentioned in international and regional conventions and plans.

Considering the main drivers of Mediterranean development identified by the Millennium Ecosystem Assessment and other studies, agriculture, water, tourism, energy, transport and industry seem to be already relatively well covered by these tools, while irrigation, rural development, public infrastructure and urban management are economic drivers that could be potentially underestimated when monitoring environmental status and trends.

Social sub-sectors are considered a primary focus by less than 33% of tools, including formal education (33%), health including disease prevention (33% and 22%) and living conditions (33%). These percentages are similar to the ones in plans and facilities. Social water such as domestic water supply, sewage and water treatment are poorly considered by the tools studied.

IV. Some major monitoring mechanisms covering environmental and development dimensions in the Mediterranean region

The review and analysis of a sample of 12 existing international (3), regional (4), national (2) and local (3) environment related monitoring systems[15] covering directly or indirectly Mediterranean wetlands show a large variety of missions, mandates and monitoring frames. They may

[15] World Conservation Monitoring Center, OECD, Global Earth Observation System of Systems, European Environment Agency, Observatory of Environment and Sustainable Development in the Mediterranean, the Observatoire Méditerranéen de l'Energie, International Center for Advanced Mediterranean Agronomics Studies, Observation et Statistiques de l'Environnement, Observatoire Camargue, the Albufera Initiative for Biodiversity, Observatoire du Litoral, Observatoire National des Zones humides.

complement each other but usually there is no evident institutionalized coordination and linkages between them. They all have a clear mission and communication products; most of them are associated to international, regional and national conventions and 60% of them have already established a set of indicators which are operational.

Altogether, the 12 monitoring systems cover 49 major subjects, including 3 policy, legislative and cooperation themes, 12 cross-cutting issues, 18 environmental, land use, habitats and species fields, 11 economic sub-sectors and 5 social sub-sectors.

Themes covered by 12 monitoring systems covering directly or indirectly on Mediterranean wetlands (in percentage of agreements covering each theme)

Themes and sub-themes	Policy and institution level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Policy and strategy	67%				
Economic and social cooperation	25%				
Legislative and regulatory instruments	25%				
Poverty		8%			
Food		8%			
Governance		25%			
Democracy		8%			
Participation		8%			
Rights		0%			
Institution building		25%			
Climate change		50%			
Security		0%			
Gender		0%			
Traditional knowledge and cultural values		0%			
Transfer and communication		75%			
Partnership		0%			
Private sector involvement		17%			
Access to technologies		0%			
Warning system		0%			
Adaptation to change		25%			
Pollution		17%			
Waste		17%			
Environment			17%		
Biodiversity			67%		
Ecosystem			33%		
Hotspot			0%		
Landscape			0%		
Habitat			8%		
Mediterranean Sea			8%		
Wetlands			33%		
Coastal/littoral			33%		
Forest			8%		
Land use			42%		
Water			58%		

Themes and sub-themes	Policy and institution level	Cross-cutting issues	Environment including habitat and species	Economic development	Social development
Soil			17%		
Air			17%		
Urban			17%		
Rural			25%		
Protected area			17%		
Watershed			0%		
River			8%		
Lake			8%		
Estuaries			0%		
Peatlands			0%		
Underground water			0%		
Species			42%		
Genetic			0%		
Agriculture				67%	
Irrigation				8%	
Fisheries				17%	
Aquaculture				8%	
Energy				50%	
Industry				33%	
Urban Management				33%	
Transport				33%	
Tourism				50%	
Ecosystem services				8%	
Employment				17%	
Health					25%
Education					25%
Domestic and potable water					8%
Sewage					0%
Disease prevention					0%
Biodiversity for medicine					0%
Mobility					9%
Living conditions					18%

The majority (67%) of the monitoring systems intend to help decision making at the **policy level**, while 25% target legislative instruments and work through economic and social cooperation. None of them declare an early warning mission.

Transfer/communication and **climate change** are the most common cross-cutting issues shared by more than half (75% and 50% respectively) of the monitoring systems. The monitoring of these subjects is in line with the high level of interest identified at the conventions/protocol level and implemented by plans and facilities. One fourth of monitoring systems identify governance, institutional building and adaptive management as cross-cutting issues; these are also included in conventions and plans.

However, **pollution, waste, participation and private sector involvement,** mentioned by more than 40% of both conventions/protocols and plans/facilities are tracked by less than 20% of the monitoring systems. **Poverty, traditional knowledge, cultural values, partnership, access to**

technologies mentioned by 50% (or more) of conventions and protocols are almost not taken into account in the monitoring systems.

