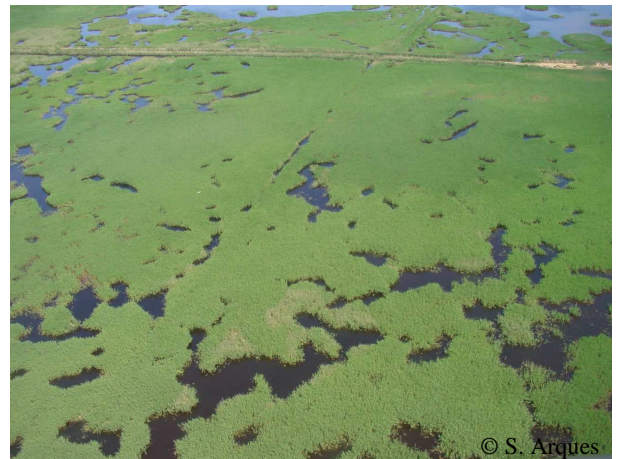
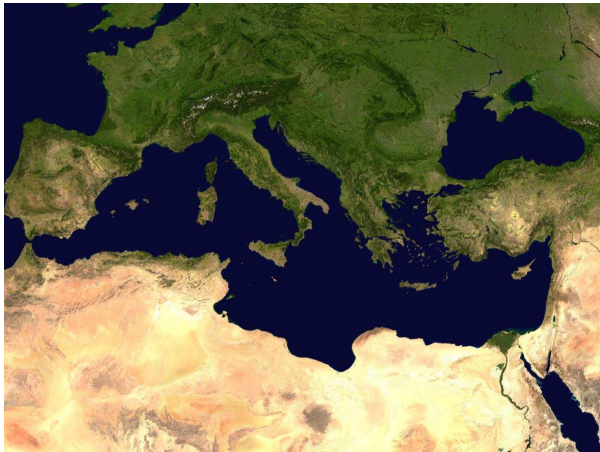


***INDICATORS FOR AN OBSERVATORY OF
MEDITERRANEAN WETLANDS***

***A review of the existing sets of indicators developed in the
main conventions and programs dedicated to biodiversity,
wetlands or sustainable development***



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Contents

Introduction	5
1. The indicators	7
1.1. Definition of an indicator	7
1.2. Contradictory qualities of an indicator: a trade-off guided by the needs of the users	8
1.3. Indicators as tools for communication	9
1.3.1. The “communication” gap between ecological scientists and policy makers	9
1.3.2. From single indicators to composite indicators	10
1.3.3. Necessity of a coherent set of indicators	12
1.3.4. Necessity of explicit baselines	14
1.3.5. Use of direct indicators of biodiversity	15
1.3.6. Importance of the presentation of the results	15
1.4. Review of the criteria of choice of the indicators	15
1.4.1. Criteria of choice from three major reviewed programs	15
1.4.2. Perspectives from the Rubicode project	17
2. Brief review of the major conventions and programs dedicated to biodiversity, wetlands or sustainable development	19
2.1. Short presentation of the reviewed programs	19
2.1.1. Programs dedicated to biodiversity	19
2.1.2. Programs related to wetlands	23
2.1.3. Environmental side of the Sustainable Development and Integrated Coastal Zone Management programs	26
2.2. The main characteristics the reviewed programs	34
2.3. The slow rise of concern about biodiversity	38
2.4. The mainstream of the Convention on the Biological Diversity	39
3. Comparison of the main topics tackled by the programs	40
3.1. Programs related to biodiversity and wetlands	40
3.2. Programs related to sustainable development	41
3.3. Links between the topics tackled by these two groups of programs	44
4. Comparison of the sets of indicators selected by the reviewed programs	46
4.1. Links between topics and indicators in the reviewed programs	46
4.2. Correspondence of the indicators used in the programs dedicated to biodiversity and wetlands	48
5. Biodiversity indicators from a scientific perspective	53
5.1. Scientific commitments to define indicators of biodiversity	53
5.2. Rising issues	54
5.2.1. Ecosystem services	54
5.2.2. Indicators to measure interactions between species	55
5.2.3. Earth Observation: a tool to use more widely?	56
5.2.4. Citizen sciences or observatories as means of actions	56
Conclusion	57
References	62

<i>Acronyms</i>	66
<i>Annex 1: Indicators found in the 23 reviewed programs classified by general theme of sustainable development</i>	67
<i>Annex 2: Indicators found in the 23 reviewed programs classified by CBD headline indicators</i>	80
<i>Annex 3: Example of a technical description of the indicators proposed for the Observatory of Mediterranean Wetlands</i>	88

Introduction

Mediterranean wetlands are regions of great biodiversity, and the source of a number of ecosystem services that sustain the livelihoods of millions of people. But they are also under the threat of dramatic anthropogenic pressures. As well as being looked on as a resource, they have long been considered hostile to people and over the centuries they have been drained and filled in. The area occupied by wetlands has decreased steadily. Currently, the majority of Mediterranean wetlands are endangered by hydraulic works, agriculture extension, urbanization, pollution and climatic change. It is roughly estimated that over the course of the last fifty years or so, half the wetlands have been destroyed. Only now with the realisation of how much of their natural functioning has been lost has the full extent of the economic, social and environmental importance of Mediterranean wetlands begun to be appreciated.

Beside a favourable policy, legal and strategic implementation framework, their conservation requires a good knowledge on their location, extent and conservation status along with a good communication strategy towards decision-makers and general public. A clear understanding of the threats and the human society's responses implemented to reduce them is needed, as well as an analysis of the links between socio-economics and this natural environment. However, currently, there is no general overview about the status and trends of wetland resources and biodiversity in the Mediterranean region and their implication for human well-being. Data exist for many countries, regions and individual sites or taxonomic groups, but often they are not easily accessible and they are under different formats.

To answer these gaps, the aims of the Observatory of Mediterranean Wetlands (OMW) are to:

- To assess and share knowledge on the conservation status and trends of Mediterranean wetlands;
- To raise awareness among users and to help decision-making towards wetland conservation and sustainable management and use;
- To assess the status and trends of ecological functions, values and services of Mediterranean wetlands in the context of sustainable development.

In order to reach these objectives, it is necessary to design a monitoring and assessment framework, including priority themes and associated priority set of indicators to measure status and trends by objective and theme. The aim of this study is to present a review of the existing sets of indicators of available monitoring and assessment systems dealing with environmental issues. This initial step will allow the Observatory to identify potential wetlands-relevant indicators, shared and recognized by several international and regional conventions and programs and interesting for a wide range of users. Their inclusion, development and harmonization in the context of Mediterranean wetlands will speed up the monitoring performance of the Observatory and ultimately the impact towards its objectives.

The review process has taken into account 23 conventions, legal instruments or programs¹. Three broad categories have been defined, depending on the main subject matter of the programs:

- Biodiversity assessment,
- Habitat conservation (here, wetlands),
- Sustainable Development (SD) and Integrated Coastal Zone Management (ICZM).

As far as geographical scale is concerned, four levels are distinguished in this study: global, Mediterranean, European and national. The national scale is based on the French example. The local scale was not included in the analysis because of the multiplicity of local programs of monitoring and evaluation on environment and SD, and sometimes their lack of linkages with global programs, as proven by already performed review on biodiversity indicators (Levrel, 2007), especially for wetlands (Feld et al., 2007).

¹ Convention on the Biological Diversity, Streaming European 2010 Biodiversity Indicators, French National Strategy for Biodiversity, RAMSAR outcome oriented indicators, European Water Framework Directive, French National Observatory of Wetlands, OECD Key environmental indicators, Millennium Development Goals, Eurostat - EU Strategy for Sustainable Development, European Environment Agency - Core set of indicators for sustainable development, EU – Integrated Coastal Zone Management, Blue Plan - Mediterranean Strategy for Sustainable Development (MSSD), Blue Plan – Coastline complement to MSSD, French Strategy for Sustainable Development, French Littoral Observatory, French Key environmental indicators, French monitoring of the European commitments

1. The indicators

The development of a long term ecological monitoring based on selected indicators is not a new approach. Since the last ten years, either for policy assessment or ecological research needs, indicators have experienced an increasing acceptance and demand from scientists and policy makers (Mace & Baillie, 2007). Such process is illustrated by the great amount of programs and indicator sets developed by relevant international policy bodies: the Convention on Biological Diversity (CBD) (CBD, 2002; CBD, 2003; CBD, 2004) or the environmental core set of indicators of the Organisation for Economic Co-operation and Development (OECD) (OECD, 2007) for instance. There are also numerous long term regional ecological monitoring strategies illustrating the urgent demand from the society and policy makers to measure nature conservation and socio-economic development issues. The existence of specialised scientific journals, like *Ecological Indicators* and *EcoHealth*, as well as the development of important research programs on indicators like Rubicode, Deduce (Développement durable des Côtes Européennes) or ALTER-Net (A Long-Term Biodiversity, Ecosystem and Awareness Research Network), illustrate this same fact in the scientific community.

1.1. Definition of an indicator

Indicators are a polemic subject and numerous definitions can be found (see ten Brink, 2006 for a short review). An indicator is a tool, built with a precise methodology that gives a synthetic piece of information on a precise object by a signal in order to be able to have a representation of a phenomenon, to act on it and to communicate about it (adapted from Level, 2007).

In the context of conservation and development, an indicator is a mean to measure status and trends of a situation. The value of indicator is calculated based on appropriate data to be collected at a given frequency.

We can distinguish quantitative and qualitative indicators. Quantitative indicators are quantifiable and verifiable, ranging from statistical data to mathematical calculation of index, ratio and composite indicator. Qualitative indicators are more subjective, and measure status and trends in perception, attitude and behaviour. Qualitative indicators often participate to explain values of quantitative indicators.

Along project and programme cycle management, we also distinguish input, output, outcome and impact indicators. While input – outputs indicators tends to measure the project and program performance, outcome and impact indicators tends to measure to what extent the performance has help to reach the purpose and the objective of the project or programme.

1.2. Contradictory qualities of an indicator: a trade-off guided by the needs of the users

They are designed to communicate simple and concrete pieces of information on ecosystem health, for example through the synthesis of a number of different variables (human pressures, species ecological guilds, climate characteristics, etc.). Accordingly they are confronted to the duality between interpretability and simplicity of the message on one hand and reliability and precision of the information given on the other hand.

Concretely, indicators are now mainly used as:

- managements tools for planning (monitoring/evaluation);
- communication tools.

In this purposes, as stated by Rey-Valette et al (2008), “a good indicator is a used indicator”. To disentangle their required characteristics and construct useful tools, the “Committee on statistical programs”, including the general directors of the national institutes for statistics of the European Union (EU) countries and the Eurostat’s director, noted 6 criteria of quality (Desrosière, 2003). These criteria are:

- *The pertinence* which implies appropriateness between the tool and the needs of the user;
- *The precision* which needs nearness between the estimated value and the real value;
- *The topicality and the punctuality* which refer to the decisional agenda;
- *The accessibility* to the statistical data and the clarity of their form for the decisional body;
- *The comparability* of the data;
- *The coherence* which is relative to the methodology of data standardisation and to their interpretations.

Tensions and deficiencies result from these various and distinct criteria. They are intrinsic to any indicator and may be described as follow (Levrel, 2007):

- *Scale of application of the indicator.* The reality of an ecological phenomenon is not the same at the local or at the global scale, as well as in the short or in the long term. Thus, an indicator built for a local and short term program will hardly be adapted to a global and long term monitoring. But, in the same time, an indicator always refers to a universal dimension to allow comparing various situations.
- *Double dimension of the indicator: political and scientific.* On one hand, the political dimension implies a great readability for a large public which means a simple indicator delivering simple information. On the other hand, the scientific dimension transforms an indicator into a tool of proof which implies great care in its interpretation. This limits its simplicity and efficiency for communication. That’s why, most of the time, the scientific weaknesses of the indicators are rapidly forgotten.
- *Double nature of the indicator: conventional (or subjective) and real (or objective).* The indicators are often criticized by scientists because they are partial and biased tools of communication. But, in the same time, they are intermediate tools that allow the discussion between different groups of the society and promote public

debate. To discredit them would lead to lose this possibility, urgently needed in environment.

In order to construct or to chose indicators, arbitration has to be done between these trades-offs. One of the main principles is certainly the *coherence between the function, the form of the tool and its methodology* (Levrel, 2007). To reach this goal, it is necessary to start with a clear definition of the expected functions, which means, to start a work on the final users. Before choosing a set of indicators, it is thus necessary to identify:

- *the potential users;*
- *their needs and expectancies*

Thus, a survey of who are the users, what are their needs and expectation is, most of the time, a necessary step to start a monitoring and assessment system and to identify recognized and relevant set of indicators. When omitted, experiences show that several monitoring systems remains an intellectual, time consuming and expensive exercise with no or low value addition towards objectives. This focus on users also allows ensuring the policy relevance of the indicators: which policy should be taken into accounts and how indicators can be useful to guide decision making (objects, deadlines, forms)?

1.3. Indicators as tools for communication

The OMW is mainly composed of conservationist organizations and one of its aims is to help decision making including influencing public policies. At this level of users, it is particularly important to have an adapted and attractive communication strategy and tools to deliver information, diagnosis and analysis of the indicators. The communication strategy should also be adapted to the other category of users, taking into account the decentralized process, the issue of governance and the different interests of the users.

1.3.1. The “communication” gap between ecological scientists and policy makers

Indeed, there is often a communication gap between scientists and policymakers. They are in different world, governed by different rules as roughly described in table 1. It is certain that biodiversity and ecosystem functioning are complex and hard to describe in a simple manner. This should not be an excuse not to develop and implement indicators as done in socio-economic context (Balmford, 2005). Most of all, ecologists and policymakers have no evident language in common, contrarily to socio-economists and policymakers (ten Brink, 2006). For example, in ecological science, basic concepts like ecosystems or species are still discussed between scientists, impeding further communication and monitoring. Moreover, scientists from different environmental disciplines are still not always used to work together as a team, to share data and information for a common conservation vision and objective, and sometimes do not use the same terminologies. With scientists who do not always speak with a unique voice, the consequence is that a not clear, easily understandable message reaches the policymakers and the public.

Table 1: Policy and ecological sciences worlds (from ten Brink, 2006)

Policy makers	Ecological scientists
quick headlines simplifications > 30% accuracy OK	slow and steady precise differentiated approaches > 95% accuracy OK

This lack of clear information is often translated into a lack of anticipative and evidence-based policy in natural resource management as well as a lack of assessment of the ecological consequences of the sector-based policies. As a result and in addition to the socio-economic indicator set, a small set of ecological indicators, useful for decision-making, is needed for policy makers, with regular up-dating and easily comprehensible messages. In order to constitute a coherent set of indicators and reach this communication goal, some points have to be underlined.

1.3.2. From single indicators to composite indicators

Biodiversity consists of an infinite and inter-related numbers of components. Policy makers need a rapid overview of the main tendencies. Composite indicators, as those used by some socio-economic conventions and institutions are especially useful for this purpose. Composite indicators are translated into a value easy to read and to compare from year to year, are gathering several raw and intermediary indicators, and summarize the main dimensions of the biodiversity.

Indicators may contain simple or highly aggregated information. It is in fact a form of data compression. Figure 1 shows the information pyramid starting with *raw field data*, which can be processed into *statistics* (aggregation of the data over space and time), *single indicators* (statistics referred to a reference value) and finally *composite indicators* (aggregation of single indicators). The level of aggregation depends on the users. Site managers are usually interested in statistics and single-indicators, while politicians at the national level are mostly interested in composite indicators.

As the same raw data allow calculating different single indicators, and identically, a set of single indicators allow the construction of numerous composite indicators. A recommendation of the expert group of the CBD (2003) was for countries “to have a flexible indicator framework to cope with a wide range of –changing - questions for different reporting functions and end-users. ... A carefully chosen set of single indicators on (i) ecosystem quantity, (ii) ecosystem quality; and (iii) pressures (incl. a few uses) may generate such a flexible indicator framework”, as shown in figure 2.

Figure 1: Information pyramid, from raw field data to composite indicators. Level use varies by the audience (from CBD, 2003).

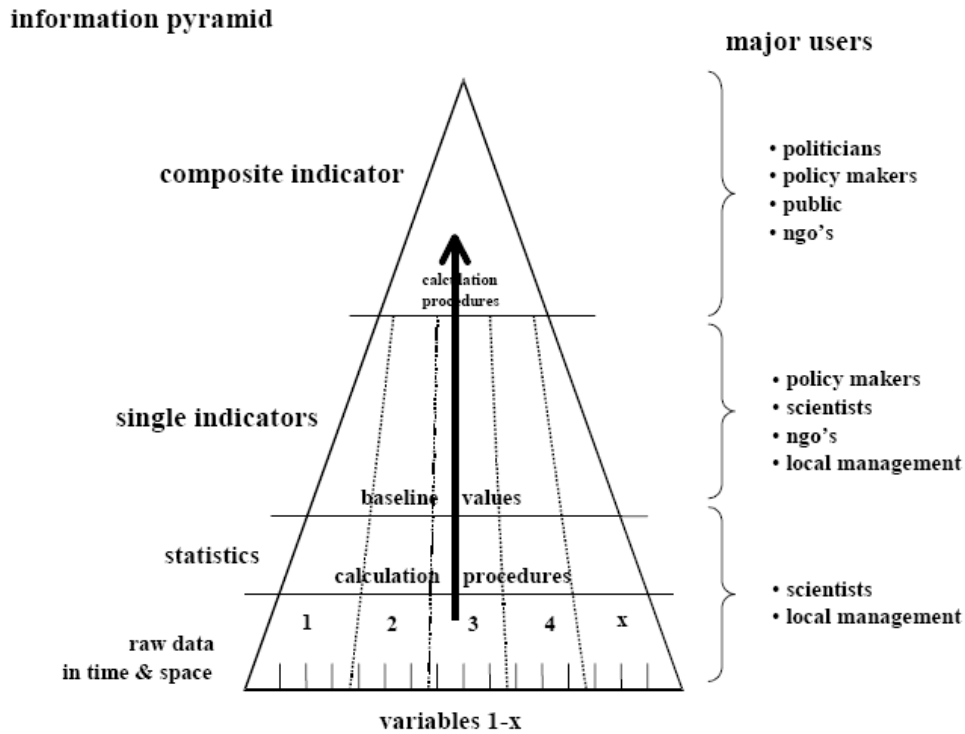
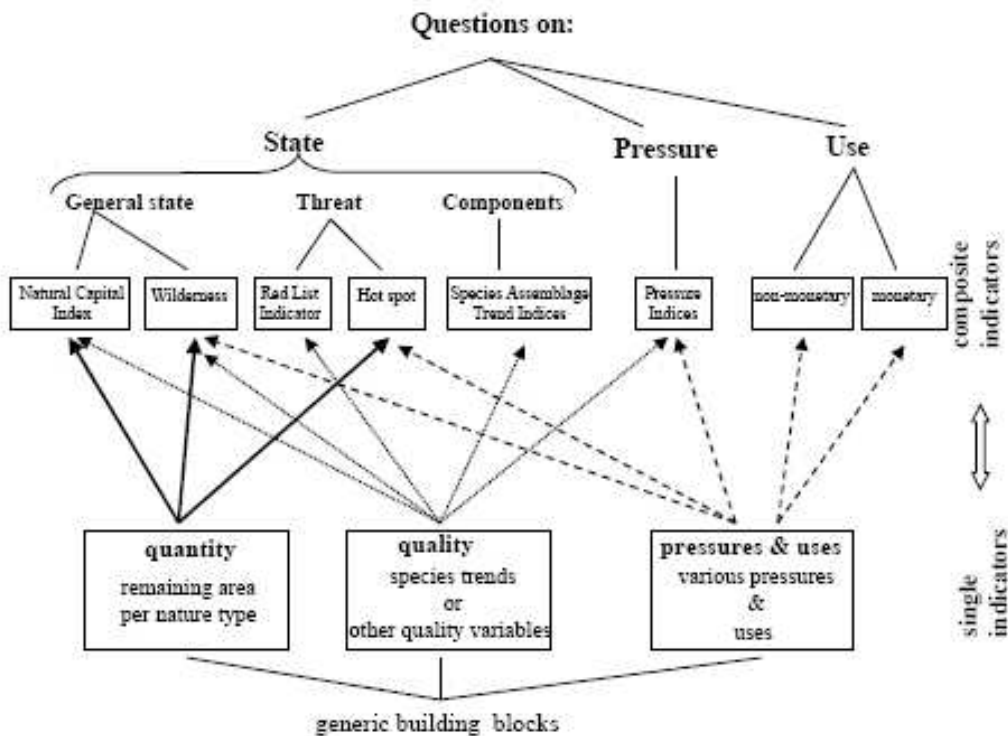


Figure 2: Single indicators on ecosystem quantity, ecosystem quality and pressures, including a few uses (below), provide flexible building blocks for numerous composite indicators relevant to key questions on state, pressure, use and effectiveness of response. Response and use have been left out for clarity (from CBD, 2003).



