Note on the refinement of the MAES analytical framework for the EU mapping and assessment of ecosystem condition

(version of 22 September 2017)

This note proposes a number of refinements of the MAES analytical framework[1] for mapping and assessment of ecosystem condition. This framework has been used by the pilots to organise the work in 2017 which led to the Background Document on mapping and assessment of ecosystem condition. The refinements are based on

- The outcomes of the MAES workshop on condition and the comments of Member States on the Background Document (version 11 June 2017[2]).
- A comparison of the different ecosystem chapters of the Background Document
- The meeting with the pilot leaders of 12 September 2017 and the presentation on the refinements on the meeting of the working group MAES on 13 September 2017

In general, there is much support for the current proposals for ecosystem condition as formulated in the Background Document but a few adaptations are needed; primarily to ensure the overall consistency of the approach.

The first version of this discussion note, which had a limited distribution only, contained a number of options for refinement. These options have been removed from this version following the discussions in the frame of the 14th meeting of the working group MAES.

1. Requirements for the MAES ecosystem condition framework

The MAES report on ecosystem condition should outline well the specific context and make clear the overall framework which guides the Commission and the Member States. There are indeed a number of issues which have to be considered in MAES which make the assessment of condition different than previous studies which developed concepts and indicators to assess ecological integrity.

[1] The first proposal was drafted after a workshop in Ispra in January 2017 and presented at the MAES working group meeting of March 2017. It is available on CIRCA BC https://circabc.europa.eu/sd/a/aefb3449-82ee-402a-ac04-a00a18c7cb71/An%20analytical%20framework%20for%20mapping%20and%20assessment%20of%20ecosystem%20condition.pdf

[2] The Background document is available on CIRCA BC: https://circabc.europa.eu/sd/a/789c428c-76d9-407c-b62f-c21949c47129/MAES%20conditions%20Background%20paper%2011%20July.pdf

A MAES framework for condition needs to be

1. aligned with the MAES conceptual framework (first MAES report[3])
2. supportive to the objectives of the EU's environmental legislation (notably the nature, water and marine directives)
3. policy relevant: indicators and assessments need to primarily support EU environment policy and also other policies which have an impact on ecosystems (see also 2nd MAES report)
4. supportive of an accounting framework (KIP INCA): the indicators need to be quantifiable, there should be regular updates of the datasets underpinning the indicators; indicators need to assigned to the proper accounting tables
5. spatially explicit and thus consider current land cover and land use and is thus specific for each ecosystem type (this requirement sets a spatial reference)
6. contributing to measuring progress/trends against a policy baseline towards different biodiversity policy targets (this requirement sets a baseline or reference point in time)

1.1. Compliance with the MAES conceptual framework.

Figure 1 contains a simplified MAES concept and is based on Grizzetti et al. 2016[4]. This simplified version is used in the analytical framework paper as well to guide the work of the ecosystem pilots. The original MAES conceptual framework links socio-economic systems (in Figure 1 depicted as humans) with ecosystems via the flow of ecosystem services, and through the drivers of change. The condition of ecosystems is specifically addressed in the framework. The argument is that healthy ecosystems (in good condition) possess the full potential of ecosystem functions.

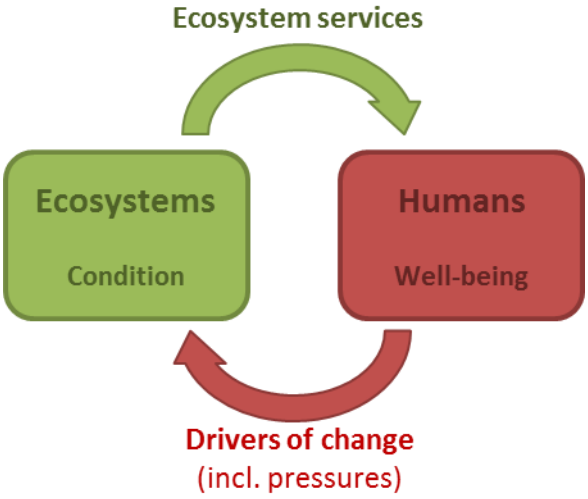

Figure 1. Simplified MAES conceptual model used by the pilots to develop an indicator framework for ecosystem condition. Based on Grizzetti et al. 2016

[3] The MAES reports are available on BISE: http://biodiversity.europa.eu/maes
[4] http://www.sciencedirect.com/science/article/pii/S1462901116300892

1.2. Supporting the EU environmental legislation

Several pieces of legislation have legally binding descriptors (or metrics) of the quality of specific ecosystems (or of their specific habitat types). These descriptors should be used in the MAES condition framework in order to profit from ongoing reporting streams and to minimize duplication. The metrics (each describing a specific aspect of the environmental and ecosystem quality considered by these directives) are then combined into a composite indicator such as ecological status or conservation status which is characterized by different, ordinal condition levels (e.g. good, medium, poor).