Environment

Out of the 18 environmental and land use themes, **biodiversity, water, species** and **land use** are the sub-themes monitored the most (by more than 40% of the monitoring systems). This is coherent with the level of interest mentioned in conventions/protocols and plans/facilities. **Ecosystem, wetlands and coastal zones** are monitored by more than 30% of monitoring systems and are also of concern in conventions and plans.

Less than 25% of monitoring systems measure the status and trends of sea, forests, protected areas, hotspots, peatlands, urban and rural areas, landscapes, rivers, lakes, estuaries, watersheds, air, soil or genetic resources. As well, there is a monitoring deficit in monitoring land use dimensions such as **watersheds, urban and rural areas and specific water bodies**.

Socio-economic aspects

The **OECD, the European Environment Agency, the Observatory of Environment and Sustainable Development in the Mediterranean** and the "**Observation et statistiques de l'environnement**" are the monitoring systems most global in their approach including at least 6 priority economic and social issues in their monitoring systems. Other monitoring systems integrate a maximum of 3 economic sub-themes.

Among **economic** activities, **agriculture**, **energy and tourism** are economic sub-sectors relatively well monitored, by more than 50% of the systems. For agriculture and energy, the ratio of monitoring is coherent with the one identified at the convention/protocol and plan/facility levels. Tourism is not mentioned by most conventions, but implementation and monitoring is taking place due to the importance of the tourism sector in the Mediterranean region. Industry, urban management and transport sub-themes included in conventions and plans are monitored by one third of the systems. However, infrastructure, rural development, irrigation, fisheries, aquaculture and employment are a low priority in the monitoring frameworks, while these economic sub-themes are of primary importance in the southern Mediterranean, especially on coastal areas where most of the population lives and continues to migrate to. The new concept of ecosystem services for which indicators are not yet fully tested and streamlined is monitored by less than 10% of systems.

In the social sector, only health, education, quality of life, domestic water supply and mobility are integrated into some monitoring systems. Similarly to the environmental tools, social water such as domestic water supply, sewage and water treatment are poorly considered by the monitoring systems. Indeed, these issues are impacting several Mediterranean wetlands and seem to be partially ignored; they may be underestimated in the process of data interpretation and analysis.

ANNEX 5

Qualitative descriptors for determining good environmental status

(referred to in Articles 3(5), 9(1), 9(3) and 24)
(*ANNEX I to the Marine Strategy Framework Directive*)

(1) Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
(2) Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems.
(3) Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
(4) All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.
(5) Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
(6) Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
(7) Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.
(8) Concentrations of contaminants are at levels not giving rise to pollution effects.
(9) Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.
(10) Properties and quantities of marine litter do not cause harm to the coastal and marine environment.
(11) Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.

To determine the characteristics of good environmental status in a marine region or subregion as provided for in Article 9(1), Member States shall consider each of the qualitative descriptors listed in this Annex in order to identify those descriptors which are to be used to determine good environmental status for that marine region or subregion.

When a Member State considers that it is not appropriate to use one or more of those descriptors, it shall provide the Commission with a justification in the framework of the notification made pursuant to Article 9(2).

ANNEX 6:

Mediterranean countries and their commitments to international agreements on biodiversity and conservation issues