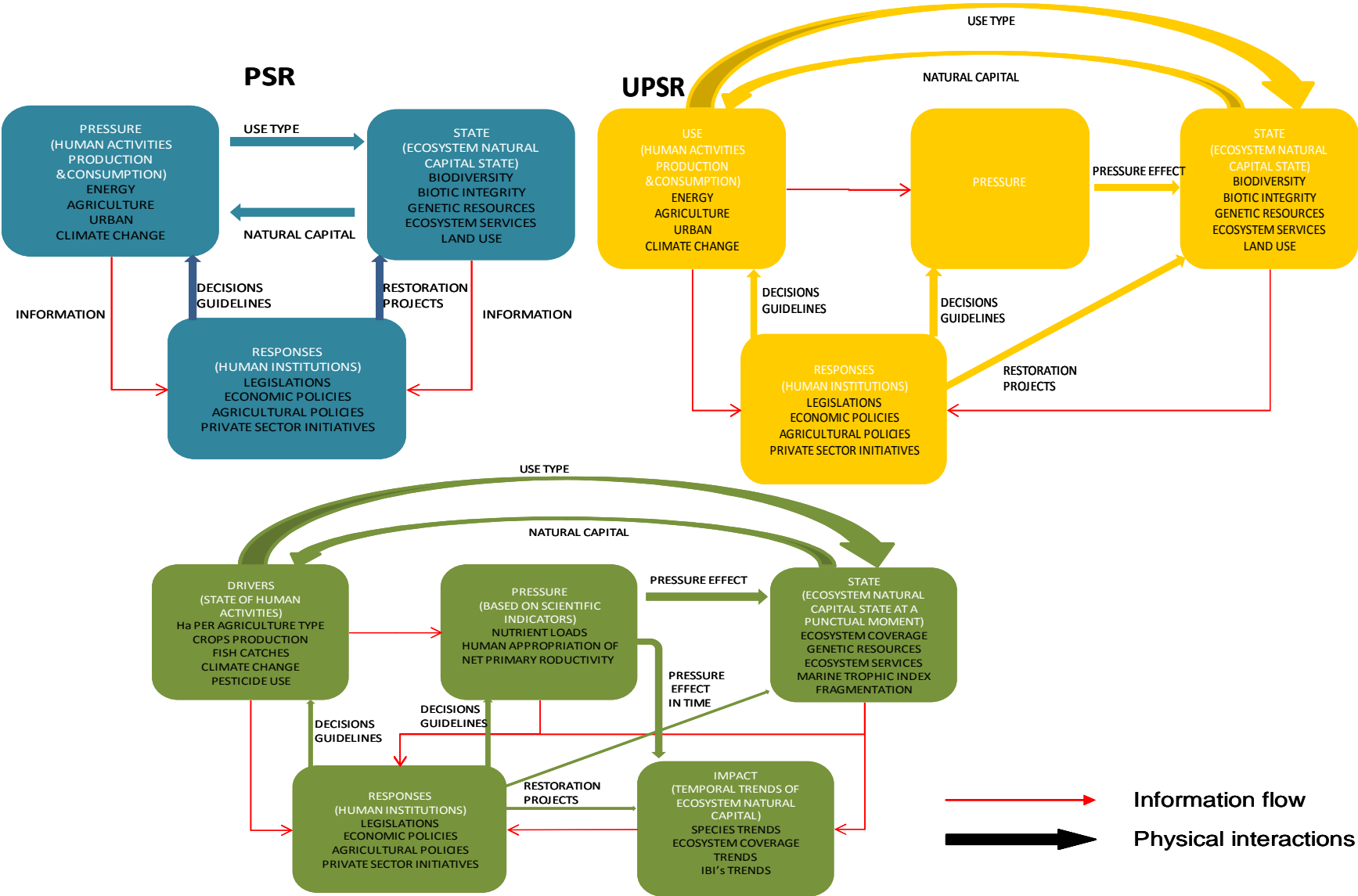
1.3.3. Necessity of a coherent set of indicators

Biodiversity is too complex to be described and assessed by one indicator, even a composite one. It has different levels (from gene to ecosystem), different scales (from local to global), many components and complex interactions between them and with human activities. They are mostly unknown or at least non-understood. Moreover there are few monitoring and the data are fragmented and scarce. Despite all, policy makers require information now (Balmford, 2005).

To provide an overview of the biodiversity trends, a set of indicators is thus necessary. But it should not be a long list of figures without clear relationships and thus, significance and communicability. The use of an indicator model is necessary to choose a “coherent framework of complementary indicators, providing maximum information with as few as possible indicators and monitoring effort” (ten Brink, 2006). Three main models of indicators are widely used in large-scale monitoring programs for environment and sustainable development.

The first widely applied model on indicators has been the Pressure-State-Response (PSR) model, developed by the OECD (OECD, 1993), with an emphasis on general environmental and economic policy indicators (e.g. carbon and sulphur oxides emissions, volume of oil consumed by the industrial sector, etc.). In the last 10 years, two more models have been developed: the Driver-Pressure-State-Impact-Response (DPSIR) and the Use-Pressure-State-Response (UPSR). The former has been developed by the European Environmental Agency (EEA) (EEA, 1999), while the latter has been developed by the CBD building from the PSR model (CBD, 2003) (see figure 3).

Figure 3: The three indicator models (adapted from: OECD, 1993; CBD, 2003; EEA, 1999 by Ezzine de Blas, 2008).



The PSR model has the most straightforward representation:

- The *pressure* compartment contains all human activities in terms of production, consumption and demand (crops production, water consumption, energy demand, herbicides inputs etc.) that impact directly the state of the ecosystem.
- The ecosystem *state* is measured in a number of variables (pH, ecosystem coverage, habitat size etc.) that can be also expressed in temporal trends (species trends, nutrient loads trends, etc.).
- Finally, the *response* compartment contains the variables that capture human institutions actions designed to restore the state of the system (through policies, laws, private sector incentives, etc.).

The DPSIR model builds from the PSR by introducing a *driver* compartment and an *impact* compartment:

- First, the *drivers* compartment captures human activities in terms of quantity and intensity: energy consumption, ha of crops, fish catches, etc. In the DPSIR model, the *drivers* contain part of the pressure variables of the PSR model;
- Second, the *pressure* variables of the DPSIR model are more scientific and ecosystem oriented: they measure the pressure related to an ecosystem function.
- Third, the difference between the *state* and the *impact* compartments is “just a matter of time”: *state* variables are information of the ecosystem at a particular moment in time, while *impact* variables show temporal trends. Such trends need to be complemented with threshold ceilings to extract its full explanatory power;
- Last, fluxes of information are more structured: the model is more “fine-tuned” though more difficult to understand than the PSR model. The DPSIR model has indeed been used to model open complex ecological systems like the Pô catchment basin (Pirrone et al., 2005).

In the UPSR model, track of a more detailed description of the *use* compartment (similar to the *driver* compartment in the DPSIR model) and the similar features with the PSR model makes the UPSR confusing and not relevant. Indeed, scientific publications applying such model have not been identified.

As said before, the aims of the OMW, its final users and their expectancies should be first determined. Based on this, a model of indicators should be built in order to ensure a coherent framework to the set of indicators. Especially, links to current policies should be thought upstream.

1.3.4. Necessity of explicit baselines

What is the significance of a decrease, in a population of cranes, from 100.000 to 75.000 individuals? Even if neglected, reference values are needed to build meaningful indicators (ten Brink, 2006). These baselines can be for instance natural population size, minimum viable population... or policy targets. They need to be explicitly defined. It allows immediate interpretation of amelioration or worsening as well as easy comparison between scales and regions as long as the baselines are the same.

1.3.5. Use of direct indicators of biodiversity

Direct indicators are mostly taxonomic indicators focusing on the monitoring of selected taxa. They give direct information about the state of the biodiversity. On the contrary, indirect indicators focus on landscape structure (hedgerows) or components (deadwood) that give information about the state of the biodiversity. But, many uncertainties exist about the relationships between direct and indirect indicators (Levrel, 2007). A classical example is the use of the surface of protected area as an indicator of biodiversity. But there is no direct link between populations' health and the surface of protected area. The surface of protected area is even inversely correlated to the remaining biodiversity (ten Brink, 2006). So, the use of direct indicators should be chosen whenever possible.

1.3.6. Importance of the presentation of the results

This is an important point to reach the goal of communication. Special care is required for the form and the frequency of reporting. Human ability to digest and fully understand different indicators is limited to 5-10 (ten Brink, 2006). It is thus important to present concise report. The figures and the graphs are central but are not always meaningful to a non-specialist as policy makers. Thus, the report should combine the analysis of each indicator as well as a global analysis, bringing out successes and failures of environmental and other policies in the wider context of the problem (EEA, 2003).

Finally, delay is necessary to ensure the dissemination of the report at the good time and places.

1.4. Review of the criteria of choice of the indicators

1.4.1. Criteria of choice from three major reviewed programs

Three reviewed programs provided clear criteria of choice for their set of indicators. They are the CBD led by United Nations Environment Programme (UNEP), the Streaming European 2010 Biodiversity Indicators program (SEBI) led by the EEA and the Core Set of Indicators (CSI) for SD from the EEA too. The criteria of choice for the indicators are very similar between the three (Table 2).

The criteria are, for individual indicators:

1. Policy relevant and meaningful: Indicators should send a clear message and provide information at a level appropriate for policy and management decision-making by assessing changes in the status of biodiversity (or pressures, responses, use or capacity), related to baselines and agreed policy targets if possible.
2. Biodiversity relevant: Indicators should address key properties of biodiversity or related issues as pressures, state, impacts and responses.
3. Progress towards 2010: Indicators should show clear progress towards the 2010 target.
4. Well founded methodology: The methodology should be clear, well defined and relatively simple. Indicators should be measurable in an accurate and affordable way,

and constitute part of a sustainable monitoring system. Data should be collected using standard methods with known accuracy and precision, using determinable baselines and targets for the assessment of improvements and declines.

5. Acceptance and intelligibility: The power of an indicator depends on its broad acceptance. Involvement of policy-makers as well as major stakeholders and experts in the development of an indicator is crucial.
6. Routinely collected data: Indicators must be based on routinely collected, clearly defined, verifiable and scientifically acceptable data.
7. Cause-effect relationship: Information on cause-effect relationships should be achievable and quantifiable in order to link pressures, state and response indicators. These relationship models allow scenario analysis and represent the basis of the ecosystem approach.
8. Spatial coverage: Indicators should ideally be pan-European and include adjacent marine areas, if and where appropriate.
9. Temporal trend: Indicators should show temporal trends.
10. Country comparison: As far as possible, it should be possible to make valid comparisons between countries using the indicators selected.
11. Sensitivity towards change: Indicators should show trends and, where possible, permit distinction between human-induced and natural changes. Indicators should thus be able to detect changes in systems in timeframes and on scales that are relevant to the decisions, but also be robust enough to measure errors that do not affect interpretation.

On the whole set, the criteria are:

12. Representative: The set of indicators provides a representative picture of the DPSIR chain.
13. Small in number: The smaller the total number of indicators, the easier it is to communicate cost-effectively to policy-makers and the public.
14. Aggregation and flexibility: Aggregation should be facilitated on a range of scales.

Table 2: Comparison of the criteria of choices for indicators.

	EEA - SEBI	EEA - CSI	UNEP - CBD
On individual indicator			
1.	Policy relevant and meaningful	Policy relevance / EU priority policy issues	Policy relevant and meaningful
2.	<i>Biodiversity relevance</i>		<i>Biodiversity relevance</i>
3.	<i>Progress towards 2010 target</i>	<i>Progress towards targets</i>	
4.	Well founded methodology	Methodologically well founded	Scientifically sound
5.	Acceptance and intelligibility	Understandability of indicators	Broad acceptance
6.	Routinely collected data	Available and routinely collected data	Affordable monitoring
7.	<i>Cause-effect relationship</i>		<i>Affordable monitoring</i>
8.	<i>Spatial coverage</i>	<i>Spatial coverage</i>	
9.	<i>Temporal trend</i>	<i>Temporal coverage</i>	
10.	<i>Country comparison</i>	<i>National scale and representativeness of data</i>	
11.	<i>Sensitivity towards change</i>		<i>Sensitive</i>

On the set as a whole			
12.	Representative	Representative	Representative
13.	Small in number	Small in number	Small in number
14.	Aggregation and flexibility	Aggregation and flexibility	Aggregation and flexibility

The three criteria, found in the SEBI and the CBD programs and that have no equivalent into the CSI list, are: biodiversity relevance, cause-effect relationship and sensitivity towards global changes. They are deeply related to CBD and SEBI's topics: 2010 targets and human impacts on biodiversity. Oppositely, 4 criteria are not found in the CBD list: progress towards target, spatial and temporal coverage and country comparisons. It reveals the differences between concrete monitoring programs and the guidelines of a convention to be implemented by other programs.

1.4.2. Perspectives from the Rubicode project

A workshop of the Rubicode project was devoted to “assessing and monitoring ecosystems – concepts, policies and indicators to discuss the results of an extensive review of existing programs, focusing especially on European commitments. A work session was proposed on the suitability criteria for a good indicator. The outputs (table 3) contain a list of suitability criteria divided into 5 major types: relevance, accepted methodology, sensitivity, data availability and practicability. Interestingly, most of the criteria underlined by the Rubicode project are taken into account in the SEBI report (table 3).

Table 3: Criteria of choice for biodiversity indicators as provided in the Rubicode project and comparison with the ones of the SEBI program.

Major suitability criteria	Sub-criteria	Correspondence with SEBI (table xx)
Relevance to the purpose		
	Representative of total biodiversity	1.
	Indicative for anthropogenic stress	7.
	Indicative for risk	7.
	Representative of a specific service	
	Relevance to policies	2; 3.
	Relevance within a proposed indicator set	12.
Accepted methodology		
	Established standardized methods for measuring and validation should be available	4.
	Effects of temporal or geographical differences on sampling should be known	4.
Sensitivity		
	Sensitivity to changes (able to provide early warning or early sign of recovery)	11.
	Show a well-defined and unambiguous response to (different intensities of) stressors; stressor specific if possible	7; 11.
	Able to differentiate between natural cycles and trends and those produced by anthropogenic stress factor	7; 11.
	Able of providing and forecasting the response in a predictable way	7.

Data availability		
	Taxonomically well-known, taxonomic expertise readily available	4.
	Baseline data on biology (e.g. traits) and ecology available, e.g. related to temporal and spatial variability	6.
	Historical/reference data available	9.
	For indicators related to drivers and conditions, information about links with biodiversity need to be clear	7.
	Good data availability across the relevant spatial and temporal scales	6; 8; 9.
Practicability		
	Cost (time, funds, equipment personnel) in relation to relevance, cost to establish reference, and to regularly update/assess	4.
	Ease of use, e.g. easy to sample, sort and identify; easy storage; easy to evaluate	4.
	Methodology not limited by small number of experts/ equipment	5.
	Capable of scaling: possible to be used through different spatial scales	10.
	Easy to communicate to the public	13.

The two scales (individual indicators and indicators set as a whole) are found. It is worth noting that scientists insist on three specific points: well founded methodology (4), cause-effect relationship (7) and sensitivity towards change (11). These two last ones particularly allow interpreting the observed indicator's trends and the scenario's building.

From this review, it appears that the criteria of choice of indicators described in the SEBI are valuable for the OMW if refocused on wetlands as a whole rather than on biodiversity. Those relative to the coherence of the set of indicators should not be forgotten.

2. Brief review of the major conventions and programs dedicated to biodiversity, wetlands or sustainable development

2.1. Short presentation of the reviewed programs

The 1972 United Nations (UN) conference on the Environment held in Stockholm in 1972, mobilised governments and public opinion and created the UNEP.

2.1.1. Programs dedicated to biodiversity

The concept of biodiversity was used for the first time in 1985 by W.G. Rosen and appeared in a publication in 1988 by E.O. Wilson. Its “official use” began in 1992 during the preparatory workshops of the Conference of Rio (Brazil), organised by the UNEP, less than 20 years ago. This new concept has become universally admitted and now replaces to some extent, the concept of “nature, in a scientific but also societal context. In front of its rapid decline, mainly driven by human pressures, conservation programs have arisen.

2.1.1.1. Global scale

- Convention on the Biological Diversity

The Convention on the Biological Diversity (CBD) was adopted in 1992 at the Conference of Rio, under the aegis of UNEP. In 2009, 191 parties, countries and EU, have signed it.

In April 2002, the Parties to the Convention met at the Conference of Johannesburg at the 6th Conference of the Parties (COP 6). At this conference, the first dead-line was set up. The governments committed themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth. This is the '2010 biodiversity target'.

In the same time, the necessity to evaluate the efforts done by the Parties raised. In this purpose, in 2004, at Kuaka Lumpur, the COP 7 of the CBD adopted a framework, which included the use of a range of indicators (CBD, 2004) on the report of an expert group specifically formed for this purpose, the Ad Hoc Technical Expert Group. In 2006, the COP 8 (CBD, 2006) further elaborated this framework and acknowledged the establishment of the 2010 Biodiversity Indicators Partnership (2010 BIP). This partnership brings together a host of international organizations working on indicator development, to provide the available information on biodiversity trends to the global community and assess progress towards the CBD 2010 target. The three main objectives of the 2010 BIP are:

- To generate information on biodiversity trends which is useful to decision makers;
- To ensure improved global biodiversity indicators are implemented and available;
- To establish links between biodiversity initiatives at the regional and national levels to enable capacity building and improve the delivery of the biodiversity indicators.

It is coordinated by the UNEP World Conservation Monitoring Centre (UNEP-WCMC). It is compounded of:

- Key indicators partners (25 organizations), to develop and implement the biodiversity indicators, enabling progress toward the 2010 target to be measured and communicated;
- Steering Committee (8), to advise on the general direction of the 2010 BIP project, and to review and provide advice on key outputs. It is comprised of individuals and representatives of organisations with a major interest and long history of involvement with the Partnership.
- Associate Indicator Partners (9), to assist in the development and implementation of the CBD suite of biodiversity indicators relating to the 2010 target, and/or to provide technical support to the Partnership.
- Affiliate Partners (3), to establish links between biodiversity initiatives at the national and regional level

Even if a first, preliminary set of indicators was adopted in 2004, it is nevertheless still in construction for:

- Implementation of already existing and tested indicators,
- Development of new indicators,
- Adaptation at different scales,
- Data availability.

<http://www.cbd.int/>

<http://www.twentyten.net/>

- Convention on Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), also known as the Bonn Convention, aims to conserve terrestrial, marine and avian migratory species throughout their range. It was signed in Bonn, Germany, in 1979. It is an intergovernmental treaty, concluded under the aegis of the UNEP, concerned with the conservation of wildlife and habitats on a global scale. It has included 110 Parties in 2008. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species.

This is not a monitoring program and no list of indicators is used to assess the impact of the CMS. Currently, there is a policy of ‘rapprochement’ with others major international programs and conventions (CBD, CITES, Ramsar...) to make sure that the CMS’s objectives are taken into account. In particular, CMS is one of the Associate Indicator Partner of the 2010 BIP (CBD).

<http://www.cms.int/>

- Convention on International Trade in Endangered Species

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. It was drafted as a result of a resolution adopted in 1963 at a meeting of members of the International World Conservation Union (IUCN). The text of the Convention finally entered in force in 1975. There are now 175 Parties.

Today, it accords varying degrees of protection to more than 30,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs. The effort to regulate their trade requires international cooperation to safeguard certain species from over-exploitation. This is not a monitoring program and no list of indicators is used to assess the impact of the CITES.

<http://www.cites.org/>

2.1.1.2. *European scale*

- Streaming European 2010 Biodiversity Indicators

EU signed the CBD in 1993. It was present at the Conference of Johannesburg in 2002 when the 2010 target was accepted and the necessity to develop biodiversity indicators to assess the progress towards the 2010 target was agreed. The EU even went a step further as, in 2003, pan-European environment ministers agreed to halt the loss of biodiversity by 2010 in the Kiev Resolution on Biodiversity.

Accordingly EU launched a process on biodiversity indicators in 2002-2004. An important event was the Conference of Malahide (Ireland). It took place in May 2004, in presence of the Environment and Agriculture General Directions of each country. This was in fact the first European conference on biodiversity. One of its main recommendations was to “develop, test and evaluate indicators, and harmonise habitat and landscape classifications, to deliver policy-relevant information on the status and trends of biodiversity, the drivers of biodiversity change and the success of policies design to halt the loss of biodiversity by 2010, and progress towards targets of the EC Biodiversity Strategy” (EC, 2004). Politically, this conference had a major impact to raise awareness about biodiversity. This time, the necessity to set up a list of biodiversity indicators was recognized a clear objective.