1.3. Policy relevance

The MAES condition framework has to structure the ecosystem information it collects for policy support. Therefore the links between ecosystem condition and human well-being have to be made explicit through ecosystem services and drivers of change (Fig. 1). Proposals have been made to link condition to ecosystem services. Through these links policies which intend to improve the condition of ecosystems and biodiversity can so demonstrate how they have a positive impact on well-being. Also, policies which intend to improve well-being can use the framework to assess how they impact the condition of ecosystems.

In the MAES report on condition, these correlations could possibly be illustrated with concrete examples or short narratives (e.g. what are the co-benefits of enhancing soil carbon content?). Guidance to policy makers of sectoral policies could also be provided on how to use the framework for assessment purposes. The second MAES report contains a list of relevant policies.

Note also that France recently made a proposal[5] which specifically includes policy objectives which the condition framework has to address: conserving remarkable biodiversity, maintaining the capacity to provide ecosystem services (link to other sectoral policies) and maintaining ecosystem functioning.

1.4. Applicable for accounting

Ecosystem accounts essentially measure ecosystems and the flows of ecosystem services from these ecosystems into economic and other human activity. Ecosystem accounts therefore track the extent (or quantity) and the condition (or quality) of ecosystems. High levels of quantity and quality will make ecosystems capable of supplying a broad portfolio of services and **resilient** to perturbations and disturbances[6].

[5] French contribution to the definition of the ecological condition of ecosystems in the context of the working group for the mapping and assessment of ecosystems and their services (MAES) of the European Commission

[6] Resilience can be defined as the capacity of a social-ecological system to absorb or withstand perturbations and other stressors such that the system remains within the same regime, essentially maintaining its structure and functions.

Both ecosystem extent and condition define the capacity of ecosystems to provide services. Ecosystem services flow from ecosystems to humans when this capacity is used. When use exceeds capacity, ecosystems are used in an unsustainable way and degrade.

The combination of structural and functional indicators which are used to assess the condition of ecosystems can also be used to define the potential or capacity of ecosystems to provide services.

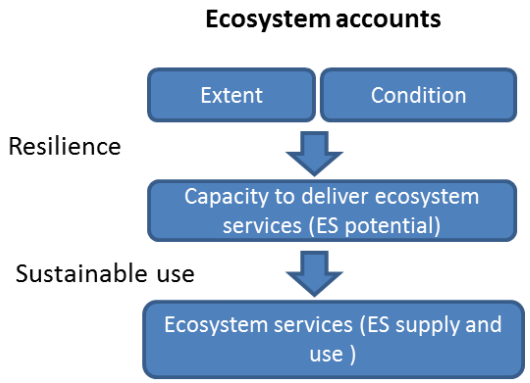

Figure 2. The place of ecosystem condition accounts in a natural accounting framework.

1.5. Spatial and temporal baselines or references for ecosystem condition

Previous studies which have assessed the condition of ecosystems have compared the actual condition against a reference value. In this context, seminal work has been carried out in rivers and lakes using macro-invertebrate communities to monitor water quality. Reference communities have been sampled in pristine water bodies in order to understand how species composition, trophic levels and community structure of aquatic macro-invertebrates are organised under undisturbed conditions. In case where such pristine conditions were lacking, historical species collections have been consulted to define a reference. In cases where neither pristine conditions nor historical reference could be found, statistical approaches and expert judgement have been used to set a reference. The measurement of ecological status of surface waters required under the WFD is a well-known example of the above mentioned approaches and could profit from decades of research and experience.

For terrestrial ecosystems potential vegetation models can be used in principle to evaluate the present use of ecosystems against a model which assumes an absence of pressures (and of people). However, in most cases reference conditions are difficult to define and proposals result in substantial scientific debate. It is particularly difficult to define a reference condition in social-ecological systems where people and ecosystems have been closely interacting since several thousand years to co-produce ecosystem services.

Therefore the choice is made to design a framework for condition to assist policy with improving the current condition of ecosystems rather than to reach a reference condition.