Country	African Convention on the Conservation of Nature and Natural Resources	Ramsar Convention	CITES	Bonn Convention	Convention on Biological Diversity (CBD)	Barcelona Convention	Bern Convention	ACCOBAMS	African-Eurasian Waterbird Agreement	EUROBATS
Albania		29/02/1996	25/09/2003	01/09/2001	05/01/1994	30/05/1990	01/05/1999	01/10/2001	01/09/2001	22/06/2001
Algeria	24/05/1983	04/03/1984	21/02/1984	01/12/2005	14/08/1995	16/02/1981		01/12/2007	01/10/2006	
Bosnia-Herzegovina		01/03/1992	21/04/2009		26/08/2002	22/10/1994	01/03/2009			
Croatia		25/06/1991	12/06/2000	01/10/2000	07/10/1996	12/06/1992	01/11/2000	01/06/2001	01/09/2000	08/08/2000
Cyprus		11/11/2001	01/07/1975	01/11/2001	10/07/1996	19/11/1979	01/09/1988	01/05/2006	01/09/2008	
Egypt	12/04/1972	09/09/1988	04/04/1978	01/11/1983	02/06/1994	24/08/1978		01/07/2010	01/11/1999	
France		01/12/1986	09/08/1978	01/07/1990	01/07/1994	11/03/1978	01/08/1990	01/06/2004	01/12/2003	07/07/1995
Greece		21/12/1975	06/01/1993	01/10/1999	04/08/1994	03/01/1979	01/10/1983	01/06/2001	14/05/1998 *	
Israel		12/03/1997	17/03/1980	01/11/1983	07/08/1995	03/03/1978			01/11/2002	
Italy		14/04/1977	31/12/1979	01/11/1983	15/04/1994	03/02/1979	01/06/1982	01/09/2005	01/09/2006	20/10/2005
Jordan		10/05/1977	14/03/1979	01/03/2001	12/11/1993				01/11/1999	
Lebanon		16/08/1999			15/12/1994	08/11/1977		01/03/2005	01/12/2002	
Libya	15/09/1968	05/08/2000	28/04/2003	01/09/2002	12/07/2001	31/01/1979		01/09/2002	01/06/2005	
Malta		30/01/1989	16/07/1989	01/06/2001	29/12/2000	30/12/1977	01/03/1994	01/06/2001		02/03/2001
Monaco		20/12/1997	18/07/1978	01/06/1993	20/11/1992	20/09/1977	01/06/1994	01/06/2001	01/11/1999	23/07/1999
Montenegro		03/06/2006	03/06/2006	01/03/2009	03/06/2006	19/11/2007	01/02/2010	01/08/2009	01/11/2011	28/03/2011
Morocco		20/10/1980	14/01/1976	01/11/1993	21/08/1995	15/01/1980	01/08/2001	01/06/2001	01/12/2012	
Portugal		24/03/1981	11/03/1981	01/11/1983	21/12/1993		01/06/1982	01/01/2005	01/03/2004	10/01/1996
Serbia		27/04/1992	03/06/2006	01/03/2008	01/03/2002		01/05/2008			
Slovenia		25/06/1991	23/04/2000	01/02/1999	09/07/1996	16/09/1993	01/01/2000	01/12/2006	01/10/2003	05/12/2003
Spain		04/09/1982	28/08/1986	01/05/1985	21/12/1993	17/12/1976	01/09/1986	01/06/2001	01/11/1999	
Syria		05/07/1998	29/07/2003	01/06/2003	04/01/1996	26/12/1978		01/06/2002	01/08/2003	
Tunisia	04/02/1977	24/03/1981	01/07/1975	01/06/1987	15/07/1993	30/07/1977	01/05/1996	01/04/2002	01/07/2005	
Turkey		13/11/1994	22/12/1996		14/02/1997	06/04/1981				

day/month/year: Date the agreement entered into force or in which the country took party; *= Date of Signing, agreement not yet entered into force in this country

Reporting requirements under International and Regional Agreements of particular relevance for the Mediterranean region

Agreement	Reporting period	Reports available online at	Online reporting system
ACCOBAMS	Every three years	http://www.accobams.org/index.php?option=com_content&view=article&id=1056&Itemid=86	Yes
AEWA	For each ordinary session of the MOP	http://www.unep-aewa.org/meetings/en/mop/mop5_docs/mop5_nreporting.htm	
Barcelona Convention	Every two years. Separate reports for the Convention and for each of its Protocols		Yes
Bern Convention	- Every two years for the granted exceptions - Every four Years for the general reports - National reports submitted to Groups of Experts Reports submitted by Parties and observers on the follow-up of Recommendations		
Bonn Convention	For the last COP reports were requested 10 months before the meeting	http://www.cms.int/documents/national_reports/index_by_cop.htm	
CITES	- Annual reports on CITES trade - Biennial report on legislative, regulatory and administrative measures taken to enforce the Convention.	information on annual and biennial reports can be found in reports prepared for meetings of the Conference of the Parties to CITES (e.g. documents CoP12 Doc. 22.1, CoP13 Doc. 18 and CoP14 Doc. 29) and the Standing Committee	
Convention on Biological Diversity (CBD)	For the national reports on the implementation of the Convention, the reporting period is decided by the COP. Under the CBD, Thematic reports are submitted by Contracting Parties concerning the following themes: Alien Species Benefit-sharing Forest Ecosystems, Forest Biological Diversity Global Taxonomy Initiative Implementation of Programme of Work Mountain Ecosystems Protected Areas Transfer of Technology and Technology Cooperation	http://www.cbd.int/reports/search/	
EUROBATS	For each ordinary meeting of Parties, the report should be submitted 90 days before the opening of the ordinary meeting.	http://www.eurobats.org/documents/national_reports.htm	
Ramsar Convention	National reports should be submitted six months before each Meeting of the Parties (MOP)	http://www.ramsar.org/cda/fr/ramsar-documents-natl-rpts/main/ramsar/1-31-121_4000_1__	