In the same time, the EEA was created in 1994. It has been an important actor in the process. Its task is to provide sound, independent information on the environment. It is a major information source for policy-makers and also the general public. Currently, the EEA has 32 member countries. It is helped by 5 thematic centres in its mission to collect, analyse, assess and synthesise the information to support the implementation of European and national policies for the environment and the sustainable development. They are:

- European Topic Centre on Air and Climate Change (ETC-ACC),
- European Thematic Centre on Biological Diversity (ETC-BD),
- European Topic Centre Land on Use and Spatial Information (ETC-LUSI),

- European Topic Centre on Sustainable Consumption and Production (ETC-SCP),
- European Topic Centre on Water (ETC-W).

Since its creation, the EEA has worked to develop a Core Set of Indicators combining all the main themes of SD. They were perceived as unaffordable tools to communicate with EU's decision makers. A problem arose rapidly on biodiversity as there were much fewer available data than for transport or wastes. The development of biodiversity indicators and of monitoring to collect the corresponding data has thus become a priority since 1999 for the ETC-BD.

Rapidly, in front of the multiplicity of national but also numerous local programs, the necessity to harmonise all the existing programs at different scales (global, European, national, local) appeared. That was the aim of the Streaming European 2010 Biodiversity Indicators program (SEBI), launched in 2005 by the EEA. The Coordination Team and 6 Expert groups involving more than 100 experts nominated by European countries as well as Non Governmental Organisations (NGOs) started working for the compilation of a First European Set of Biodiversity Indicators for assessing the 2010 target. A list of 26 biodiversity indicators was delivered in 2007 (EEA, 2007), in accordance with the CBD objectives as well as the main European policies for biodiversity (EU Habitats and Birds Directives). Some indicators need further work to reach a clear definition or some necessary data are yet unavailable but the list is set up. This program should end up in 2012.

SEBI 2010 is one of the Affiliate Partner of the 2010 BIP, representing an official regional CBD initiative.

<http://www.eea.europa.eu/fr>

<http://www.eionet.europa.eu/topics>

<http://biodiversity-chm.eea.europa.eu/information/indicator/F1090245995>

- Convention on the Conservation of European Wildlife and Natural Habitats

The Convention on the Conservation of European Wildlife and Natural Habitats, known as the Bern Convention, is a binding international legal instrument in the field of nature conservation, which covers the whole of the natural heritage of the European continent and extends to some States of Africa. Its aims are to conserve wild flora and fauna and their natural habitats and to promote European co-operation in that field. It was adopted in Bern, Swiss, in 1979. As the CMS, it is not a monitoring program and no list of indicators is used to assess its impact.

http://www.coe.int/t/dg4/cultureheritage/conventions/bern/default_en.asp

2.1.1.3. *National scale: the French case*

- A national adaptation of the CBD: the French National Strategy on Biodiversity

Since the adoption of the 2010 Biodiversity Target, most countries have established specific national targets to fulfil their commitments. In this scope, France adopted its National Strategy on Biodiversity (NSB) in 2004. One of its first aims was to set up biodiversity indicators in order to assess the related policies. It very rapidly proposed a first list of 9 indicators in 2004. But it clearly lacks of coherence and policy-relevance. Moreover, in the context of the European policy of harmonization of the sets of environmental indicators, French government has to harmonize the NSB' set with the SEBI's one. Experts are currently working on it in order to revise it. There is thus no relevant set of indicators in use for the assessment of the CBD's implementation in France.

<http://www.ecologie.gouv.fr/-Strategie-nationale-pour-la-.html>

2.1.2. Programs related to wetlands

2.1.2.1. Global scale

- The Ramsar Convention on Wetlands

The Convention on Wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It was adopted in Ramsar (Iran) in 1971 and came into force in 1975. It is the only global environmental treaty that deals with a particular ecosystem. 158 parties have signed the convention by January 2009.

The Convention's mission is "the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving SD throughout the world".

Under the "three pillars" of the Convention, the Parties have committed themselves to:

- work towards the wise use of all their wetlands through national land-use planning, appropriate policies and legislation, management actions, and public education;
- designate suitable wetlands for the List of Wetlands of International Importance ("Ramsar List") and ensure their effective management;
- cooperate internationally concerning transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

By January 2009, more than 1,800 wetlands, covering more than 170 million hectares, have been included in the Ramsar List.

The Convention works closely with other environment-related global and regional conventions, especially the CBD, Convention for Combating Desertification (CCD), CMS, and Convention on the World Heritage. Especially, the broad objectives of the CBD and the Ramsar Convention are perceived mutually compatible. The secretariats have already started the process by signing in January 1996 a Memorandum of Cooperation, whilst the

two Conventions' technical bodies have built upon it by establishing practical working relations.

This partnership especially concerns the indicators. Ramsar is one of the Associate Indicator Partner of the 2010 BIP and is part of its steering committee. Collaboration between Ramsar's Scientific and Technical Review Panel (STRP) and UNEP-WCMC, which coordinates the 2010 BIP, has led to the definition of an initial set of 8 ecological "outcome-oriented" indicators, including 11 sub-indicators. Their aim is to assess the implementation effectiveness of the Ramsar Convention. They were validated at the Ramsar's COP 9 in Kampala (Uganda) in 2005 (Ramsar, 2005). While various aspects of this work continue to be developed, the indicators in that Resolution are available to Parties and others to assessments at national level.

The collaboration between UNEP-WCMC and Ramsar's STRP has still gone on for:

- an Implementation Plan (including costings) for the full implementation of the first tranche of indicators adopted under Resolution IX.1 Annex D;
- updated fact sheets on these indicators following up on the sheets provided in Resolution IX.1 Annex D;
- some initial indicator assessments for certain of those indicators for which existing data is readily available, as a demonstration example of presentation of indicator results.

The advances were presented at the Ramsar's COP 10 in Changwon (Corea) (Ramsar, 2008). As a consequence of that collaboration, several Ramsar subindicators have substantial linkages with the global biodiversity indicators being implemented under the 2010 BIP. They also have links with the indicators for the Millennium Development Goals.

<http://www.ramsar.org/>

2.1.2.2. European scale

- Water Framework Directive

On 23 October 2000, the "Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy" or, in short, the EU Water Framework Directive (WFD) was finally adopted (EU, 2000). It is the most substantial and comprehensive approach to water policy ever produced by the EC, and provides the major driver for achieving sustainable management of water.

The scale of application is the river basin - the natural geographical and hydrological unit - instead of according to administrative or political boundaries. It requires that all inland and coastal waters within defined river basin districts must reach at least good status by 2015. It distinguishes between surface waters (rivers, lakes, transitional waters, coastal waters and artificial and little modified water bodies) and groundwater.

The wetlands are not identified as water bodies for themselves in the WFD. However, the WFD protects and enhances, with regard to their water needs, terrestrial ecosystems and

wetlands directly depending on the aquatic ecosystems. Moreover, wetlands that are depended on groundwater bodies, form part of a surface water body, or are Protected Areas, will benefit from WFD obligations to protect and restore the status of water. At the same time, wetland ecosystems are expected to play an important role in the achievement of sustainable river basin management. For instance, wetland creation and enhancement can, in appropriate circumstances, offer sustainable, cost-effective and socially acceptable mechanisms for helping to achieve the environmental objectives of the WFD.

For surface waters, there are the two requirements: "good ecological status" and "good chemical status". Good ecological status is defined in Annex V of the WFD, in terms of the quality of the biological community, the hydrological characteristics and the chemical characteristics. As no absolute standards for biological quality can be set which apply across the EC, because of ecological variability, the controls are specified as allowing only a slight departure from the biological community which would be expected in conditions of minimal anthropogenic impact. Thus the assessment of ecological status of water bodies will be carried out with the use of indicators. But these precise indicators and their reference values will be defined in each river basin. The WFD just gives the main parameters that should be monitored.

Voted in 2000, the WFD sets out clear deadlines for each of the requirements.

- 2000: WFD entered into force
- 2003: Transposition in national legislation; identification of River Basin Districts and Authorities
- 2004: Characterisation of river basin: pressures, impacts and economic analysis
- 2006: Establishment of monitoring network; start public consultation (at the latest)
- 2008: Present draft river basin management plan
- 2009: Finalise river basin management plan including program of measures
- 2012: Make operational programmes of measures
- 2015: Meet environmental objectives; First management cycle ends; Second river basin management plan & first flood risk management plan.

http://ec.europa.eu/environment/water/water-framework/index_en.html

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>

2.1.2.3. National scale: the French case

- National Observatory on Wetlands

In France, the Ministry of Ecology launched the National Observatory on Wetlands (NOW) in 1995, in the framework of the National Action Plan for Wetlands. Its objective was to do the monitoring and the evolution of "Wetland of major importance". The organism in charge of the national environmental statistics is accountable of its implementation. Since 2008, it is Service for Observation and Statistics (SOaS), directly included to the French Ministry of Ecology.

There were 87 of these “wetlands of major importance” at the beginning, designated by experts. In 2007, there were 152 of them (Atlantic littoral, Mediterranean littoral, alluvial valleys, interior plains) as well 52 peat-bog massifs. They are representative of the French metropolitan ecosystems in terms of diversity of natural habitats and socio-economic services. Most of them are under a protected status. Inventories and monitoring were performed in these wetlands of major importance. They are also used by this Observatory to assess the state of conservation in Ramsar sites and in other wetlands. Nevertheless, the NOW has not implemented a regular monitoring scheme of the French wetlands, neither built a relevant set of indicators. It is currently being restructured.

<http://www.ifen.fr/acces-thematique/territoire/zones-humides/onzh.html>

2.1.3. Environmental side of the Sustainable Development and Integrated Coastal Zone Management programs

The concept of sustainable development was first used in 1987 in the Report of the World Commission on Environment and Development (UN, 1987), better known as the Brundtland Commission.

2.1.3.1. Global scale

- Global Environment Outlook

Global Environment Outlook (GEO) has been the main UNEP’s evaluation program since 1995. GEO is both a process and a series of reports. It aims to achieve the following objectives:

- To provide access to the scientific knowledge for international environmental governance and the mainstreaming of environmental concerns into social and economic sectors, and in support of internationally agreed environmental goals.
- Facilitate the interaction between science and policy through a multi scaled and multi-dimensional integrated assessment process and products of high legitimacy, credibility and utility.
- Build partnerships and capacity for environmental assessments.

To reach these goals, it produces:

- GEO Reports (1997, 2000, 2003, 2007);
- GEO Year Books, since 2003
- GEO Data Portal, an on-line database.

GEO's primary target audiences are UNEP’s Governing Bodies and policy advisors in relevant government ministries. . It provides information for decision-making, supports early warning and builds capacity at global and sub-global levels. The assessment also reaches out to other UN organizations, Inter-Governmental Organizations, NGOs, civil society, scientific communities, media, the private sector and the general public. Thus GEO is also a communication process that aims at raising awareness and providing options for action.

The online database, GEO Data Portal, currently holds more than 450 variables. It covers environmental themes such as climate, forests and freshwater and many others, as well as socioeconomic categories, including education, health, economy, population and environmental policies. The data sets can be displayed on-line or downloaded.

It does not use a set of regularly up-dated indicators. But each annual report, after a brief global overview of the main events of the year, focuses on a special thematic.

<http://www.unep.org/GEO/>

- Millennium Development Goals

The eight Millennium Development Goals (MDGs) were adopted within the UN Millennium Declaration in 2000 by the world leaders at UN Headquarters in New York. The aim is to reduce extreme poverty and setting out a series of time-bound targets, the MDGs - with a deadline of 2015. These eight goals are:

- End poverty and hunger
- Achieve universal primary education
- Promote Gender equality
- Reduce Child mortality
- Improve Maternal health
- Combat HIV/AIDS, Malaria and Other Diseases
- Ensure Environmental Sustainability
- Develop a Global Partnership for Development

The Millennium Project was commissioned by the UN Secretary-General in 2002 to develop a concrete action plan for the world to achieve the Millennium Development Goals. To understand where the goals are on track, and where additional efforts and support are needed, both globally and at the country level, the MDG Monitor was created. It shows how countries are progressing in their efforts to achieve the MDGs by a set of 60 indicators. It is designed as a tool for policymakers, development practitioners, journalists, students and others.

From an environmental point of view, CBD was later endorsed at the World Summit on Sustainable Development and has been included in MDG7 under the 'reducing biodiversity loss' target. Seven indicators are devoted to this target.

<http://www.un.org/millenniumgoals/>

<http://www.mdgmonitor.org/>

- Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment (MEA) was called for by the UN Secretary-General Kofi Annan in 2000. Initiated in 2001, the objective of the MEA was to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. It is the first assessment to focus on the impacts of ecosystem changes for human well-being. It ended in 2005. It has involved the work of

more than 1,360 experts worldwide. The MEA primarily synthesized the findings of existing research, to make them available in a form that is relevant to current policy questions. Their findings, contained in five technical volumes and six synthesis reports, provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide (such as clean water, food, forest products, flood control, and natural resources) and the options to restore, conserve or enhance the sustainable use of ecosystems (see for instance MEA, 2005a for policymakers and 2005b on wetlands).

Policymakers were the target-audience. They were involved from the start via a Board. It was established to represent key "users" of the findings of the MA. The Board includes representatives of the CBD, CCD, Ramsar, and the CMS, national governments; UN agencies; civil society representatives; and the private sector. In addition, 10 "at-large" members were selected by the Steering Committee and an additional 10 members were chosen by the Board at its first meeting.

Interestingly, the MEA was intended to be indicator-based, but the subjects (biodiversity, goods and services) appeared too difficult and badly-defined to do so successfully (ten Brink, 2006). However, its influence was very high. First, it raised awareness among the policy-makers and the media about the link between human well-being and biodiversity via powerful communication campaigns. As a consequence, a lot of programs and initiatives were induced. Second, within the scientific community, it provided a classification of ecosystem services now widely used.

<http://www.millenniumassessment.org/en/index.aspx>

- World Heritage Convention

The Convention concerning the Protection of World Cultural and Natural Heritage was adopted by the General Conference of United Nations Educational, Scientific and Cultural Organization (UNESCO) in 1972. It combined two, originally separated, movements: the first focusing on the preservation of cultural sites, and the other dealing with the conservation of nature. By regarding heritage as both cultural and natural, it insists on the ways in which people interact with nature, and of the fundamental need to preserve the balance between the two. In 2007, there were 186 State Parties.

The aims of the World Heritage Centre are to protect and preserve. From emergency assistance to safeguard properties in danger, to long term conservation, management planning, technical assistance, professional training, public and youth education, and awareness-building, the World Heritage Centre and its partners have developed a series of initiatives and have been actively involved in the implementation of projects, participatory workshops, seminars and training courses. There is no monitoring program with clear set of indicators.

<http://whc.unesco.org/en/35/>

- The Man And the Biosphere Program

In the frame of the World heritage Convention, the Man and the Biosphere Programme (MAB), proposes an interdisciplinary research agenda and capacity building aiming to

improve the relationship of people with their environment globally. Launched in the early 1970s, it notably targets the ecological, social and economic dimensions of biodiversity loss and the reduction of this loss. MAB's work over the years has concentrated on the development of the World Network of Biosphere Reserves. Biosphere reserves are sites recognized under the MAB, which innovate and demonstrate approaches to biodiversity conservation and sustainable development. There are 531 sites worldwide in 105 countries. They provide context-specific opportunities to combine scientific knowledge and governance modalities to:

- Reduce biodiversity loss;
- Improve livelihoods;
- Enhance social, economic and cultural conditions for environmental sustainability;
- Thus contributing to the pursuit of the MDGs, in particular MDG7 on environmental sustainability.

The Madrid Action Plan was agreed at the 3rd World Congress of Biosphere Reserves which was held in Madrid in February 2008 for five years. It raises biosphere reserves to be the principal internationally-designated areas dedicated to SD in the 21st century. In this framework, it sets up to reach global goals: MDG & 2010 target. A MEA should also be performed in each Biosphere Reserve to evaluate the ecological services.

The aim of this program is to build a network of reserves and not to set up a monitoring or a long-term evaluation program, neither to define indicator. It only encourages the different reserves to evaluate their local goals achievement and, to do so, to define a set of indicators.

http://portal.unesco.org/science/en/ev.php-URL_ID=6393&URL_DO=DO_TOPIC&URL_SECTION=201.html

- Indicators from the Organisation for Economic Co-operation and Development

The OECD is an intergovernmental organisation which brings together 30 member countries (2007) sharing a commitment to democratic government and the market economy. Founded in 1961, its principle aim is to promote policies for sustainable economic growth and employment, a rising standard of living, and trade liberalisation. It is clearly inscribed in a SD approach as well as in a liberal ideology.

It is one of the world's largest sources of comparable statistical, economic and social data. It has a long knowledge and practice of indicators. It notably developed the widely used OECD 'Pressure-State-Response' framework. From the environmental side, the OECD thus provides data and indicators for policy development and assessment (nationally and internationally) as well as for public information. The PSR model helps decision-makers and the public to see how environmental, economic and social indicators are interconnected. Together with its member countries, the OECD has established a common approach and framework for developing, measuring and using environmental indicators. In particular, the trends of its set of key environmental indicators is published every year.

http://www.oecd.org/department/0,3355,en_2649_34441_1_1_1_1_1,00.html

2.1.3.2. Mediterranean scale

- Convention of Barcelona and Blue Plan / Mediterranean Action Plan

In 1975, the Mediterranean countries and the EC adopted in Barcelona a convention supplemented by a Mediterranean Action Plan (MAP) under the auspices of the UNEP. Although MAP's initial focus was aimed at marine pollution control, over the years, its mandate gradually widened to ICZM.

The 1980s saw the creation of specific regional activity centres (RAC) and the development of MAP's activities on the coastal regions with its "Coastal Area Management Programm". A co-ordination unit in Athens sees to the implementation of the whole. There are currently 6 RAC:

- Blue Plan / RAC, France → socio-economics indicators and scenarios;
- Priority Actions Programme / RAC, Croatia → ICZM;
- Specially Protected Areas / RAC, Tunisia → biodiversity;
- Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea, Malta → major marine pollution incidents;
- INFO/RAC, Italy → communication services and technical support;
- Cleaner Production / RAC, Spain → reduction of industrial waste.

At the 1992 UN Conference of Rio, the concept of SD was confirmed, and Agenda 21, in particular, was adopted. This international dynamic and the results of the previous Mediterranean work led to the development of an Agenda MED 21 in 1994 in Tunis, as well as to the revision of the MAP in Barcelona in 1995 (MAP II) renamed Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. There are nowadays 22 contracting parties.

The Convention's main objectives are:

- to assess and control marine pollution;
- to ensure sustainable management of natural marine and coastal resources;
- to integrate the environment in social and economic development;
- to protect the marine environment and coastal zones through prevention and reduction of pollution, and as far as possible, elimination of pollution, whether land or sea-based;
- to protect the natural and cultural heritage;
- to strengthen solidarity among Mediterranean coastal States;
- to contribute to improvement of the quality of life.

It also led to the decision in Montpellier in 1996 to establish a Mediterranean Commission on Sustainable Development (MCSD). This is a forum for dialogue and proposals where the Contracting Parties define a sustainable development strategy for the Mediterranean. As MAP's advisory organ, the MCSD is made up of 46 members: 22 permanent, representing each of the Contracting Parties to the Barcelona Convention, as well as 24 rotating representatives from wider community (local authorities, the business community, NGOs, scientific community, intergovernmental organisations and eminent experts) and 14 alternate members that in principle have a mandate of 2 years.

In addition to "thematic" activities, the MCSD prepared a Mediterranean Strategy for Sustainable Development (MSSD), which was adopted during the 14th Meeting of the Contracting Parties (Slovenia, November 2005).

The Blue Plan / RAC drew up a set of indicators fact-sheets for the follow-up of the MSSD. 34 priority indicators have been selected at Regional Workshop on « Indicators for Sustainable Development Strategies and Policies in the Mediterranean Region » organised by Blue Plan in 2005, in cooperation with INFO-RAC and with EEA support (Blue Plan, 2006). Complementary lists were provided for tourism (Blue Plan, 2007a) and coastal area (Blue Plan, 2007b).