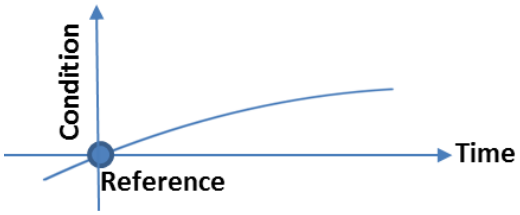

Figure 3. The reference condition for MAES is a fixed point in time against which progress can be measured.

For these reasons, the MAES framework for condition proposes that

(1) the measurement of condition depends on the current pattern of sea and land use and management which is reflected in using the MAES ecosystem typology resulting in specific indicators and assessments per ecosystem type.

(2) the measurement of condition in 2010 can be used as a reference condition so that ecosystem condition can be assessed relative to 2010.

2. Analysis of the proposals for specific ecosystem types

2.1. Differences in reporting pressures and condition indicators

The different indicators used to measure ecosystem condition should cover the main aspects of each ecosystem type that affect the ongoing functioning, resilience and integrity of the ecosystem (SEEA EEA). So the analytical framework paper proposed to collect indicators and metrics assorted according to **pressure, state, and biodiversity**. This classification was used in the 4th MAES report to describe the condition of urban ecosystems.

In turn, this proposal was based on Table 3 of the second MAES report which was a first attempt to define an indicator framework for condition. But Table 3 of the 2nd MAES report is somewhat ambiguous in its terminology. It suggests that condition is measured using indicators for drivers and pressures and for state while it excludes typical biodiversity indicators which are considered separately. That was a deliberate choice at the time to highlight the importance of biodiversity in the MAES conceptual framework.

In addition, slightly different classifications (or dimensions) have been used to group different indicators used to measure condition (**see also Table 1**). The differences are summarized here:

- Nature: Figure 2 of nature ecosystems[7] (page 23 of the Background Document) suggests that condition can be measured by habitat quality and biodiversity.
- Freshwater: Different attributes are proposed to assess status: water quantity, water quality, biological elements and hydro-morphological structure. Table 1 (page 54 of the Background Document) follows the proposal of the analytical framework. State is indicated by a composite indicator (ecological status) but the annex contains the different metrics.
- Marine: Table 1 (on page 67 of the Background Document) follows the proposal of the analytical framework (pressure, state, biodiversity)
- Forest: Page 86 of the Background Document: A typology for pressure, state and biodiversity indicators including structural, functional and compositional attributes.
- Agro-ecosystems: Classification of condition indicators: ecological factors – abiotic factors. Further subdivision in agro-ecological factors, physical and chemical factors and productivity parameters. Classification of pressures follows the traditional HIPOC[8] groupings
- Urban pilot: Different classification relevant for urban ecosystem
- Soil pilot: proposed an additional category to indicate condition (besides pressure, state, biodiversity): management.

[7] The Nature ecosystems include: heathland and shrub, wetland and sparsely vegetated habitats.

[8] HIPOC refers to the five main threats to biodiversity which are Habitat conversion and degradation, Invasion of alien species, Pollution and eutrophication, Over exploitation and unsustainable use, Climate change

Table 1. Different categories as prioritized to group ecosystem condition indicators (Marine did not include a further break down of indicators)

	Urban	**Agro-ecosystems (Cropland and grassland)**	**Woodland and forest**	**Heathland and shrub**	**Sparsely vegetated land**	**Wetlands**	**Rivers and lakes including marine inlets and transitional waters**
Pressures	Urban sprawl	Climate change	Changes in climatic parameters	Agriculture	All	Agriculture	Water quality
	Temperature	Land use change	Deposition of pollutants	Air pollution	Climate Change	All	Water quantity
	Noise	Pollution and nutrient enrichment	Diseases & pests	All	Human disturbance	Climate Change	Habitat
	Water pollution	Overexploitation	Excessive Nutrient loading	Fragmentation	Mining	Human disturbance	Biota
	Air pollution	Invasive alien species	Fires	IAS	Natural system modifications	Hydrological Modification	Integrated
			Fragmentation	Natural processes	Pollution	Invasive Species	
			Invasive alien species	Silviculture		Pollution	
			LU/LC change	Urbanisation			
			Storms and other extreme weather events				
			Tropospheric ozone				
			Unsustainable resource use				
			Wildlife & grazing				
State	built infrastructure	Agro-ecological factors	Biogeochemical & Biogeophysical	Land use	Land use	Land use	Biological elements
	green infrastructure	Physical & chemical factors	Physiognomic & Morphological	Red List	Red List	Red List	Hydromorphological elements supporting the biological elements
	ratio green to built	Productivity parameters	Stress	Conservation status	Conservation status	Conservation status	Chemical and physico-chemical elements supporting the biological elements
			Structural & Phenotypical				
			Physiological & Functional				
			Phenology & senescence				
Biodiversity	Species diversity	Bird trends	Biodiversity	Species diversity	Species diversity	Species diversity	
	Conservation	Mammals, amphibians, reptiles impacted by changes in agriculture		Conservation status	Conservation status	Conservation status	
	Introductions	Wild pollinators					
		Soil biodiversity					