<http://www.planbleu.org/index.html>

<http://www.unepmap.org/>

2.1.3.3. European scale

- Integrated Coastal Zone Management in Europe / Deduce program

Growing concerns about the state of the coast in Europe prompted the EC to establish a 'Demonstration Programme' in 1996 to ascertain best practice in arresting and reversing decades of economic, social and environmental decline. Among other things, the Demonstration Programme concluded that the lack of relevant, credible and reliable information was impeding effective coastal planning and management. Hence the Recommendation concerning the implementation of ICZM (EU, 2002) calls for an integrated approach to monitoring and measuring the sustainable development of the coastal zone.

The EU ICZM Expert Group established a Working Group on Indicators and Data in 2002 to advise it on ways in which Member States, and the EU as a whole, can assess whether they are moving further towards, or away from, a more sustainable future for their coastal zones, and at what pace. Led by the ETC-LUSI, it subsequently drew up a set of 27 indicators of SD of the coastal zone and 45 measurements.

This was the starting point of Deduce, a transnational project concerning ICZM, co-financed by the EC and the participating regions (2004-2007). Its main objective was to evaluate the utility of indicators for optimal decision making on the coast, following the principles and criteria established by the EU Recommendation on ICZM. Nine partners representing all decision-making levels (European, national, regional and local) carried out the project. More precisely, its aims were to:

- Define the methodology for the indicators calculation;
- Test the calculation at each level: European, national, regional and local (Martí-Ragué et al., 2007);
- Produce Indicators Fact Sheets, that are analyses;
- Study the feasibility of an coastal interregional observatory to store the data and organise the results;
- Produce a sustainability evaluation model.

The program is now over and results are available on line.

<http://www.deduce.eu>

- The EU Sustainable Development Indicators developed by Eurostat

The European Strategy for Sustainable Development (ESDS) was adopted in June 2001, and renewed in June 2006. It reaffirms the overall aim of achieving continuous improvement of the quality of life and well-being on earth for present and future generations, through the creation of sustainable communities able to manage and use resources efficiently and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion.

The ESDS requires the EC to develop indicators at the appropriate level of details to monitor progress with regard to each particular challenge. A first set of indicators was adopted by the EC in 2005 and further reviewed in 2007 in order to adjust to the ESDS. Sustainable Development Indicators (SDIs) are used to monitor the ESDS in a report to be published by Eurostat every two years.

The SDI framework is based on ten themes, reflecting the seven key challenges of the strategy, as well as the key objective of economic prosperity, and guiding principles related to good governance. The themes follow a general gradient from the economic, to the social, and then to the environmental and institutional dimension. Biodiversity does not appear for itself but in “natural resources”.

In order to facilitate communication, the indicator set is built as a three-level pyramid. This distinction between the three levels of indicators reflects the structure of the renewed strategy (overall objectives, operational objectives, actions) and also responds to different kinds of user needs, with the headline indicators having the highest communication value. The three-levels are complemented with contextual indicators, which provide valuable background information but which do not monitor directly the strategy’s objectives. The SDI set comprises 127 indicators, some of them being described but not yet fully developed.

http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1998,66119021,1998_66292168&_dad=portal&_schema=PORTAL

- Core Set of Indicators for SD of the Environment European Agency

As exposed in the presentation of the SEBI, since its creation, the EEA has worked to develop a CSI combining all the main themes of SD in order to communicate with EU’s decision makers at European and national levels. The EEA management board approved a set compounded of 37 indicators in March 2004. Its purpose is:

- to provide a stable and manageable basis for indicator reporting by EEA (EEA Signals)
- to prioritise improvements in data quality from countries to European level
- to streamline EEA/Eionet contributions to other European and global indicator initiatives, e.g. structural indicators and sustainable development indicators

- in doing so, to strengthen environmental dimension alongside economic and social dimensions

<http://themes.eea.europa.eu/indicators/>

<http://www.eionet.europa.eu/>

2.1.3.4. *National scale: the French case*

The Service for Observation and Statistics (SOaS), included in French Ministry of Ecology, Energy, Sustainable development and Land Use Management, has been in charge of the environmental statistics in France. Recovering the missions of the Ministry, it is in charge of the monitoring system for environment, building, transport, energy and sustainable development. It is especially the focal point of the EEA. It thus gathers official data, produce indicators and implement them.

- Core Indicators of Sustainable Development

In the framework of the EU ESDS, France adopted a National Strategy for Sustainable Development in 2003, revised in 2006 to integrate the new objectives of the ESSD. In this framework it has to develop a set of SDIs. Now, 11 headline indicators, published in November 2006, are used.

<http://www.ifen.fr/indicateurs/indicateurs-de-developpement-durable.html?taille=target>

<http://www.ecologie.gouv.fr/3-Indicateurs.html>

- French Observatory of the Littoral

The French Observatory of the Littoral was created in 2004. It was requested by the State for all the national territory and implemented in the frame of a convention between the ministries in charge of the environment and the one in charge of the equipment (now merged), the General secretariat to the sea and the delegation for land use management and regional action. Its work is defined by a steering committee grouping all the partners of the convention as well as the 3 other national entities, in charge of littoral protection or geographic data management.

The observatory missions are:

- Littoral monitoring : to provide environmental, social and economic data to evaluate the state of the littoral but also the public policies;
- Disseminate consistent information to a large public;
- Mutualisation and homogenization of the means to collect data and generate knowledge;
- Prospective.

In this frame, it has determined a set of 28 indicators, related to the sustainable use of the coastal area. One of the 10 themes is the biodiversity. For each one a fact sheet available on-line, with details on the methodology and the data, but also the results and their interpretation. The set does not rely on a clear model.

This set is currently evaluated by an on-line investigation for the users, which are not explicitly named. Nevertheless, in the missions, two kinds of users are implied: the policy-makers and the public.

<http://www.littoral.ifen.fr/Indicateurs.8.0.html>

- French Key Indicators of the Environment

To make a rapid and global assessment of the environment in France, a set of 10 key indicators is used. They are related to the main issues of sustainable use. It has not been thought to evaluate a particular policy or a national commitment. One is directly related to biodiversity. Since 2005, an annual implementation is available on-line. It corresponds to the implementation and deliverance of the indicators without communication strategy behind.

http://www.ifen.fr/indicateurs/10-indicateurs-cles-de-l-environnement.html?taille=target%3D_self

- French monitoring of the European commitments

This set of indicators is aimed to evaluate the public policies, and more precisely the national and European commitments for environment. It particularly takes care of the 6th Environment Action Programme, adopted by the European Parliament and the EU Council in 2002, which defined the environmental priorities and main objectives for the EU for 2002-2010. It identified four topics: climatic change, nature and biodiversity, environment, health and quality of life, natural resources & wastes. A set of 19 indicators has been built to monitor French achievement towards the quantitative objectives. Users are not clearly defined and the communication process seems weak.

<http://www.ifen.fr/indicateurs/indicateurs-de-suivi-des-engagements-europeens.html>

2.2. The main characteristics the reviewed programs

The table 4 presents the main characteristics of the reviewed programs.

Table 4: Main characteristics of the reviewed programs

Main theme	Sc	Full name	Type	Organisms in charge	Set of indicators	Organisms in charge of indicators	Aims	Nb topics	End users	Model	Nb indic	Links with other sets of indicators
Biodiversity	G	Convention on Biological Diversity	Convention	UNEP	W	2010 BIP	PA: 2010 target	7	GP DM	UPSR	29	
		Convention on Migratory Species of Wild Animals	Convention	UNEP	N							
		Convention on International Trade in Endangered Species of Wild Fauna and Flora	Convention	UNEP	N							
	E	Streaming European 2010 Biodiversity Indicators	Program	UE	W	EEA	PA: 2010 target, EU Habitats and Birds Directives	7	DM	DPSIR	41	CBD
N	French National Strategy for Biodiversity	Law	French ministry of Environment	W	Ministry / NMNH	PA: related policies	5				9	CBD
Wetlands	G	RAMSAR outcome oriented indicators	Convention	RAMSAR	W	UNEP-WCMC / RAMSAR		10	DM, SM, OMP		16	CBD MDG
	E	Water Framework Directive	Law	EU	W	Proposal in WFD- Water Basin scale	PA	3			21	
	N	French National Observatory of Wetlands	Program	French ministry of Environment	W	SOeS		3			5	
SD	G	Millennium Development	Convention	UN	Y	UN	PA: Millennium goals	8		?	60	CBD

		Goals										
		Key environmental indicators	Monitoring	OECD	Y	OECD	M	10	UNEP's DM	PSR	10	
		World Heritage Convention	Convention	UNESCO	N							
		Man and the Biosphere	Program	UNESCO	N							CBD, MDG, MEA
		Millennium Ecosystem Assessment	Punctual Assessment	Consortium	N				DM			CBD, Ramsar, CMS
		Global Environment Outlook	Regular Assessment	UNEP	N							
E		DEDUCE	Program	EU	Y	Researchers	PA: EU ICZM Recommendation	7	DM		45	
		EU Strategy for Sustainable Development	Law	EU	W	Eurostat	PA: Strategy for Sustainable Development	10	DM		128	
		EU Core set of indicators for Sustainable Development	Monitoring	EU	Y	EEA	M, DC, C to strengthen the environmental pillar of SD	10	DM, DC, OMP	DPSIR	37	
M		Mediterranean Strategy for Sustainable Development	Convention	UNEP-MAP	Y	BLUE PLAN	PA: MSSD	9	DM GP		34	
		MSSD: Coastline complement	Convention	UNEP-MAP	Y	BLUE PLAN		7			33	
N		French National Strategy for Sustainable Development	Law	French ministry of Environment	W	SOeS		9		none	11	EU SSD
		French Littoral Observatory	Monitoring	French ministry of Environment	Y	SOeS	M, C, DC	10		none	28	

	French monitoring of the European commitments	Monitoring	French ministry of Environment	Y	SOeS	PA: EU 6 th Environment Action Programme	4		none	20	
	French Key environmental indicators	Monitoring	French ministry of Environment	Y	SOeS	M	10		none	10	

Sc=Scale: G=Global, E=European, M=Mediterranean, N=National (French example); Organisms in charge: see the list of acronyms; Set of indicators: Y=yes and finished, N= no, W= in work, Aims: PA=policy assessment, M=monitoring, C=communication, DC=data centralisation and quality enhancement, RT=Review and test of used indicators for scientific recommendations; Nb themes = number of themes described in the set of indicators (as announced by the program); End users: DM=decision makers, GP=general public, SM=Site Managers, OMP=Other Monitoring Programs; Model = type of models of indicators explicitly used; Nb indic = number of indicators proposed in the data; Biodiv indic = number of indicators of the dataset devoted to biodiversity; Wetland indic = number of indicators of the dataset devoted to wetlands

Major quantitative traits of their sets of indicators are summarized below (table 5). From the 23 reviewed programs, the majority (74%, 17) has developed a set of indicators, of which 11 for programs of SD. A striking feature is that all the set of indicators related to biodiversity or wetlands programs are still in construction whereas most of the one related to SD programs are finalized (> 80%).

The mean number of topics by program, as stated in the description of the set of indicators, is 7.7 (with high variability). As expected the mean number of topics is higher for programs dedicated to SD than for biodiversity, biodiversity being most of the time one of the topics of SD.

A total of 537 indicators were listed. This high number does not take into account the high redundancy between the different sets of indicators.

It is also worth noting that, at the national level, the monitoring schemes on biodiversity or wetlands seem to have been done in a hurry without clear objectives, end-user nor modelling (table 5). They thus offer weak examples and they will be excluded of further analysis on themes or indicators' redundancy.

Table 5: Major quantitative characteristics of the sets of indicators of the reviewed programs.

	Nb	Of which with a set of indicators	Of which finalized		Themes	Indicators	Nb indicators /theme
All	23	17 (74%)	9	Total		537	
				Mean	7.6	31.6	4.2
				SD	2.5	29.0	3.1
Biodiversity	5	3 (60%)	0	Mean	6.3	26.3	3.9
				SD	1.2	16.2	2.0
Wetlands	3	3 (100%)	0	Mean	5.3	14	3.4
				SD	4.0	8.2	3.1
Sustainable development	15	11 (73%)	9	Mean	8.5	37.8	4.5
				SD	1.9	33.8	3.5

2.3. The slow rise of concern about biodiversity

Biodiversity, since its first use in 1992, is not anymore seen as a reality out of human world and the interactions with human activities are clearly taken into accounts (see the CBD and SD programs for instance). Its importance for life and human well-being is becoming admitted, mainly since the MEA reports on ecosystem services.

But, it is worth noting that there is still an important work to be done to monitor routinely biodiversity. Most of the set of indicators reviewed here are still in construction (see table 5), especially those concerning biodiversity or wetlands. Even the CBD's set of indicators, whose construction began in 2002, is not finished yet. This may be mainly explained by:

- The recent development of ecology and existing gaps in the comprehension of ecosystem functioning;
- Difference in languages used by policy-makers and scientists;
- Lack of available, standardized data on biodiversity components.

This last point is still a problem in the programs, avoiding easy implementation of indicators. For instance, the MEA report (MEA, 2005a) underlines that “basic global data on the extent and trends in different types of ecosystems and land use are surprisingly scarce”. And despite important human and material means, some regional assessments of this program were left. This problem of data availability and standardization will be a main issue for the OMW.

2.4. The mainstream of the Convention on the Biological Diversity

Nevertheless, some signs are really encouraging. Especially, the CBD plays a role more and more important and recognized. It shows a good potential to unify the existing empirical approaches to monitor biodiversity.

For instance, many programs focusing on SD explicitly refers to the CBD and uses its indicators, as MDG or MAB. In the same way, the major biodiversity-related conventions (CBD, CITES, CMS, Ramsar Convention, and the World Heritage Convention) maintain a Joint Web Site, hosted by the CBD, which provides a useful comparative gateway into the Web sites of all five conventions. For technical issues, Ramsar worked with the CBD’s experts group on indicators, the 2010 BIP, to define its set of indicators. The EU program on indicators of biodiversity (SEBI) clearly aims at being compatible with the CBD. It uses the same themes and the same indicators whenever possible. But it is worth noting that this EU program may be more developed than the CBD one in the definition of the indicators and their implementation.

Finally, even if it takes time to be implemented, the CBD may have in the future the same unifying and leading role than the MDG program in socio-economic development. The OMW should thus clearly be in agreement with this convention.

3. Comparison of the main topics tackled by the programs

As the number of the listed indicators is very high (> 500), in order to be able to find the correspondence between the sets of indicators developed by the reviewed programs, we first look at the topics tackled by the different programs.

As seen in the second part of the present report, three kinds of programs can be identified. Two of them focus on nature-related themes (biodiversity and wetlands) while other deals with SD as a whole. For an easier lecture, we analyse separately the topics covered by these two groups before highlighting the links between them.

3.1. Programs related to biodiversity and wetlands

As the CBD is the program of reference on biodiversity and ecosystem monitoring, its topics are used as a “key themes” to classify the topics approached by the other reviewed programs (table 6).

Table 6: Comparison of the main themes tackled by the sets of indicators developed for reviewed programs relative to biodiversity or wetlands. The key themes are in bold; they are the ones from the CBD or they are added from reviewed programs if relevant (under the triple line).

Global scale		European scale	
UNEP - CBD	UNEP - Ramsar	EEA - SEBI	EU - WFD
Components of biodiversity	Overall conservation status of wetlands	Components of biodiversity	Water Biological parameters
	Management effectiveness		
	Population trends		
	Threat status of species		
	Ramsar site designation progress		
Sustainable use of natural resources		Sustainable use of natural resources	
Threats to biodiversity	Threats to wetlands	Threats to biodiversity	
Ecosystem integrity / Ecosystem services	Ecological character of Ramsar sites	Ecosystem integrity / Ecosystem services	
	Water quality		Water chemical and physico-chemical parameters supporting the biological ones
	Ecosystem services		
	Water quantity		Water hydromorphological parameters supporting the biological ones
Traditional knowledge			
Access and benefit-sharing to ecosystems		Access and benefit-sharing to ecosystems	
Resource transfers for biodiversity	Ramsar site designation progress		
	Policy responses		
		Public opinion	

The sets of indicators of the SEBI have been built on the same plan than the CBD one as it is a European program to assess progress towards the CBD “2010 target”. It is very clear as all the topics, but one, are the same. The SEBI just adds “Opinion” and lets “Traditional knowledge”.

The correspondences between the topics tackled by the Ramsar set of indicators and the CBD one are easy to be drawn. But it is worth noting that the Ramsar one details much more 2 CBD topics: “biodiversity components” and “Ecosystem integrity / Ecosystem services”. It thus really puts a stress on the ecological point of view. As the CBD, it also considers threats on the ecosystem and resource transfer for biodiversity. Finally, whereas the social and economic aspects are not tackled with the same themes than the ones of the CBD (local knowledge, access to ecosystems, sustainable use of natural resources), it more explicitly considers ecosystem services, which are not merged with ecosystem functions as in the CBD.

As far as the WFD is concerned, there are only the topics that must be taken into account to assess the “good ecological status” of the water bodies by each river basin (EU, 2000). They are thus dedicated to the ecological point of the WFD. It does not correspond to its orientation. Indeed, other parts are dedicated to economic aspects (price especially) and governance, but there are no set of indicators for these.

3.2. Programs related to sustainable development

The Eurostat program on indicators of SD to assess the ESDS is the most inclusive of all the programs dedicated to SD. It has 10 broad themes and no less than 127 indicators. It is thus used here as the program of reference to classify the topics tackled by the reviewed program on SD (Table 7).

Table 7: Comparison of the main themes tackled by the sets of indicators developed for the reviewed programs on SD. The triple line marks the distinction with peculiar themes not found in the Eurostat's set of indicators but relevant for wetland conservation.

Global scale			European scale		Mediterranean scale		National scale			
Eurostat-EU Strategy for SD	OECD – Key environmental indicators	UN - MDG	EU – DEDUCE: indicators for ICZM	EU-EEA: SD Core set of indicators	UNEP-MAP – Blue Plan: MSSD	UNEP-MAP – Blue Plan: coastal complement	French strategy for SD	French Observatory of Littoral	French Key environmental indicators	French monitoring of the European commitments
Socio-Economic dev.			Economy				Economy Employment	Economy Employment		
Sustainable production and consumption	Waste			Waste					<i>Natural resources & wastes</i>	Waste
Social Inclusion		Poverty and Hunger	Social cohesion		<i>Research, training, awareness-raising, education & participation</i>		Social			
		Primary Education								
		Gender								
Demographic changes								Demography		
Public Health	Air quality & Ozone	Child Mortality		Air pollution and ozone depletion			Health		Health & life quality	Air quality
		Maternal Health								
		Diseases								
Climatic change & energy	Climate change		Climate change	Climate change	Energy & climate change	Climatic change	Climate change	Threats	Climatic change	Climate change
	Energy			Energy			Energy			Energy
Sustainable transport				Transport	Transport		Transport			
Natural	Sustainable	Environment	Sustainable	Fisheries		Fisheries,	Sustainable		<i>Natural</i>	

resources	use of natural resources		use of natural resources			aquaculture and living marine resources	use of natural resources		<i>resources & wastes</i>	
	Biodiversity		Natural and cultural diversity	Biodiversity		Biodiversity	Biodiversity	Biodiversity	Biodiversity	Biodiversity
			Beach and coastal waters pollution	Water	Water	Pollution from ships		Water quality		Water quality
						Land based Pollution				
				Terrestrial		Landscape heritage		Land use		Land use
Global partnership		Global Partnership			Financing SD		Financing Dev.			Financing biodiversity
Good governance					<i>Research, training, awareness-raising, education & participation</i>					Opinion
					Tourism			Tourism		
				Agriculture	Agricultural & rural development			Agriculture		
			SD of the undeveloped coast		Urban development	Littoralisation		Buildings / lodging		
					Sustainable management			Property of construction		

Natural resources as stated in the set of indicators for the ESDS developed by Eurostat are much more detailed in other programs. Four main sub-categories can be listed: sustainable use of natural resources, biodiversity, water quality and land use.

It is worth noting that the programs dedicated to the littoral (Deduce program on ICZM, French Observatory of the Littoral) and the Mediterranean context (Blue Plan for MSSD) deal with topics that are hardly directly classifiable in the set of indicators developed by Eurostat. Three main classes can be remembered as they are of particular importance for Mediterranean wetlands:

- Tourism: not only the economic activity but also its impacts on the use of natural resources and on the social web.
- Littoralisation: the migration of population towards the coastal regions and its consequences;
- Agricultural and rural development: not only the economic activity but also the type of agriculture and its impact on environment.

These programs also put a stress on pollution and water quality as well as on sustainable fisheries.

Very few programs take into account governance and demographic changes. The MDG set of indicators is quite apart as it clearly underlines the social and health panels.

3.3. Links between the topics tackled by these two groups of programs

It is now important to look to the convergence between the two groups of programs, the ones dedicated to SD on one hand and the ones dedicated to biodiversity or wetlands on the other hand, as shown in table 8.

The topic “Natural resources” in the SD programs gathers together the following categories listed in the biodiversity or wetlands related ones:

- “Biodiversity components”, which includes population trends, protected areas and land use,
- “Sustainable use of natural resources”,
- “Ecosystem integrity / ecosystem services”.

As expected, the programs dedicated to biodiversity or wetlands conservation are much more precise on the description of biodiversity or ecosystem functioning.

Oppositely, whereas “threats to biodiversity” constitutes only one topic in biodiversity or wetlands related programs (which even not includes climatic change in the CBD), it is well developed in the SD programs, though it is not clearly identified as threats on biodiversity. The following topics can be related, to some extent, to threat on biodiversity:

- “Sustainable production and consumption” which includes “Wastes management”,
- “Public health” which includes “Air quality”,

- “Demographic changes”,
- “Sustainable transport”,
- “Climatic change and energy”,
- “Tourism”,
- “Littoralisation”,
- “Agriculture”.

Thus, the indicators of SD programs will give clues to explain the trends observed in biodiversity and wetlands dedicated programs. They are, indeed, quite complementary.

Finally, “Governance” and “Global partnership” of the SD programs may be related to the following topics of the programs dedicated to biodiversity or wetlands:

- Access and benefit-sharing to ecosystems,
- Resource transfers for biodiversity,
- Public opinion.

Table 8: Correspondence between the topics tackled by biodiversity or wetlands dedicated programs and the SD ones. All the topics that can be, to some extent, related to threats on biodiversity (or at least drivers of change) are in italic.

SD programs	Biodiversity/Wetlands programs
Socio-Economic dev.	
Sustainable production and consumption	
Social Inclusion	
<i>Demographic changes</i>	
Public Health (of which <i>Air quality</i>)	
<i>Climatic change & energy</i>	
<i>Sustainable transport</i>	
Natural resources	Biodiversity components
	Sustainable use of natural resources
	Ecosystem integrity / ecosystem services
Global partnership	Resource transfers for biodiversity
Good governance	Access and benefit-sharing to ecosystems
	Public opinion
<i>Tourism</i>	
<i>Agricultural & rural development</i>	
<i>Littoralisation</i>	
	Traditional knowledge
	<i>Threats on biodiversity</i>

4. Comparison of the sets of indicators selected by the reviewed programs

4.1. Links between topics and indicators in the reviewed programs

A total of 537 indicators were listed in all the reviewed sets of indicators relative to biodiversity (79), wetlands (42) or sustainable development (416) (table 9). 77% are found in the programs related to SD, which are the more numerous. The main programs of SD have high number of indicators: 127 for the European set of indicators of SD proposed by Eurostat, and to a lesser extent, 60 for the MDG monitoring. This is not surprising as their scopes are very wide.

All these listed indicators were sorted out into the main 10 main themes of the set of indicators on SD developed by Eurostat, completed by topics relevant for wetlands from other programs as noted in part 3. This highlights the high discrepancy between the two main groups of set of indicators, as biodiversity or wetlands dedicated programs only address a part of the SD programs. It would thus be difficult to find indicators for the third objective of the OMW which aims to link biodiversity and wetlands to SD.

Table 9: Number of indicators listed in the reviewed programs by main themes (Eurostat entrance). In italics there are the themes, found in the reviewed programs but not in the Eurostat's set of indicators, and added because of their importance for the Mediterranean wetlands.

Topics found in SD programs	Topics specific of biodiversity programs	All the programs	Biodiversity / wetlands ones	SD ones
Total		537	121 (79/42)	416
Socio-Economic dev.		34		34
Sustainable production and consumption		27		27
Social Inclusion		40		40
Demographic changes		13		13
Public Health (of which Air quality)		53		53
Climatic change & energy		52		52
Sustainable transport		17		17
Natural resources		205	106	99
Global partnership		36	2	34
Good governance		13	5	8
<i>Tourism</i>		4		4
<i>Agricultural & rural development</i>		10		10
<i>Littoralisation</i>		23		23
	<i>Traditional knowledge</i>	1	1	
	<i>Threats on biodiversity</i>	9	7	2

The indicators from reviewed programs have been classified into the CBD headline indicators, whenever possible. It was done for all the indicators from the programs related to biodiversity or wetlands and 285 of the 416 indicators (68%) from SD programs (Table 10). It is worth noting that SD programs cover most of the CBD headlines indicators, except:

- Genetic diversity,
- Ecological footprint (but this area is covered by wider SD topics like energy and climate change for instance),
- Nitrogen deposition,
- Marine Trophic Index,
- Water quantity (but water availability for human is largely reported),
- Local communities' well-being and knowledge.

This brief analysis can bring clues to the OMW about the gap in the existing SD programs, the topics they are mostly interested in and the terminology they use. If they appear to take into account biodiversity in table 9, a more detailed analysis as in table 10 shows that they in fact mainly address:

- Sustainable use of resources,
- Impacts of climate change,
- Water quality.

Table 10: Number of indicators listed in the reviewed programs by main biodiversity or wetlands-related headline indicators (CBD entrance). In italics there are headline indicators, found in the reviewed biodiversity/wetlands programs but not in the CBD and that were added because of their importance for the Mediterranean wetlands. Coloured stars mean that one indicator was relevant for the two or three headline indicators

CBD Themes	CBD headline indicators (or other biodiversity/wetlands related ones listed in reviewed programs)	All the programs	Biodiversity / wetlands ones	SD ones
Status and trends of the components of biological diversity	Trends in extent of selected biomes, ecosystems, and habitats	18	8	10*
	Trends in abundance and distribution of selected species	19	12	7*
	Coverage of protected areas (PA)	28	16*	12
	Change in status of threatened species	11	6	5
	Trends in genetic diversity	4	4	
Sustainable use	Proportion of products derived from sustainable sources	55	15	40
	Ecological footprint	2	2	
Threats to biodiversity	Nitrogen deposition	3	3*	
	Invasive Alien Species indicator	5	4*	1
	<i>Impact of climate change</i>	16	3*	13
Ecosystem integrity and ecosystem goods and services	Marine Trophic Index	2	2	
	Water quality	49	19	30
	<i>Water quantity</i>	9	9	
	Connectivity/fragmentation of	8	6	2

	ecosystems			
	Incidence of human-induced ecosystem failure	8	1	7
	Health and well-being of communities who depend directly on local ecosystem goods and services	3	3	
	Biodiversity for food and medicine	2		2
Status of traditional knowledge, innovations and practices	Status and trends of linguistic diversity and numbers of speakers of indigenous languages	1	1	
Status of access and benefit-sharing	Indicator of access and benefit-sharing	2	2	
Status of resource transfers	Status of resource transfers for the CBD or for <i>biodiversity</i>	4	2	2
	<i>Change in legislation and policy - governance</i>	4	4*	
	Indicator of technology transfer			
<i>Public opinion</i>		2	1	1
TOTAL		537	121	285 (of 416)

All these figures hide a large redundancy rate. For indicators of biodiversity, as there are few tested indicators and available data, the same are always used (mainly on bird, Water bird Index, Trends in bird abundances, Red List Index etc ...). The precise lists of indicators by “CBD headline indicator” and by “main themes” are available in annex 1 and 2 respectively and allow to observing it.

4.2. Correspondence of the indicators used in the programs dedicated to biodiversity and wetlands

As stated above, the four international programs on biodiversity or wetlands are deeply congruent for the embraced topics, excepted the WFD which aims is very specific. This congruency is, as expected, also found in the set of indicators (Table 11). It is worth noting that most of them are still in development or to be tested. Very few are routinely implemented.

For a same headline indicator, the proposed indicators are much more thought as a whole set in the case of the SEBI program or Ramsar one than in the case of the CBD. For instance, for ‘Trends in abundance and distribution of selected species’, three indicators are proposed in the CBD. They are all related to the same part of the biodiversity (vertebrates and mainly birds). On the contrary, in the SEBI, one is dedicated to bird and the other to butterflies, in order to cover two groups with different dynamics and expected reaction to global changes.

The set of indicators of the EU WFD is much more detailed about water quantity, water quality and even water biodiversity. For this last, it is worth noting that the proposed indicators correspond to the CBD headline indicator ‘Trends in abundance and distribution of selected species’, but it is applied to other taxonomical groups which may be relevant for wetlands.

Table 11: In italic, in the column ‘CBD headline indicators’, are the headline indicators added by other programs to the CBD ones.

CBD Themes	CBD headline indicators	CBD	EEA - SEBI	UNEP- RAMSAR	EU- WFD	
Status and trends of the components of biological diversity	Trends in extent of selected biomes, ecosystems, and habitats	Trends in extent of selected biomes, ecosystems and habitats	Ecosystem coverage: trends in spatial coverage of land categories	Status and trends in ecosystem extent		
			Habitats of European interest : change in conservation status	Trends in conservation status of wetlands - qualitative assessment		
	Trends in abundance and distribution of selected species	Living Planet Index				
		Waterbird Indicator			Waterbird biogeographic populations	
		Global Wild Bird Index				
			Trends in common birds populations			
			Trends in butterflies populations			
			Species of European interest			
						Macrophytes
						Phytoplankton
						Fish
					Macroinvertebrates	
	Coverage of protected areas (PA)	Extent of PA		Nationally designated PA: IUCN categories		
				Nationally designated PA: biogeographic region		
				Nationally designated PA: country		
			Sites designated under the EU Habitats and Birds Directives: Trends in surface			
Overlays of PA with biodiversity			Sites designated under the EU Habitats and Birds Directives: Sufficiency Index	Coverage of the wetland biodiversity designated Ramsar sites		
				Coverage of wetland-dependent bird populations by designated Ramsar sites		
Management effectiveness of PA				Trends in management effectiveness in Ramsar sites		
				Management effectiveness in Ramsar sites - distribution of scores		
Change in status of threatened species	Red list Index (RLI) or sampled RLI		RLI for European species based on global extinction risk: Global RLI	Wetland RLI		

		RLI for European species based on regional extinction risk at either the pan European or EU scale : European RLI		
Trends in genetic diversity	Ex situ crop collection			
	Genetic diversity of terrestrial domesticated animals	Livestock genetic diversity		
Sustainable use	Proportion of products derived from sustainable sources	Areas of forest under sustainable management: certification		
		Areas of forest under sustainable management: degradation and deforestation	Forest: growing stock	
			Forest: balance between increment and fellings	
			Forest: deadwood	
		Areas of agricultural ecosystems under sustainable management	Agriculture: nitrogen balance	
			Agriculture: area under management practices potentially supporting biodiversity --> high nature value farmland area	
			Agriculture: area under management practices potentially supporting biodiversity --> organic farming	
			Agriculture: area under management practices potentially supporting biodiversity --> biodiv supportive agri-env schemes	
		Proportion of fish stocks in safe biological limits	Fisheries: European commercial fish stocks	
			Aquaculture: effluent water quality from finfish farms	
		Status of species in trade		
		Wild commodities index		
		Ecological footprint	Ecological footprint	Ecological Footprint of European countries

Threats to biodiversity	Nitrogen deposition	Nitrogen deposition	Critical load exceedance for nitrogen	Frequency of threats affecting Ramsar sites - qualitative assessment	
	Invasive Alien Species indicator	Invasive Alien Species indicator	Invasive alien species in Europe: Cumulative number of alien species in Europe since 1900' Invasive alien species in Europe: Worst invasive alien species threatening biodiversity in Europe'	Frequency of threats affecting Ramsar sites - qualitative assessment	
	Impact of climate change		Occurrence of temperature-sensitive species		
Ecosystem integrity and ecosystem goods and services	Marine Trophic Index	Marine Trophic Index	Marine Trophic Index of European seas		
	Water quality	Composite indicator of BOD + nitrate concentration + suspended sediments + pH/temperature	Nutrients in transitional, coastal and marine waters: N, P, N/P	Trends in dissolved nitrate / nitrogen concentration	Total N and P
					Transparency
					Water temperature
					Oxygen dissolved
					Water salinity
					Water pH
					Priority pollutants
	Water quantity		Freshwater quality: annual concentration in rivers of BOD and total ammonium concentration	Trends in Biological Oxygen Demand (BOD)	Quantity of pollutants
					Trends in water quantity
					Volume of the water body
					Lake flow
					Water permanence time
Connectivity with aquifer					
Lake depth					
Structure of the bed					
Connectivity/fragmentation of ecosystems	Connectivity/fragmentation of ecosystems: river fragmentation and flow regulation	Fragmentation of river systems	Trends in conservation status of Ramsar sites - qualitative assessment	Structure of the coast	

		Connectivity/fragmentation of ecosystems: forest fragmentation	Fragmentation of natural and seminatural areas		
	Incidence of human-induced ecosystem failure			The economic costs of unwanted floods and droughts	
	Health and well-being of communities who depend directly on local ecosystem goods and services	Health and well being of communities depending directly on ecosystem goods and services			
		Nutritional status of biodiversity			
	Biodiversity for food and medicine	Biodiversity for food and medicine			
Status of traditional knowledge, innovations and practices	Status and trends of linguistic diversity and numbers of speakers of indigenous languages	Status and trends of linguistic diversity and number of speakers of indigenous languages			
Status of access and benefit-sharing	Indicator of access and benefit-sharing		Patent applications based on genetic resources		
Status of resource transfers	Official development assistance provided in support of the Convention	Status of resources transfer: Official development assistance provided in support of the Convention	Financing biodiversity management		
	Indicator of technology transfer				
Change in legislation and policy				Legislative amendments implemented to reflect Ramsar provisions	
				Wise use policy	
Public opinion			Public awareness		

5. Biodiversity indicators from a scientific perspective

5.1. *Scientific commitments to define indicators of biodiversity*

There is a lack of science on both the assessment of biodiversity status and change and its implications for sustainable use (Balmford, 2005; Feld et al., 2006; ten Brink, 2006; Levrel, 2007).

But, since the definition of the 2010 target in 2002, policy-makers have asked scientific experts to be involved in the definition of the official sets of indicators of biodiversity (SEBI 2010, 2010 BIP, Ramsar, French NSB). Interestingly, this scientific involvement should, in turn, feed theoretical and applied research. The development of indicators, their test and their implementation are nowadays very dynamic fields of research as proved by the number of publications and the development of indicators-dedicated journal (e.g. “Ecological Indicators”).

This thematic has also become a priority in the research policies and their funding. It has promoted wide, integrative projects. For instance, The European Commission established the ALTER-Net project (A Long-Term Biodiversity, Ecosystem and Awareness Research Network) through its Framework VI research programme. It is one of several Networks of Excellence established to achieve lasting integration of research capacity. It addresses biodiversity research in terrestrial and freshwater ecosystems. A related Network of Excellence, Marbef, is focussing on marine biodiversity. ALTER-Net is a partnership of 24 organisations from 17 European countries, aiming to help deliver on the 2010 target. The result will be the establishment of a lasting infrastructure for integrated ecosystem research, combining ecological and socio-economic approaches, and with greater emphasis on communication with relevant audiences.

Another research program related to the indicators in environment was the Rubicode (note that some results of this program are shown in the first part of this study). Rubicode was a pan-European project that reviewed and developed concepts of dynamic ecosystems and the services they provided. It took place from 2006 to early 2009, coordinated by the Environmental Change Institute at the University of Oxford and involved 22 academic partners. It particularly focused on assessing the ecological resilience of those components of biological diversity essential for maintaining ecosystem services. One of its aims was ‘to improve and test indicators that provide rapid assessment methods for monitoring ecosystem and habitat ecological quality’.

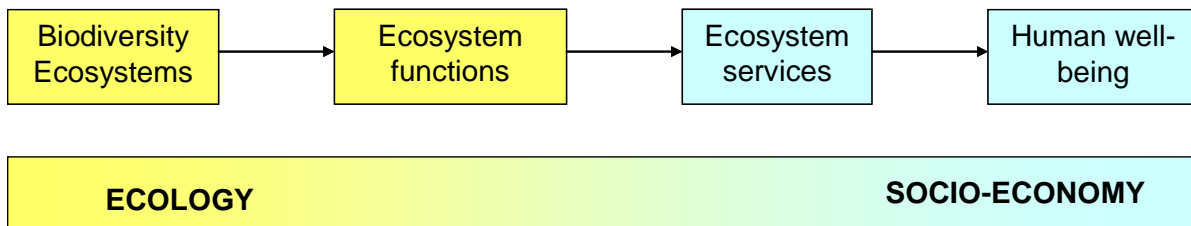
The trend to connect scientific investigations to indicators issue is growing and reveals the increasing implication of scientists in providing policy makers with tools to measure the fate of biodiversity. But, in the same time, it shows how recently ecological sciences have begun to work on these questions and that progress still need to be done (Mace & Baillie, 2007). That’s why it is important not to choose a set of indicators once for all but to be aware of new scientific developments. At the present stage, we propose a short review of the new issues in the field of the indicators of biodiversity.

5.2. *Rising issues*

5.2.1. Ecosystem services

Since the report of the MEA in 2005, the concept of ecosystem service has provided a new way to see the relationships between the three pillars of the sustainable development. Ecosystem services are ‘the benefits people obtain from ecosystems’ (MEA, 2005a). It relies on the functions of ecosystems (see figure 4).

Figure 4: Ecosystems and ecosystem services



It explores the consequences for human well-being of the current ecological crisis, underlining especially the link between poverty and ecosystem degradation (Diaz et al. 2006). It states that the degradation of ecosystem services poses a significant barrier to the achievement of the MDG targets for 2015 as many of the regions facing the greatest challenges in achieving the MDGs overlap with the regions facing the greatest problems related to the sustainable supply of ecosystem services (MEA, 2005a). A special focus is done on wetlands because of their importance as services providers (MEA, 2005b). The echo of the MEA reports in the media and for the policy-makers has proven that, being at the interface between environment and socio-economy, ecological services could be useful tools to communicate (Nature Editorials, 2009a).

However, the MEA also underlined the lack of:

- Available data on biodiversity and ecosystem functions;
- Comprehension of the ecological processes sustaining the delivery of the services.

Thus, at this stage, no indicators of ecological services or ecosystem functions have been tested and implemented. It is thus important to be aware of the findings in this field in order to incorporate this dimension in the OMW when indicators would be ready to be tested. Ideally, in the mind of most of the conservationists, it should bridge the environmental pillar of the sustainable development and the socio-economic ones.

But caution is needed for this approach as ‘conserving ecological services’ is not equivalent to ‘conserving biodiversity’. For instance, purification of water is an ecological service provided by wetlands. It can be maximised by a homogenous reed bed. This would not, in reverse, maximise biodiversity in the wetlands. Moreover if, in the MEA report, cultural services (aesthetical, spiritual) are clearly stated, in practice, their assessment is far harder than for the provisioning services (agriculture, fisheries ...). This approach may thus lead to a materialist view of the nature, denying its spiritual and/or intrinsic values. Finally, in this scope, valuing ecological services should not be mistaken with their monetary assessment.

Value and price are not the same. It is better not to try to put a price of some ecosystems to defend their importance.

5.2.2. Indicators to measure interactions between species

Currently, the indicators based on species, mostly found in “Trends in abundance and distribution of selected species” in the CBD, are all of the same type. The principle of such indicators is to summarize the average trend of several population sizes for several species. They have been used to describe the general trend of biodiversity (Living Planet Index) or more specific trends (e.g., WaterBird Index, Species Trend Index). The meaning and statistical property of these indicators are, by construction, highly dependent on the selected species. For instance, the farmland bird indicator, which reflects the trend in a selected list of farmland birds (which is officially used in many European countries, Gregory et al. 2005), is obviously silent on biodiversity’s fate in other habitats. Moreover, the link of these indicators with driving forces of biodiversity loss is not necessarily established. For instance the Living Planet Index (Loh et al. 2005), summarizes the average trend in vertebrate populations, can be positively or negatively influenced by human pressures depending on the area and species considered. Even if they give precious information on biodiversity, they are, by construction highly dependent on the selected species. Species can be selected for several reasons. First, species selection can be determined by practical constraints. For instance, the Living Planet is in theory only conditioned on the data available (Loh et al. 2005). Although this approach is free from subjective species selection, it is still highly dependent on the data used because the range of taxa and biomes covered are incomplete (only vertebrates, and mostly birds, are considered) and biased (LPI is only relevant in well-monitored regions). Alternatively, species selection can be motivated to summarize the fate of particular species a priori known to be influenced by specific anthropogenic pressures (e.g. agricultural intensification). This subjective species selection (e.g. focusing on farmland birds) is often itself dependent on other arbitrary criteria to determine which species should be included (e.g. which species should be considered as a farmland species). At best, a quantitative assessment is used (e.g. above a particular threshold of relative abundance in farmland the species is considered to be specialist to farmland). However, this species selection often results from expert judgment only. In any case the species selection leads these indicators based on selected species trends to be prone to a lack of objectivity and representativeness.