2.2. Issues with the current approach

During the first phase, work on the condition of the main ecosystem types has evolved in relative isolation and there is sometimes inconsistency in the proposed indicator tables. The consequence is that pressure indicators, stock indicators, flow indicators, quality indicators, species-based indicators, single indicators and aggregate or composite indicators are mixed or sometimes put into one basket.

Here are some problems with the current approach to systematically organise all information on condition.

1. Condition, state and status are used as synonyms in the text of the Background Document and of the previous MAES reports.
2. Condition indicators include pressure, state and biodiversity indicators which suggest that condition is hierarchically different than state (conflict with issue 1)
3. Pressure is proposed to have an impact on condition and conceptually put on an equal footing with condition and ecosystem services (see Fig.1 conceptual model) while at the same time pressure is used as indicator for condition (conflict with issue 2). This is confusing.
4. Different categories of pressure indicators and state (or condition) indicators are used for the different ecosystem types (see table 1)
5. Conservation status is reported as biodiversity indicator and as state indicator for the Nature ecosystems but only as state indicator for the other ecosystems
6. The work is in different stages of development according to the specific ecosystem types (nature, marine and freshwater ecosystems have composite indicators whereas forest, agri and urban do not have a composite indicator for condition). This difference should be clear for readers/users.
7. In systems thinking a "state variable" typically describes the state of a dynamic system. In this sense NO2 concentration (air quality, measured in ug/m3) is not a pressure but a state variable. Positive drivers of change increase the concentration and are called sources (emissions). Negative drivers of change decrease the concentration and are called sinks. Within the boundary of systems, sources and sinks (or drivers of change) are **ALWAYS** expressed in **quantity per unit time.** In contrast, state variables are **NEVER** expressed in quantities per unit time but in quantities as such (this is the basis for the differential equations which are used to describe the dynamic behaviour of state variables). The conceptual figure in Fig. 1 is based on this notion: drivers of change and ecosystem services are flows; ecosystems are stocks (characterised by quality and quantity). The present proposal with indicators mixes the "sources and sinks" of ecosystem condition with condition itself and this creates confusion for a limited group of users who argue that even policy relevant indicators need to be scientifically rigid. Note also that (again following systems thinking) many of the listed pressure indicators are in fact state indicators: e.g. NO2 concentration in cities is a state indicator while NO2 emissions are the driver of change (pressure).

3. A more consistent framework for mapping and assessment of ecosystem condition

Based on the discussions in the frame of the MAES working group meeting of 13 September, there is an agreement to **use one framework for all ecosystem types.**

One consistent set of indicators organised into one framework for all ecosystem types

(1) Indicators for pressures and ecosystem condition are reported in separate tables

(2) A common classification to assort indicators according to main indicator classes

(3) A special mentioning of soil and biodiversity indicators as well as indicators reported under the Nature Directives (nature ecosystems)

(4) A core set of indicators based on the proposals in the Background Document for integrated assessment across ecosystem type

(5) A complete set of indicators available as background information for detailed assessment per ecosystem type

3.1. Indicators for pressures and ecosystem condition are reported in separate tables

This is a change with respect to Table 3 of the second MAES report and results in **a more consistent indicator framework for ecosystem condition**. This separation reflects well the conceptual difference between pressures and environmental quality. Pressures cause a decrease in environmental quality. Environmental quality indicators typically tell us that there is something wrong in the ecosystems (or in the environment) while pressure indicators tell us why something is wrong. Both are relevant to measure: they are policy relevant and the movement of these indicators is usually linear and negatively related to ecosystem condition.

The ecosystem condition indicators measure the "state" box of the DPSIR model while pressure indicators measure the pressure box of the DPSIR model. Given the strong causal relation between pressures and ecosystem condition, pressures can be used as indicators to approximate condition in cases where indicators for ecosystem condition are not available, which is often the case.