A new type of indicators has been developed: Marine Trophic Index (Pauly et al., 2005), Community Specialization Index (Devictor et al., 2007), Community Temperature Index (Devictor et al. 2008). Their main advantage is to be ecologically meaningful: a change in the indicator’s value can be related to ecological processes and to main drivers of biodiversity loss unambiguously (habitat degradation, climate change ...). This type of indicators could be calculated with the same data than for the indicators of trends in population, and are free from any subjective expert choice. They may also be calculated using presence/absence data instead of abundance data (Kerbiriou et al. In press). Moreover, as all the collected data are used, they give an outlook of the whole community and not only of a selected list of species. It is particularly important in the context of rapid global change increasing instability in species trends (invasive species, climatic change and change of the species ranges ...). To take all the species of a community without selection also allows to comparing distant geographical regions and/or habitats. For instance the Community Specialization Index was show consistent trends across biogeographic zones and habitats (Devictor et al. 2008)

The OMW should take into account these new potentialities, all the more since they will certainly be used in the next years at least at the European level (current process of

expertise). As the SEBI 2010 is the most advanced set of indicators and will certainly inspire the CBD's set of indicators, this new generation of indicators will certainly be widely used within the next decade.

5.2.3. Earth Observation: a tool to use more widely?

Once the indicators have been defined, data availability and standardisation are the main difficulties to surmount to implement the sets of indicators of biodiversity. In this context, EO can interestingly provide highly standardized data on land use and/or ecosystem extent with a large geographic scope, for a relative low cost.

Nevertheless, EO is not a magic tool. Field verifications are still necessary to validate the results and image analysis is long and requires qualified staff. The type of image has to be chosen depending on a trade-off between the degree of precision needed and the financial and human means.

It is also important to keep in mind that EO tools can give information relative to land use but not directly on biodiversity. It can thus be used to build indirect indicators of biodiversity, which should be used cautiously (see part 1.5.6.). For instance, the coverage of an area by forest does not tell about its management and the quality of the habitats for biodiversity.

5.2.4. Citizen sciences or observatories as means of actions

There has been a recent surge in ecological studies based on data collected from the general public, so-called citizen-science programs (Nature Editorials, 2009b). A huge number of such programs already exist, for a large variety of scales and taxa (Devictor & Beltrame, in press).

There are two advantages for this kind of programs in the OMW. First it provides valuable data on biodiversity, land use or physico-chemicals parameters, to assess the status and trends of wetlands. It is cost-efficient as it relies on a large and volunteer "research team". Second, beyond the traditional scientific component of large-scale investigations, citizen-science should promote environmental education and public commitment with conservation programs for more value-led global strategies (Jepson & Canney, 2003). It could therefore be a promising way for reconnecting people to nature (Miller 2005), raise awareness about wetlands, and involve the civil society in their protection. Specific programs can be dedicated to student and even to children. Without any doubt, the implication of civil society in collecting data on biodiversity can influence the choices of policy makers many countries.

Even if the first aim of the OMW is not to collect new data in the field, citizen science could be kept in mind as a possible way to gather standardized data at a large spatial scale, with relatively few means. It could be also a way to involve general public and thus, policy makers. Symbolically, to have local volunteers participating to a unique conservation program, with the same protocol, for instance on the same day, all around the Mediterranean Basin could be very strong. Indeed, this ecoregion is not only one of the biodiversity's hotspot but it is also a culturally and socially fragmented territory.

Conclusion

Possibility to find a small set of indicators widely used in the main programs

This review of 23 programs related to biodiversity, wetlands and SD registers around 20 themes and a large number of indicators (> 500). Nevertheless redundancy and congruency between the reviewed programs are high, especially as far as biodiversity and wetlands are concerned. This, put in respect with the three main objectives of the OMW, allows proposing five, integrative themes for the OMW and 13 sub-themes (Table 12).

Table 12: Proposed themes and sub-themes for the OMW, in relationships with its three objectives.

Observatory Objectives	Proposed priority themes	Proposed priority sub-thematics
1. To assess and share knowledge on the conservation status and trends of Mediterranean wetlands	Biodiversity components	Species
		Genetic
		Land cover
	Ecosystem integrity	Water
		Pollution
		Fragmentation
		Regulatory functions
		Interactions between species
2. To raise awareness among users and to help decision-making towards wetland conservation and sustainable management and use	Land management	Policies with environmental impact
		Policy implementation
	Adaptive management	Legislative and regulatory mechanisms
		Knowledge and innovation
3. To assess the status and trends of ecological functions, values and services of Mediterranean wetlands in the context of sustainable development.	Sustainable development	Ecological services

The first two themes correspond to the central objective of assessing the status and trends of Mediterranean wetlands. The third and four themes look at the threats over wetlands and the responses implemented by the society in terms of policy effectiveness and adaptive capacities. Last, the monitoring of ecological services should allow linking the environmental issues with the socio-economic ones.

In front of these sub-themes, few indicators can be suggested (Table 13). Their technical description is presented in annex 3. They have been chosen to be in accordance with the main

conventions and existing programs in order to be relevant for policymakers as well as in accordance with the scientific perspectives in order to anticipate changes.

Table 13: Suggested indicators for the OMW, in relationships with the three main objectives and the proposed themes and sub-themes. To be discussed at the workshop in March 2009. For indicators under themes “Adaptive management”, “Integration of environment in development process” and “Ecosystem services”, indicators are indicative and need to be reviewed in more detail (in green).

Observatory Objectives	Proposed priority themes	Proposed priority sub-themes	Indicator	Used in:
1. status & trends of wetlands	Biodiversity components	Species	Living Planet Index	CBD with WWF and IZL
			Species assemblage Trend Index	CBD (Wild Bird Index), SEBI (common birds, farmland birds butterflies), RAMSAR (WaterBird Index, amphibians) WFD (macrophytes, phytoplankton, invertebrates, fishes)
			Red List Index for wetland taxa	CBD with IUCN SEBI Ramsar Number of threatened species = OECD, MDG, EEA CSI, EU ICZM, BP Coastal, Fr NSB
			<i>Invasive species? List of species?</i>	<i>CBD, SEBI, Blue Plan Coastal</i>
		Genetic		
		Land cover	Proportional and absolute change in extent and turnover of land cover categories	CBD, SEBI, RAMSAR, frNOW, Fr Obs Litt, Fr Key env indic Partially, for particular ecosystems: Fr NSB, MDG, Eurostat, EEA CSI, EU ICZM, Fr Eu Com
			Coverage of PA and Wetlands (Inventory)	CBD, SEBI, Ramsar, FrNOW, MDG, Eurostat, CSI EEA, EU ICZM, BP MSSD, BP Coast, Fr Obs Littoral, Fr Eu Com
	Ecosystem integrity	Water	Trends in water quantity	Ramsar, WFD
			Exploitation Index of renewable resources	Equivalent to Intensity of use of water resources in OECD, MDG, EEA-CSI
		Pollution	Water – BOD	CBD, SEBi, Ramsar, WFD, Eurostat, CSI EEA, BP Coast
			Water - total N et P	CBD, SEBi, Ramsar, WFD, CSI EEA, EU ICZM, BP Coast
			Trends in the consumption and purchase of pesticides and fertilizers	
			Air quality in the main Mediterranean urban areas	Numerous indicators corresponding to the different pollutants, few global indicators (OECD, Eurostat, CSI EEA, Fr Key env indic, Fr Eu commitments)
		Fragmentation	Fragmentation of natural and semi-natural areas	CBD, SEBI BP Coast
			Fragmentation of river systems: number of dams in the watershed	CBD, SEBI, WFD
		Biotic integrity	Community Specialization Index	Expertise in course for SEBI-EU
			Community Temperature	Expertise in course for SEBI-EU

			Index	(Occurrence of temperature-sensitive species)
2. Threats on wetlands and responses	Land management	Policies with environmental impact on wetlands	Census of environmental policies	Ramsar (Legislative amendments implemented to reflect Ramsar provisions or Wise use policy in local management plan – not available yet)
			Census of sector-based policies with impact on environment	
			Update and development of Wetlands Inventories	Ramsar and at the Mediterranean level, MedWet Used also in local management plan: Biosphere Reserves, Natura 2000, PA, Local Development Plans, Charts.
		Policy implementation	Financing Biodiversity management	CBD, SEBI, Fr env key indic / Quite similar to the ones developed for development in Blue Plan, MDG, Eurostat, Fr SSD
			Ecological footprint	CBD, SEBI
			Demographic pressure and migrations	Eurostat, EU ICZM, Blue Plan Coastal, Fr Littoral Obs
			Urban expansion	Eu ICZM, Blue Plan MSSD, Blue Plan Coastal, Fr Littoral Obs
			Tourism: seasonality (water demand, demography, flat occupancy...), prices and access to housing	Blue Plan MSSD (+ a set of complementary indicators for tourism), Fr Littoral Obs
			Agriculture: surfaces, sustainable use or intensive farming	Sustainable agriculture: CBD, SEBI, Eurostat, EEA-CSI, EU ICZM, Blue Plan MSSD, Blue Plan coastal, Fr littoral Obs
			Water sanitation	
	Industry			
	Waste generation and recycling		OECD, Eurostat, EEA-CSI for SD, EU ICZM, Blue Plan MSSD, Blue Plan Coastal, Fr SSD, Fr key env indic, Fr Eu commitments	
	Energy: CO2 emission (with transports) or intensity of energy use		OECD, MDG, Eurostat, EEA-CSI for SD, EU ICZM, Blue Plan MSSD, Blue Plan Coastal, Fr SSD, Fr key env indic, Fr Eu commitments	
	Adaptive management	Legislative and regulatory mechanisms	Number and nature of training delivered in environmental adaptive management	
			Trends in launching eco-tourism initiatives	
			Number of labels for local products	BP Coast – EU ICZM
			Number of approved local and participative development plans	EU, UNDP
			Urbanization rate in the coastal areas at risk (coastal erosion + sea-level rise + storms)	BP Coastal, EU ICZM
		Knowledge and innovation	Livestock and plant varieties genetic diversity	CBD, SEBI, Fr NSB
			Public and private	

			expenses for research and development in percentage of GDP	
			Public awareness and participation	SEBi, Fr Key env
			% of countries including traditional knowledge and cultural values in their local development plans	ILO, UNESCO
			Number of domestication initiatives of local flora or fauna	
			Number of curriculums of primary education with environment courses	
			Number of national university/Institutes delivering specialized environmental curricula (number, contents, participants)	
3. Sustainable development	Integration of environment in development process		Trends in relative importance of environmental objectives and targets in the national MDG monitoring reports	MDG, Human Development Report, National Poverty Reduction Strategy, Link between MDG indicators and CBD ones
			Rate of achievement of environmental targets under the Objective 7 of MDG	Governments, all Sector Ministries, MDG Link between MDG indicators and CBD ones
			Number of countries adopting livelihood method for planning development	Local development, sustainable development planning process
			Number of countries implementing development for conservation projects.	PA, SPA, Natura 2000?
	Ecosystem services		Primary production	

Next steps for the OMW

Thus, this review provides materials to further establish a set of indicators, in accordance with all the partners of the OMW. The next meeting, foreseen in March 2009, should be a good opportunity to go a step forward. As the main objectives of the OMW have already been defined in 2007, it would be time to validate the main themes and sub-themes and to discuss the list of proposed indicators.

Nevertheless, even if a first list of indicators has been provided, it is important to keep in mind some important steps that should be implemented:

- To define accurately the users targeted by the OMW and their needs (see part one);

- To assess data availability and quality in the Mediterranean Basin;
- To test the adaptability of the proposed indicators at different scales.

All these steps are necessary to be able to answer the criteria of choice listed in part 1. They are thus essential for the OMW to start on an efficient basis.

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Acronyms

2010 BIP: 2010 Biodiversity Indicators Partnership
ALTER-Net: A Long-Term Biodiversity, Ecosystem and Awareness Research Network
CBD: Convention on the Biological Diversity
CCD: Convention to Combat Desertification
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS: Convention on Migratory Species of Wild Animals
COP: Conference of the parties
CSI: Core Set of Indicators
Deduce: Développement durable des Côtes Européennes
DPSIR: Driver-Pressure-State-Impact-Response
EC: European Commission
EEA: European Environment Agency
ESDS: European Strategy for Sustainable Development
ETC-ACC: European Topic Centre on Air and Climate Change
ETC-BD: European Thematic Centre on Biological Diversity
ETC-LUSI: European Topic Centre Land on Use and Spatial Information
ETC-SCP: European Topic Centre on Sustainable Consumption and Production
ETC-W: European Topic Centre on Water
EU: European Union
GEO: Global Environment Outlook
ICZM: Integrated Coastal Zone Management programs
IUCN: International Union for Conservation of Nature
MAB: Man and the Biosphere Programme
MAP: Mediterranean Action Plan
MCSD: Mediterranean Commission on Sustainable Development
MDG: Millennium Development Goals
MEA: Millennium Ecosystem Assessment
NGO: Non-Governmental Organisation
NMNH: National Museum of Natural History in Paris
MSSD: Mediterranean Strategy for Sustainable Development
NOW: French National Observatory on Wetlands
NSB: French National Strategy on Biodiversity
OECD: Organisation for Economic Co-operation and Development
OMW: Observatory of Mediterranean Wetlands
PSR: Pressure-State-Response
RAC: Regional Activity Centre
Rubicode: Rationalising Biodiversity Conservation in Dynamic Ecosystems
SEBI: Streaming European 2010 Biodiversity Indicators program
SD: Sustainable Development
SDI: Sustainable Development Indicators
SOaS: Service for Observation and Statistics
STRP: Scientific and Technical Review Panel
UN: United Nations
UNEP: United Nations Environment Programme
UNEP-WCMC: United Nations Environment Programme – World Conservation Monitoring Centre
UNESCO: United Nations Educational, Scientific and Cultural Organization
UPSR: Use-Pressure-State-Response
WFD: Water Framework Directive

Annex 1: Indicators found in the 23 reviewed programs classified by general theme of sustainable development

These general themes are the ones of the Eurostat set of indicators for the European SD Strategy. They are completed by others, found in the reviewed programs and of main relevance for wetlands.

General theme	Program main scope	Programs	Full name of indicators
Biodiversity Components	Biodiversity	CBD	Trends in extent of selected biomes, ecosystems and habitats
			Trends in abundance and distribution of selected species: LPI
			Trends in abundance and distribution of selected species: WaterBird Indicator
			Trends in abundance and distribution of selected species: Global Wild Bird Index
			Coverage of protected areas: extent
			Coverage of protected areas: overlays with Biodiversityersity
			Coverage of protected areas: management effectiveness of protected areas
			Change in status of threatened species: Red list Index or sampled RLI
			Trends in genetic diversity: Ex situ crop collection
			Trends in genetic diversity: genetic diversity of terrestrial domesticated animals
		EU SEBI	Ecosystem coverage: trends in spatial coverage of proposals of sites
			Habitats of European interest : change in conservation status
			Abundance and distribution of selected species:common bird
			Abundance and distribution of selected species: butterflies
			Nationally designated protected areas: IUCN category
			Nationally designated protected areas: biogeographic region
			Nationally designated protected areas: country
			Sites designated under the EU Habitats and Birds Directives: Trends in surface
			Sites designated under the EU Habitats and Birds Directives: Sufficiency Index
			Red List Index for European species based on global extinction risk (i.e. a European subset of the global RLI) : Global Red List Index
			Red List Index for European species based on regional extinction risk at either the pan European or EU scale : European Red List Index
			Species of European interest
			Livestock genetic diversity
		Fr NSB	Map of the land use diversity for little artificialised areas
			Dominance of little artificialised areas in landscapes
			Specific richness of common birds
			Specific richness of fishes
			Habitats of European interest: conservation status
			National red list species: status
		Wetlands	RAMSAR
	Trends in conservation status of wetlands - qualitative assessment		
	Status and trends of waterbird biogeographic populations		
	Trends in management effectiveness in Ramsar sites		

		Management effectiveness in Ramsar sites - distribution of scores
		Coverage of wetland-dependent bird populations by designated Ramsar sites
		Wetland Red List Index
		Coverage of the wetland Biodiversity designated Ramsar sites
	EU WFD	Composition and abundance of aquatic flora (other than phytoplankton)
		Composition, abundance and biomass of phytoplankton
		Composition and abundance of benthic invertebrate fauna
		Composition, abundance and age structure of fish fauna
	Fr NOW	Trends in land use between 1990 and 2000 in major wetlands
		Area and % of Ramsar sites included in protected area
		Part of wetlands Habitats of European interest in the site proposal for N2000
		Area of major wetlands sites included in protected area
		Scientific inventory coverage of Major wetlands
SD	OECD key env indic	Threatened species
	MDG	Proportion of land area covered by forest
		Proportion of terrestrial and marine areas protected
		Proportion of species threatened with extinction
	Eurostat-SD indic	Built-up areas
		Common bird index
		Sufficiency of sites designated under the EU Habitats directive
	EEA-CSI for SD	Land take
		Species diversity
		Designated areas
		Threatened and protected species
	EU ICZM	Area of semi-natural habitat
		Number of species per habitat type
		Area protected for nature conservation, landscape and heritage
		Rate of loss of or damage to, protected areas
		Number of Red List coastal area species
		Status and trend of specified habitats and species
	Blue Plan-MSDD	Surface of protected coastal and marine areas
	Blue Plan-Coastline	Evolution of the critical habitats (wetlands)
		Effective management of the protected areas (Surface, Number, %)
		Share of coastal and marine protected areas effectively managed
		Share of the posidonia beds in the infralittoral area (in some testing areas) with some vitality-related attribute
		Number of threatened species
	Fr SSD	Abundance index of the populations of common birds
	Fr Obs Littoral	Natural habitats in the coastal communes in 2000 and trends since 1990
		Land use in the coastal communes in 2000 and trends since 1990
		Statutory, landed and contractual protection of nature implemented in coastal communes
		Distribution of the coastal natural habitats of European interest
	Fr Key env indic	Trends in ecosystem coverage - land use
		Abundance index of the populations of common birds
	Fr Eu commitments	Land artificialisation
		Abundance index of the populations of common birds
		N2000 network advancement

Sustainable use of natural resources	Biodiversity	CBD	Areas of forest under sustainable management: certification		
			Areas of forest under sustainable management: degradation and deforestation		
			Areas of agricultural ecosystems under sustainable management		
			Proportion of products derived from sustainable sources: proportion of fish stocks in safe biological limits		
			Proportion of products derived from sustainable sources: status of species in trade		
			Proportion of products derived from sustainable sources: wild commodities index		
			Ecological footprint		
		EU SEBI	Forest: growing stock		
			Forest: balance between increment and fellings		
			Forest: deadwood		
			Agriculture: nitrogen balance		
			Agriculture: area under management practices potentially supporting Biodiversityersity --> high nature value farmland area		
			Agriculture: area under management practices potentially supporting Biodiversityersity --> organic farming		
			Agriculture: area under management practices potentially supporting Biodiversityersity --> Biodiversity supportive agri-env schemes		
			Fisheries: European commercial fish stocks		
			Aquaculture: effluent water quality from finfish farms		
			Ecological Footprint of European countries		
			SD	OECD key env indic	Intensity of use of water resources
					Intensity of use of forest resources
	Intensity of use of fish resources				
	MDG	Proportion of fish stocks within safe biological limits			
		Proportion of total water resources used			
	Eurostat-SD indic	Fish catches taken from stocks outside safe biological limits			
		Deadwood			
		Size of fishing fleet			
		Forest increment and fellings			
	EEA-CSI for SD	Use of freshwater resources			
		Area under organic farming			
		Status of marine fish stocks			
		Aquaculture production			
		Fishing fleet capacity			
	EU ICZM	State of the main fish stocks by species and sea area			
		Recruitment and spawning stock biomass by species			
		Landings and fish mortality by species			
		Value of landings by port and species			
		Number of days of reduced water supply			
Blue Plan-MSDD	Water Efficiency Index (total and by sector)				
	Water demand and compared to GDP (total and by sector)				
	Exploitation Index of renewable resources				
Blue Plan-Coastline	Regional labels of quality, local handcraft Labels				
	Number of employments in the fisheries sector				
	Fishing effort efficiency				
	Evolution of fish stocks yield				
	Aquaculture production				
	Catches/unloading by species				

			Percentage of certified fisheries
		Fr SSD	Part of the catches relative to fish stocks
		Fr Eu commitments	Commercial fishes stocks
Ecosystem integrity	Biodiversity	CBD	Marine Trophic Index
			Water quality : composite indicator of (BOD + Nitrate concentration + suspended sediments +pH/Temperature)
			Connectivity/fragmentation of ecosystems: forest fragmentation
			Connectivity/fragmentation of ecosystems: river fragmentation and flow regulation
			Health and well being of communities depending directly on ecosystem goods and services
			Nutritional status of Biodiversityersity
			Biodiversityersity for food and medicine
		EU SEBI	Marine Trophic Index of European seas
			Nutrients in transitional, coastal and marine waters : N, P, N/P
			Freshwater quality: annual concentration in rivers of BOD
			Freshwater quality: annual concentration in rivers of total ammonium concentration
			Freshwater quality: trends in concentration of orthophosphate in rivers
			Freshwater quality: trends in concentration of nitrate in rivers
			Freshwater quality: trends in concentration of total phosphorus in lakes
			Freshwater quality: trends in concentration of nitrate in lakes
			Freshwater quality: trends in concentration of nitrate in grounwater
			Fragmentation of natural and seminatural areas
			Fragmentation of river systems
			Fr NSB
	Tree defoliation		
	Wetlands	RAMSAR	The economic costs of unwanted floods and droughts
			Trends in dissolved nitrate / nitrogen concentration
			Trends in Biological Oxygen Demand (BOD)
			Trends in water quantity
			Trends in conservation status of Ramsar sites - qualitative assessment
		EU WFD	Quantity and dynamics of water flow
			Residence time
			Connection to the groundwater body
			River continuity
			Lake depth variation
			Quantity, structure and substrate of the lake bed
			Structure of the lake shore
			Transparency
Thermal conditions			
Oxygenation conditions			
Salinity			
Acidification status			
Nutrient conditions			
Pollution by all priority substances identified as being discharged into the body of water			
Pollution by other substances identified as being discharged in significant quantities into the body of water			
Direction of dominant currents			
Wave exposure			

	SD	MDG	Proportion of population using an improved sanitation facility
		Eurostat-SD indic	Surface and groundwater abstraction as a share of available resources
			Population connected to urban wastewater treatment with at least secondary treatment
			Biochemical oxygen demand in rivers
			Concentration of mercury in fish and shellfish
			Forest trees damaged by defoliation
			Land at risk of soil erosion
		EEA-CSI for SD	Oxygen-consuming substances in rivers
			Nutrients in freshwater
			Nutrients in transitional, coastal and marine waters
			Bathing water quality
			Chlorophyll in transitional, coastal and marine waters
			Urban wastewater treatment
		EU ICZM	Progress in management of contaminated sites
			Percentage of bathing waters compliant with the guide value of the European Bathing Water Directive
			Riverine and direct inputs of nitrogen and phosphorus in inshore waters
			Volume of accidental oil spills
		Blue Plan-MSDD	Number of observed oil slicks from aerial surveillance
			Share of population with access to an improved sanitation system (total, urban, rural)
		Blue Plan-Coastline	Proportion of coastal urban population connected to a sanitation network
			Discharge at sea per flag (frequency, volume, surface)
			Number of penalties per flag
			Share of the stock of yachting boats with wastewater tank
			Percentage of ports with worn oils facilities
			Volume of the sales of paintings at-risk (TBT)
			Releases of BOD and nutrients from industrial sites
			Bathing water quality
			Concentration of nutrients in coastal water
Releases of toxic substances			
Number of landfills (controled and uncontroled) on the coast			
Share of non-fragmented sites, ecosystems and landscapes			
Fr Obs Littoral	Trends in the sea bathing water quality from 1992 to 2003		
Fr Key env indic	NO3 in rivers		
Fr Eu commitments	Total P in rivers		
	NO3 in rivers		
Threats on Biodiversity	Biodiversity	CBD	Nitrogen deposition
			Invasive Alien Species indicator
	EU SEBI	Critical load exceedance for nitrogen	
		Invasive alien species in Europe: Cumulative number of alien species in Europe since 1900'	
		Invasive alien species in Europe: Worst invasive alien species threatening Biodiversityersity in Europe'	
		Occurrence of temperature-sensitive species	
Wetlands	RAMSAR	Frequency of threats affecting Ramsar sites - qualitative assessment	
SD	Blue Plan-Coastline	Number of alien marine plants	

		Fr Obs Littoral	Population living in areas under industrial risk in the coastal communes in 2002
Traditional knowledge	Biodiversity	CBD	Status and trends of linguistic diversity and number of speakers of indigenous languages
Socio-economic development	SD	Eurostat-SD indic	Growth rate of GDP per inhabitant
			Total investment
			Public investment
			Business investment
			Dispersion of regional GDP per inhabitant
			Net national income
			Gross household saving
			Growth rate of labour productivity per hour worked
			Total R&D expenditure
			Real effective exchange rate
			Turnover from innovation (by economic sector not yet available)
			Effects of innovation on material and energy efficiency
			Energy intensity of the economy
			Employment rate
			Employment rate, by gender
			Employment rate, by highest level of education attained
			Dispersion of regional employment rates, by gender
			Unemployment rate, by gender
			Unemployment rate, by age group
		EU ICZM	Number and value of sales of local products with regional quality labels or European PDO/PGI/TSG
			Full time, part time and seasonal employment per sector
			Value added per sector
			Number of incoming and outgoing passengers per port
			Total volume of goods handled per port
			Proportion of goods carried by short sea routes
			Number of overnight stays in tourist accommodation
			Occupancy rate of bed places
			Number of tourist accommodation units holding EU Eco-label
			Ratio of overnight stays to number of residents
		Fr SSD	GDP growth by inhabitant
		Fr Obs Littoral	Employment on the coast in 1999 and trends since 1990
			Distribution of the "productive", "residential" and "public" sphere in the paid employees on the coast in 2005
			Typology of the main employment sectors on the coast in 1999
Typology of the people in employment living on the coast in 1999			
Sustainable production	SD	OECD key env indic	Municipal waste generation intensities
			Waste water treatment connection rates
		EU ICZM	Volume of litter collected per given length of shoreline
		Eurostat-SD indic	Organisations with an environmental management system
			Eco-label awards
			Area under agri-environmental commitment
			Area under organic farming
			Livestock density index
			Resource Productivity
		Municipal waste generated	
Components of domestic material consumption			

			Domestic material consumption by material
			Municipal waste treatment, by type of treatment method
			Generation of hazardous waste, by economic activity
			Emissions of acidifying substances by source sector
			Emissions of ozone precursors by source sector
			Emissions of particulate matter by source sector
			Electricity consumption by households
			Final energy consumption by sector
			Consumption of certain foodstuffs per inhabitant
			Motorisation rate
		EEA-CSI for SD	Municipal waste generation
			Generation and recycling of packaging waste
		Fr SSD	Quantity of collected municipal waste
		Fr Key env indic	Recycling of packaging waste
		Fr Eu commitments	Recycling of packaging waste
			Quantity of collected municipal waste
Social integration	SD	MDG	Proportion of population below \$1 (PPP) per day
			Poverty gap ratio
			Share of poorest quintile in national consumption
			Growth rate of GDP per person employed
			Employment-to-population ratio
			Proportion of employed people living below \$1 (PPP) per day
			Proportion of own-account and contributing family workers in total employment
			Prevalence of underweight children under-five years of age
			Proportion of population below minimum level of dietary energy consumption
			Net enrolment ratio in primary education
			Proportion of pupils starting grade 1 who reach last grade of primary
			Literacy rate of 15-24 year-olds, women and men
			Ratios of girls to boys in primary, secondary and tertiary education
			Share of women in wage employment in the non-agricultural sector
			Proportion of seats held by women in national parliament
			Eurostat-SD indic
		At-persistent-risk-of-poverty rate	
		At-risk-of-poverty rate after social transfers, by age group	
		At-risk-of-poverty rate after social transfers, by household type	
		Relative at-risk-of-poverty gap	
		Inequality of income distribution	
		People living in jobless households, by age group	
		In-work poverty	
		Total long-term unemployment rate	
		Gender pay gap in unadjusted form rate after social	
		Early school leavers	
		At-risk-of-poverty rate, by highest level of education attained	
		Persons with low educational attainment, by age group	
		Life-long learning	
		Low reading literacy performance of pupils	
		Individuals' level of computer skills	
		Individuals' level of internet skills	

		EU ICZM	Indices of social exclusion by area	
			Average household income	
			Percentage of population with a higher education qualification	
			Ratio of first to second and holiday homes	
		Blue Plan-MSDD	Youth literacy rate	
			Girl/Boy primary and secondary school registration ratio	
		Fr SSD	Part of the households under poverty threshold after social transferts	
			Rate of old dependancy	
Demography	SD	Eurostat-SD indic	Employment rate of older workers	
			Life expectancy at age 65, by gender	
			Total fertility rate	
			Net migration including corrections	
			Aggregated replacement ratio	
			At-risk-of-poverty rate for persons aged 65 years and over	
			General government debt	
			Average exit age from the labour market	
		Fr SSD	Life expectancy in good health	
		Fr Obs Littoral	Inhabitants age on the coast in 1999 and trends since 1990	
			Net natural and migration rate on the coast between 1990 and 1999	
			Median fiscal income in the area of coastal employment	
Trends in the population of the coastal communes from 1968 to 1999				
Public health	SD	OECD key env indic	Ozone depleting substances	
			SOx and NOx emission intensities	
		MDG	Under-five mortality rate	
			Infant mortality rate	
			Proportion of 1 year-old children immunised against measles	
			Maternal mortality ratio	
			Proportion of births attended by skilled health personnel	
			Contraceptive prevalence rate	
			Adolescent birth rate	
			Antenatal care coverage (at least one visit and at least four visits)	
			Unmet need for family planning	
			HIV prevalence among population aged 15-24 years	
			Condom use at last high-risk sex	
			Proportion of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS	
			Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years	
			Proportion of population with advanced HIV infection with access to antiretroviral drugs	
			Incidence and death rates associated with malaria	
			Proportion of children under 5 sleeping under insecticide-treated bednets	
			Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs	
			Incidence, prevalence and death rates associated with tuberculosis	
			Proportion of tuberculosis cases detected and cured under directly observed treatment short course	
			Proportion of population using an improved drinking water source	
			Proportion of urban population living in slums	
			Eurostat-SD indic	years and life expectancy at birth, by gender
				Death rate due to chronic diseases, by gender

			Healthy life years and life expectancy at age 65, by gender	
			Suicide death rate, total by age group	
			Suicide death rate, males by age group	
			Suicide death rate, females by age group	
			Self reported unmet need for medical examination or treatment, by income quintile	
			Dispersion of regional death rates Not yet available	
			Index of production of toxic chemicals, by toxicity class	
			Population exposure to air pollution by particular matter	
			Population exposure to air pollution by ozone	
			Population living in households considering that they suffer from noise	
			Serious accidents at work	
		EEA-CSI for SD	Emissions of acidifying substances	
			Emissions of ozone precursors	
			Emissions of primary particulates and secondary particulate precursors	
			Exceedance of air quality limit values in urban areas	
			Exposure of ecosystems to acidification, eutrophication and ozone	
			Consumption of ozone-depleting substances	
		Blue Plan-MSDD	Share of population with access to an improved water sources (total, urban, rural)	
		Fr Eu commitments	Ozone: overtaking of the treshold for health protection	
			Particles: overtaking of the treshold for health protection	
			Nitrogen dioxyd: overtaking of the treshold for health protection	
			Protection of the ozone layer	
			Emissions of acidifying substances and ozone precursors	
			Emissions of dioxines and furannes	
			Emissions of HAP	
			Emissions of fine particles by road transport	
			Emissions of heavy metals in the air (Cadmium, mercury,lead)	
		Fr Key env indic	Air pollution Index	
Climatic change and energy	SD	OECD key env indic	CO2 and greenhouse gas emission intensities	
			Intensity of enedgy use	
		MDG	CO2 emissions, total, per capita and per \$1 GDP (PPP)	
			Consumption of ozone-depleting substances	
		Eurostat-SD indic	Greenhouse gas emissions	
			Share of renewables in gross inland energy consumption	
			Greenhouse gas emissions by sector (including sinks)	
			Greenhouse gas emissions intensity of energy consumption	
			Projections of greenhouse gas emissions	
			Global surface average temperature	
			Energy dependency	
			Gross inland energy consumption by fuel	
			Electricity generated from renewable sources	
			Consumption of biofuels by transport	
			Combined heat and power generation	
			Implicit tax rate on energy	
			Energy consumption by transport mode	
			EEA-CSI for SD	Global and European temperature
				Greenhouse gas emissions and removals

			Projections of greenhouse gas emissions and removals and policies and measures
			Atmospheric greenhouse gas concentrations
			Final energy consumption
			Total energy intensity
			Total energy consumption
			Renewable energy consumption
			Renewable electricity
		EU ICZM	Number of 'stormy days'
			Rise in sea level relative to land
			Length of protected and defended coastline
			Number of people living within an 'at risk' zone
			Area of protected sites within an 'at risk' zone
			Value of economic assets within an 'at risk' zone
			Length of dynamic coastline
			Area and volume of sand nourishment
		Blue Plan-MSDD	Energy intensity (total and by sector)
			Share of renewable energies in energy balance
			Greenhouse gas emissions
			Amount financed in the framework of the Kyoto Protocol flexibility mechanisms by the annex 1 countries to the benefit of other Mediterranean countries
		Blue Plan-Coastline	Number of stormy days
			Sea level rise
			Share of the land exposed to the sea level rise (share of the exposed urban zones)
			Cost for protecting the zones at-risk/cost for management-anticipation of climatic change
			Value of the ecosystems threatened by the sea level rise (by km ²)
			Population potentially affected by the sea level rise
		Fr SSD	Greenhouse gas emissions
			Share of renewable energies in energy balance
		Fr Key env indic	Greenhouse gas emissions
			Share of renewable energies in energy balance
			imported materials/consumed materials
		Fr Eu commitments	Greenhouse gas emissions
			Share of renewable energies in electricity balance
			Share of renewable energies in energy balance
Transport	SD	Eurostat-SD indic	Modal split of passenger transport
			Modal split of freight transport
			Volume of freight transport relative to GDP
			Volume of passenger transport relative to GDP
			Investment in transport infrastructure by mode
			Greenhouse gas emissions by transport mode
			People killed in road accidents
			Emissions of ozone precursors from transport
			Emissions of particulate matter from transport
			Average CO ₂ emissions per km from new passenger cars
		EEA-CSI for SD	Passenger transport demand
			Freight transport demand
			Use of cleaner and alternative fuels

		Blue Plan-MSDD	Motor transport intensity compared to GDP		
			The proportion of road transport in terms of land freight transport		
			Share of public surface transport (urban and inter-urban)		
		Fr SSD	Energy consumption of transport		
Global partnership	Biodiversity	CBD	Status of resources transfer: Official development assistance provided in support of the Convention		
		EU SEBI	Financing Biodiversity management		
	SD	MDG	Net ODA, total and to the least developed countries, as percentage of OECD/DAC donors' gross national income		
			Proportion of total bilateral, sector-allocable ODA of OECD/DAC donors to basic social services (basic education, primary health care, nutrition, safe water and sanitation)		
			Proportion of bilateral official development assistance of OECD/DAC donors that is untied		
			ODA received in landlocked developing countries as a proportion of their gross national incomes		
			ODA received in small island developing States as a proportion of their gross national incomes		
			Proportion of total developed country imports (by value and excluding arms) from developing countries and least developed countries, admitted free of duty		
			Average tariffs imposed by developed countries on agricultural products and textiles and clothing from developing countries		
			Agricultural support estimate for OECD countries as a percentage of their gross domestic product		
			Proportion of ODA provided to help build trade capacity		
			Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion points (cumulative)		
			Debt relief committed under HIPC and MDRI Initiatives		
			Debt service as a percentage of exports of goods and services		
			Proportion of population with access to affordable essential drugs on a sustainable basis		
			Telephone lines per 100 population		
			Cellular subscribers per 100 population		
			Internet users per 100 population		
			Eurostat-SD indic		Development Assistance as share of gross national income
					EU imports from developing countries, by income group
	EU imports from developing countries by group of products				
	EU imports from least-developed countries by group of products				
	Aggregated measurement of support				
	EU financing for developing countries, by type				
	Foreign direct investment in developing countries, by income group				
	Official development assistance, by income group				
	Untied official development assistance				
	Bilateral official development assistance, by category				
	Blue Plan-MSDD		CO2 emissions per inhabitant in the EU and in developing countries		
			ODA allocated as % of OECD DAC countries donors' GNP; proportion of the ODA allocated to Mediterranean countries and proportion contributing to the strategy objectives		
				EU net public financial flows to EU Mediterranean members, candidates, CARDS and MEDA countries (in absolute value and per capita) and proportion contributing to the objectives of the strategy	

			Proportion of bank credit allocated to the private sector – Existence of alternative financing systems to bank credit
			Proportion of local government tax receipts as percentage of total tax revenues (government receipts). Proportion of government budget allocated to local authorities.
			Public financial mechanisms to support the least favoured regions
		Fr SSD	Public aid to development
		Fr Key env indic	Environment protection expenditures
Governance	Biodiversity	CBD	Indicator of access and benefit-sharing
		EU SEBI	Patent applications based on genetic resources
			Public awareness
	Wetlands	RAMSAR	Legislative amendments implemented to reflect Ramsar provisions
			Wise use policy
	SD	Eurostat-SD indic	Shares of environmental and labour taxes in total tax revenues
			New infringement cases
			Transposition of Community law, by policy area
			Voter turnout in national and EU parliamentary elections
			E-government on-line availability
E-government usage by individuals			
Blue Plan-MSDD		Public and private expenses for research and development in percentage of GDP	
Fr Key env indic	French people preoccupation (poll)		
Tourism	SD	Blue Plan-MSDD	Share of “non-seaside resort beds” vs total number of beds
			International tourism receipts
		Fr Obs Littoral	Touristic typology in the coastal communes in 2000
			Land use trend in relation with distance to the sea between 1990 and 2000
Agricultural and rural development	SD	EAA-CSI for SD	Gross nutrient balance
		Blue Plan-MSDD	Proportion of agriculture quality products and Share of the agricultural land area used by organic farming
			Ratio of agricultural population vs rural population
			Loss of arable land
			Share of public budget allocated to sustainable rural development programmes
		Fr Obs Littoral	Proportion of farms with at least one activity related to tourism or direct sale in the coastal districts in 2000
			Trends in the agricultural land area used by agriculture in the coastal communes and their hinterland between 1970 and 2000
			Urban land pressure on the rural areas in surface and in value, outside of the area to urbanize, in the coastal districts
			Socio-economic typology of the farms in the coastal districts in 2000
			Main culture types on the coast in 2000
Littoralisation	SD	EU ICZM	Proportion of agricultural land farmed intensively
			Size, density and proportion of the population living on the coast
			Value of residential property
			Percentage of built-up land by distance from the coastline
			Area converted from non-developed to developed land uses
			Volume of traffic on coastal motorways and major roads
			Number of berths and moorings for recreational boating

	Blue Plan-MSDD	Number of cities with over 10 000 inhabitants engaged in a process Agenda 21 type or in urban renewal programmes
		Proportion of urban population with access to a decent dwelling
		Household waste produced per capita and number of uncontrolled landfills
		Air quality in the main Mediterranean urban areas
		Share of artificialised coastline
		Operational pollution from ships
	Blue Plan-Coastline	Artificialisation by transport infrastructures
		Population Growth in coastal cities
		Built up area per capita
	Fr Obs Littoral	Coastal erosion in 2003
		Trends in housing building between 2000 and 2006 on the coast
		Trends in housing building between 2000 and 2006 in the coastal communes, by type
		Trends in non-residential building between 1990 and 2003 on the coast (coastal communes and hinterland)
		Building density in the coastal districts between 1990 and 2003
		Typology of the main residences on the coast in 1999
	Value of the real estate in the coastal communes: the old flats	

Annex 2: Indicators found in the 23 reviewed programs classified by CBD headline indicators

These CBD headline indicators were completed by other major headline indicators found in the reviewed programs related to biodiversity or wetlands and not found in the CBD.

CBD headline indicators	Program main theme	Programs	Full name of indicators
Trends in extent of selected biomes, ecosystems and habitats	Biodiversity	CBD	Trends in extent of selected biomes, ecosystems and habitats
		EU SEBI	Ecosystem coverage: trends in spatial coverage of proposals of sites
			Habitats of European interest : change in conservation status
		Fr NSB	Map of the land use diversity for little artificialised areas
	Dominance of little artificialised areas in landscapes		
	Wetlands	Fr NOW	trends in land use between 1990 and 2000 in major wetlands
		RAMSAR	Status and trends in ecosystem extent
			Trends in conservation status of wetlands - qualitative assessment
	SD	MDG	Proportion of land area covered by forest
		Eurostat-SD indic	Built-up areas
		EEA-CSI for SD	Land take
		EU ICZM	Area of semi-natural habitat
			<i>Status and trend of specified habitats and species</i>
		Blue Plan-Coastline	Evolution of the critical habitats (wetlands)
		Fr Obs Littoral	Natural habitats in the coastal communes in 2000 and trends since 1990
			Land use in the coastal communes in 2000 and trends since 1990
	Fr Key env indic	trends in ecosystem coverage - land use (CLC 7 categories)	
Fr Eu commitments	Land artificialisation		
Trends in abundance and distribution of selected species	Biodiversity	CBD	Trends in abundance and distribution of selected species: LPI
			Trends in abundance and distribution of selected species: WaterBird Indicator
			Trends in abundance and distribution of selected species: Global Wild Bird Index
	EU SEBI		Abundance and distribution of selected species:common bird
			Abundance and distribution of selected species: butterflies
	Fr NSB		Specific richness of common birds
			Specific richness of fishes
	Wetlands	RAMSAR	Status and trends of waterbird biogeographic

			populations
		EU WFD	Composition and abundance of aquatic flora (other than phytoplankton)
			Composition, abundance and biomass of phytoplankton
			Composition and abundance of benthic invertebrate fauna
			Composition, abundance and age structure of fish fauna
	SD	Eurostat-SD indic	Common bird index
		EEA-CSI for SD	Species diversity
		EU ICZM	Number of species per habitat type
			<i>Status and trend of specified habitats and species</i>
		Fr SSD	Abundance index of the populations of common birds
		Fr Key env indic	Abundance index of the populations of common birds
		Fr Eu commitments	Abundance index of the populations of common birds
Coverage of protected areas	Biodiversity	CBD	Coverage of protected areas: extent
			Coverage of protected areas: overlays with biodiversity
			Coverage of protected areas: management effectiveness of protected areas
		EU SEBI	Nationally designated protected areas: IUCN category
			Nationally designated protected areas: biogeographic region
			Nationally designated protected areas: country
			Sites designated under the EU Habitats and Birds Directives: Trends in surface
			Sites designated under the EU Habitats and Birds Directives: Sufficiency Index
		Fr NSB	Etat de conservation des habitats d'intérêt communautaire des sites N2000 (MNHN)
		Wetlands	RAMSAR
	Management effectiveness in Ramsar sites - distribution of scores		
	Coverage of wetland-dependent bird populations by designated Ramsar sites		
	<i>Coverage of the wetland biodiversity designated Ramsar sites</i>		
	Fr NOW		Area and % of Ramsar sites included in protected area
			Part of wetlands Habitats of European interest in the site proposal for N2000
			Area of major wetlands sites included in protected area
	SD	MDG	Proportion of terrestrial and marine areas protected
		Eurostat-SD indic	Sufficiency of sites designated under the EU Habitats directive
		EEA-CSI for SD	Designated areas
		EU ICZM	Area protected for nature conservation, landscape and heritage

			Rate of loss of or damage to, protected areas
		Blue Plan-MSDD	Surface of protected coastal and marine areas
		Blue Plan-Coastline	Effective management of the protected areas (Surface, Number, %)
			Share of coastal an marine protected areas effectively managed
		Fr Obs Littoral	Share of the posidonia beds in the infralittoral area (in some testing areas) with some vitality-related attribute
			Statutory, landed and contractual protection of nature implemented in coastal communes
		Fr Eu commitments	Distribution of the coastal natural habitats of European interest
			N2000 network advancement
Change in status of threatened species	Biodiversity	CBD	Change in status of threatened species: Red list Index or sampled RLI
		EU SEBI	Red List Index for European species based on global extinction risk (i.e. a European subset of the global RLI) : Global Red List Index
			Red List Index for European species based on regional extinction risk at either the pan European or EU scale : European Red List Index
			Species of European interest
	Fr NSB	Statut des espèces de la liste rouge nationale (MNHN)	
	Wetlands	RAMSAR	Wetland Red List Index
	SD	OECD key env indic	Threatened species
		MDG	Proportion of species threatened with extinction
		EEA-CSI for SD	Threatened and protected species
		EU ICZM	Number of Red List coastal area species
Blue Plan-Coastline		Number of threatened species	
Trends in genetic diversity	Biodiversity	CBD	Trends in genetic diversity: Ex situ crop collection
			Trends in genetic diversity: genetic diversity of terrestrial domesticated animals
	EU SEBI	Livestock genetic diversity	
	Fr NSB	Number of vegetal and animal varieties registred for trade	
Proportion of products derived from sustainable sources	Biodiversity	CBD	Areas of forest under sustainable management: certification
			Areas of forest under sustainable management: degradation and deforestation
			Areas of agricultural ecosystems under sustainable management
			Proportion of products derived from sustainable sources: proportion of fish stocks in safe biological limits
			Proportion of products derived from sustainable sources: status of species in trade
			Proportion of products derived from sustainable sources: wild commodities index

	EU SEBI	Forest: growing stock
		Forest: balance between increment and fellings
		Forest: deadwood
		Agriculture: nitrogen balance
		Agriculture: area under management practices potentially supporting biodiversity --> high nature value farmland area
		Agriculture: area under management practices potentially supporting biodiversity --> organic farming
		Agriculture: area under management practices potentially supporting biodiversity --> biodiv supportive agri-env schemes
		Fisheries: European commercial fish stocks
		Aquaculture: effluent water quality from finfish farms
SD	OECD key env indic	Intensity of use of water resources
		Intensity of use of forest resources
		Intensity of use of fish resources
	MDG	Proportion of fish stocks within safe biological limits
		Proportion of total water resources used
	Eurostat-SD indic	Fish catches taken from stocks outside safe biological limits
		Deadwood
		Size of fishing fleet
		Forest increment and fellings
		Surface and groundwater abstraction as a share of available resources
		Organisations with an environmental management system
		Eco-label awards
		Area under agri-environmental commitment
		Area under organic farming
		Livestock density index
	EEA-CSI for SD	Use of freshwater resources
		Area under organic farming
		Status of marine fish stocks
		Aquaculture production
		Fishing fleet capacity
	EU ICZM	State of the main fish stocks by species and sea area
		Recruitment and spawning stock biomass by species
		Landings and fish mortality by species
		Value of landings by port and species
		Number of days of reduced water supply
		Number and value of sales of local products with regional quality labels or European PDO/PGI/TSG
		Proportion of agricultural land farmed intensively
	Blue Plan-MSDD	Water Efficiency Index (total and by sector)
		Water demand and compared to GDP (total and by sector)
		Exploitation Index of renewable resources
Proportion of agriculture quality products and Share of the agricultural land area used by organic farming		
Blue Plan-	Regional labels of quality, local handcraft Labels	

		Coastline	Number of employments in the fisheries sector
			Fishing effort efficiency
			Evolution of fish stocks yield
			Aquaculture production
			Catches/unloading by species
			Percentage of certified fisheries
		Fr SSD	Part of the catches relative to fish stocks
		Fr Eu commitments	Commercial fishes stocks
Ecological footprint and related concepts	Biodiversity	CBD	Ecological footprint
		EU SEBI	Ecological Footprint of European countries
Nitrogen deposition	Biodiversity	CBD	Nitrogen deposition
		EU SEBI	Critical load exceedance for nitrogen
	Wetlands	RAMSAR	<i>Frequency of threats affecting Ramsar sites - qualitative assessment</i>
Invasive species	Biodiversity	CBD	Invasive Alien Species indicator
		EU SEBI	Invasive alien species in Europe: Cumulative number of alien species in Europe since 1900'
			Invasive alien species in Europe: Worst invasive alien species threatening biodiversity in Europe'
	Wetlands	RAMSAR	<i>Frequency of threats affecting Ramsar sites - qualitative assessment</i>
	SD	Blue Plan-Coastline	Number of alien marine plants
Impact of climate change	Biodiversity	EU SEBI	Occurrence of temperature-sensitive species
	Wetlands	RAMSAR	The economic costs of unwanted floods and droughts
			<i>Frequency of threats affecting Ramsar sites - qualitative assessment</i>
	SD	EEA-CSI for SD	Global and European temperature
			EU ICZM
			Rise in sea level relative to land
			Length of protected and defended coastline
			Number of people living within an 'at risk' zone
			Area of protected sites within an 'at risk' zone
			Value of economic assets within an 'at risk' zone
		Blue Plan-Coastline	Number of stormy days
			Sea level rise
			Share of the land exposed to the sea level rise (share of the exposed urban zones)
		Cost for protecting the zones at-risk/cost for management-anticipation of climatic change	
		Value of the ecosystems threatened by the sea level rise (by km2)	
	Population potentially affected by the sea level rise		
Marine Trophic Index	Biodiversity	CBD	Marine Trophic Index
		EU SEBI	Marine Trophic Index of European seas
Water quality	Biodiversity	CBD	Water quality : composite indicator of (BOD + Nitrate concentration + suspended sediments +pH/Temperature)
		EU SEBI	Nutrients in transitional, coastal and marine waters : N, P, N/P

		Freshwater quality: annual concentration in rivers of BOD	
		Freshwater quality: annual concentration in rivers of total ammonium concentration	
		Freshwater quality: trends in concentration of orthophosphate in rivers	
		Freshwater quality: trends in concentration of nitrate in rivers	
		Freshwater quality: trends in concentration of total phosphorus in lakes	
		Freshwater quality: trends in concentration of nitrate in lakes	
		Freshwater quality: trends in concentration of nitrate in groundwater	
	Fr NSB	Global Normalized Biological Index of rivers	
Wetlands	RAMSAR	Trends in dissolved nitrate / nitrogen concentration	
		Trends in Biological Oxygen Demand (BOD)	
	EU WFD	Transparency	
		Oxygenation conditions	
		Salinity	
		Acidification status	
		Nutrient conditions	
		Pollution by all priority substances identified as being discharged into the body of water	
Pollution by other substances identified as being discharged in significant quantities into the body of water			
SD	MDG	Proportion of population using an improved sanitation facility	
	Eurostat-SD indic	Population connected to urban wastewater treatment with at least secondary treatment	
		Biochemical oxygen demand in rivers	
		Concentration of mercury in fish and shellfish	
	EEA-CSI for SD	Oxygen-consuming substances in rivers	
		Nutrients in freshwater	
		Nutrients in transitional, coastal and marine waters	
		Bathing water quality	
		Chlorophyll in transitional, coastal and marine waters	
	EU ICZM	Urban wastewater treatment	
		Percentage of bathing waters compliant with the guide value of the European Bathing Water Directive	
		Riverine and direct inputs of nitrogen and phosphorus in inshore waters	
		Volume of accidental oil spills	
	Blue Plan-MSDD	Number of observed oil slicks from aerial surveillance	
		Share of population with access to an improved sanitation system (total, urban, rural)	
	Blue Plan-Coastline	Proportion of coastal urban population connected to a sanitation network	
		Discharge at sea per flag (frequency, volume, surface)	
		Number of penalties per flag	
			Share of the stock of yachting boats with wastewater tank

			Percentage of ports with worn oils facilities
			Volume of the sales of paintings at-risk (TBT)
			Releases of BOD and nutrients from industrial sites
			Bathing water quality
			Concentration of nutrients in coastal water
			Releases of toxic substances
			Number of landfills (controled and uncontroled) on the coast
		Fr Obs Littoral	Trends in the sea bathing water quality from 1992 to 2003
		Fr Key env indic	NO3 in rivers
		Fr Eu commitments	Total P in rivers
			NO3 in rivers
Water quantity	Wetlands	RAMSAR	Trends in water quantity
		EU WFD	Quantity and dynamics of water flow
			Residence time
			Connection to the groundwater body
			Lake depth variation
			Quantity, structure and substrate of the lake bed
			Structure of the lake shore
			Thermal conditions
			Direction of dominant currents
Wave exposure			
Connectivity/fragmentation of ecosystems	Biodiversity	CBD	Connectivity/fragmentation of ecosystems: forest fragmentation
			Connectivity/fragmentation of ecosystems: river fragmentation and flow regulation
		EU SEBI	Fragmentation of natural and seminatural areas
			Fragmentation of river systems
	Wetlands	RAMSAR	Trends in conservation status of Ramsar sites - qualitative assessment
		EU WFD	River continuity
	SD	Blue Plan-Coastline	Share of non-fragmented sites, ecosystems and landscapes
			Artificialisation by transport infrastructures
Incidence of human-induced ecosystem failure	Biodiversity	Fr NSB	Tree defoliation
	SD	Eurostat-SD indic	Forest trees damaged by defoliation
			Land at risk of soil erosion
		EEA-CSI for SD	Progress in management of contaminated sites
		EU ICZM	Length of dynamic coastline
			Area and volume of sand nourishment
	Fr Obs Littoral	Population living in areas under indutrial risk in the coastal communes in 2002	
Coastal erosion in 2003			
Health and well being of communities	Biodiversity	CBD	Health and well being of communities depending directly on ecosystem goods and services
			Nutritional status of biodiversity
			Biodiversity for food and medecine

	SD	Blue Plan-MSDD	ODA allocated as % of OECD DAC countries donors' GNP; proportion of the ODA allocated to Mediterranean countries and proportion contributing to the strategy objectives EU net public financial flows to EU Mediterranean members, candidates, CARDS and MEDA countries (in absolute value and per capita) and proportion contributing to the objectives of the strategy
Linguistic diversity	Biodiversity	CBD	Status and trends of linguistic diversity and number of speakers of indigenous languages
Status of access and benefit sharing	Biodiversity	CBD	Indicator of access and benefit-sharing
		EU SEBI	Patent applications based on genetic resources
Status of resources transfers for biodiversity	Biodiversity	CBD	Status of resources transfer: Official development assistance provided in support of the Convention
		EU SEBI	Financing biodiversity management
	SD	Eurostat-SD indic	Shares of environmental and labour taxes in total tax revenues
		Blue Plan-MSDD	ODA allocated as % of OECD DAC countries donors' GNP; proportion of the ODA allocated to Mediterranean countries and proportion contributing to the strategy objectives EU net public financial flows to EU Mediterranean members, candidates, CARDS and MEDA countries (in absolute value and per capita) and proportion contributing to the objectives of the strategy
		Fr Key env indic	Environment protection expenditures
Change in legislation and policy - governance	Wetlands	RAMSAR	<i>Coverage of the wetland biodiversity designated Ramsar sites</i>
			Legislative amendments implemented to reflect Ramsar provisions
			Wise use policy
	Fr NOW	Scientific inventory coverage of Major wetlands	
Indicator of technology transfer			
Public opinion	Biodiversity	EU SEBI	Public awareness
	SD	Fr Key env indic	French people preoccupation (poll)

Annex 3: Example of a technical description of the indicators proposed for the Observatory of Mediterranean Wetlands

Objective of the Observatory	1. Timely and quality inform on Mediterranean wetlands status and trends	
Related theme	1. Biodiversity components	
Related sub-theme	Land cover	
Indicator	Surface of Protected Areas including Mediterranean wetlands	Indicator code: Bio_XX

1. Strategic objective:

The first objective of the observatory is share knowledge on Mediterranean wetlands status and trends. Biodiversity is a key component of ecology included in both environmental and development international and regional conventions, protocols and programmes associated with MedWet partners. Under the sub-theme of land cover that measure a quantitative aspect of biodiversity, the monitoring of this indicator aims at evaluating if the level of percentage of surface of PA is an efficient tools to protect biodiversity. A positive assessment may motivate more protected areas and inclusion of this tool in territorial development plans. Interpretation and analysis will be correlated with other indicators under ecosystem fragmentation, biotic integrity and species.

2. Justification of indicator selection

This indicator is already developed, recognized and used by several international and regional partners and data are available in the Mediterranean region. It informs how effective has the designation of protected area been a tool to protect biodiversity as a response to biodiversity loss, in accordance with international commitments. This indicator is also a strong indication of political commitment of states towards biodiversity conservation, informing indirectly objectives 2 and 3 of the Observatory. This indicator is relatively easy to monitor and can also be developed through remote sensing.

- Policy relevance and meaningful (CBD, Convention of Barcelona)
- Well founded methodology
- Broad acceptance and intelligibility
- Routinely collected data
- Favourable spatial coverage: the whole Mediterranean Basin with possible desegregation to the regional scale
- Availability of past temporal trends
- Possible comparison between countries
- “Surface of protected area in the coastal zone” is an indicator already implemented by the Blue Plan (priority indicator for the Mediterranean Strategy for Sustainable Development)

3. Targeted users including data providers

- o International level:
 - Convention on Biological Diversity
 - RAMSAR outcome oriented indicators
 - Millennium Development Goals
- o European level:

- Streaming European 2010 Biodiversity Indicators
- Eurostat- EU Strategy for Sustainable Development
- European Environment Agency - Core set of indicators for sustainable development
- EU – Integrated Coastal Zone Management (from Deduce project)
- Mediterranean level:
 - Blue Plan - Mediterranean Strategy for Sustainable Development
 - Blue Plan – Coastline complement to MSDD
- National level (French case of study)
 - French National Observatory of Wetlands
 - French Littoral Observatory
 - French monitoring of the European commitments
- Local authorities and decentralized ministries in charge of local development management
- Scientists, researchers and students
- Site managers, including NGOs and associations

4. Definition of indicator

This indicator is a quantitative and result oriented. It informs on number and surface of nationally protected areas including Mediterranean wetlands. It provides a quantitative result of a political and scientific process towards area protection guided by international and national conventions and administrative steps.

5. Unit of measurement

Surface (km²)

6. Indicator type

Core indicator

7. Baseline and target: expected outcome and impact for Mediterranean wetlands

Baseline (past and present) has to be consolidated and harmonized at the Mediterranean level based on available inventories. Future targets to be defined by the consortium, in line with Ramsar/MedWet and Barcelona Convention

8. Level of desegregation of the indicator

Mediterranean	Cluster of countries	National	Coastal area	Watershed	Key Biodiversity areas	Wetland sites	Other
X	X	x	X	X	x	X	

9. Data needed and methodology of data collection:

Number, size and location of the nationally protected areas with the required level of geographic and site desegregation. It takes into account the surface of the whole protected area, even if wetlands are just a part of it. The data should provide the cumulative area of nationally designed protected areas over time in Mediterranean countries, including at least one wetland, for the period XXXX-YYYY is calculated in km² by adding the absolute surface areas reported by countries.

10. Frequency of monitoring

Every 3 years

11. Data source and availability:

Main source of data is through the World Database on Protected Area (WDPA) hosted by the WCMC and the Common Database on Designated Area (CDDA). Other data may be available at regional (European database), at national and at local levels.

12. Limits and cautious in use:

This indicator only inform on status and trends of surface of protected areas without direct cause-effect linkages with biodiversity. Interpretation should be correlated with other indicators (qualitative, input, outcome and impact) to assess if 1) protected areas are rightly selected, 2) change in surface is also linked to change in effective biodiversity protection, 3) management and use of these areas are more environmentally friendly compared to other areas not protected; 4) protected area status is seriously considered in national and local development planning.

Current data may not capture all the protected areas, especially in south Mediterranean countries and middle-east (See findings in wetlands inventories).

- Absence of sensitivity towards changes → this indicator will mainly be increasing around the Mediterranean Basin
- Spatial data and data sets are not complete (logistical problem due to the multiplicity of organization holding the data)
- Still diverging criteria to define a protected area: available data correspond to designated areas at the national level. Some of these areas would not meet the internationally recognised criteria (IUCN, 1994).

13. Final responsibility for timely providing value of indicator

To be determined

The RAC-SPA may be an important partner for the Mediterranean Specially Protected Area. The RAC-Blue Plan already implements a similar indicator at the Mediterranean scale about coastal protected areas.

The European Environment Agency also implemented similar indicator for the whole European countries about all designated protected area;

14. Cross-cutting and development issues to be potentially considered in interpretation and analysis of indicator value and trend value

Demography density, participation, decentralization, cultural values, security, environmental policy and strategy.

15. References

Common Database on Designated Area:

http://dd.eionet.europa.eu/dataset.jsp?mode=view&ds_idf=CDDA

EEA. 2007. EEA Technical report No 11/2007. Halting the loss of biodiversity by 2010: proposal for a first set of indicators to monitor progress in Europe. ISSN 1725–2237.

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IUCN. 1994. Guidelines for Protected Area Management Categories. CNPPA with the assistance of WCMC. IUCN, Gland, Switzerland and Cambridge, UK. x + 261pp.

RAC-SPA: <http://www.rac-spa.org/>

World Conservation Monitoring Centre: <http://www.unep-wcmc.org/>

World Database on Protected Area: <http://www.wdpa.org/>