Note that Germany seems to favour this approach when placing pressures in a separate table containing cross cutting issues (see note sent by Germany[9]).

Based on this proposal the MAES report can **avoid using "ecosystem state" and use only the term "ecosystem condition"** consistently throughout the report.

3.2. A common set of indicator classes or categories to capture the different aspects of pressures and ecosystem condition

The different pilots have experimented and proposed different classes of indicators (see table 1). There are probably good arguments for ecosystem specific groupings given that the MAES condition assessment is (will be) ecosystem specific. However, some internal consistency would be welcome when reporting different indicators in the pressure and condition table.

The general definition of ecosystem condition is provided in the SEEA EEA: "Ecosystem condition reflects the overall quality of an ecosystem asset in terms of its characteristics."[10] Indicators in the ecosystem condition may thus reflect aspects as the occurrence of species, soil characteristics, water quality, or ecological processes. In turn, the indicators should be relevant for policy and decision making, for instance because they reflect policy priorities (e.g. preservation of native habitat); pressures on ecosystems (e.g. deposition levels of acidifying compounds versus critical loads for such compounds); ecosystem functioning or processes (e.g. Net Primary Production) or the capacity of ecosystems to generate one or more services (e.g. attractiveness of the landscape for tourism). Generally, in a fully spatial approach, different ecosystem types require different indicators. Based on these technical recommendations and based on the different classification systems used for the different ecosystem types, the following classification of pressure and ecosystem condition indicators is proposed

For pressures, the proposal is to use the HIPOC classification given its relevance for reporting the state of biodiversity. Therefore the pilots are asked to organise the pressure indicators using the following main pressure classes:

- Habitat conversion and degradation
- Invasion of alien species
- Pollution and eutrophication
- Over exploitation and unsustainable use
- Climate change
- (Others)

[9] Comments from Germany on the Background Document: https://circabc.europa.eu/sd/a/9b8f323f-fdf9-4fc9-aaf6-4a85ac503c06/ConditionIndicatorsJuly2017GermanComments.pdf

[10] The proposal in the OpenNESS glossary is: Ecosystem condition: The overall quality of an ecosystem unit, in terms of its main characteristics underpinning its capacity to generate ecosystem services."

For ecosystem condition we suggest including two main classes which essentially indicate the abiotic and biotic quality of ecosystems:

- Environmental quality (here used for abiotic quality)
- Ecosystem attributes (or biotic attributes) which include structural and functional ecosystem indicators
    - Of which species-based indicators may be considered a subdivision.
    - Of which soil indicators may be considered as a subdivision
    - Of which indicators proposed by the nature may be considered as a subdivision

Specific comments Ecosystem attributes refer to both structural and functional indicators. This is very much in line with the ecosystem services cascade concept as structure and function both contribute to ecosystem condition and to the provision of services.

- Ecosystem structure refers to attributes that can be evaluated with point-in-time measurements and that are assumed to reflect the existing condition of an ecosystem. Structural attributes may be easy to measure, but they do not capture the dynamic properties of an ecosystem that represent its actual performance.
- Functional measurements, on the other hand, attempt to capture system dynamics through repeated measurements that quantify key biophysical processes.

Note that also here a same conceptual difference exists as in the pressure and environmental quality indicators: Functional indicators usually are processes whereas structural indicators measure the state. So from this framing ecosystem functions are drivers of change. Land conversion reduces soil carbon content while detritus from fallen leaves increase soil carbon content. Or primary production (a function) increases chlorophyll concentration (a structural variable).

Contrary to the pressure and environmental quality indicators there is for several indicators, but in particular for functional attributes, no clear (linear) relation with ecosystem condition. Take primary productivity. Does increasing ecosystem condition mean that primary productivity increases, decreases or should fall inside an interval? So it would be good to reflect on every indicator what the preferred behaviour of the indicator is under increasing ecosystem condition. For some indicators such as conservation status the relation with ecosystem condition is clear. For others (e.g. in the pilots which consider intensively managed land) indicator selection requires a careful second assessment to ensure what indicator movement says about ecosystem condition (increasing indicator values are positive, increasing values are negative or a value should lie within a range to obtain good condition). Examples are water flow, proportion of urban green space, nutrient availability, etc.

The behaviour of each indicator should therefore be checked for each ecosystem type in function of ecosystem condition and the question if there is a clear correlation with condition should be asked?

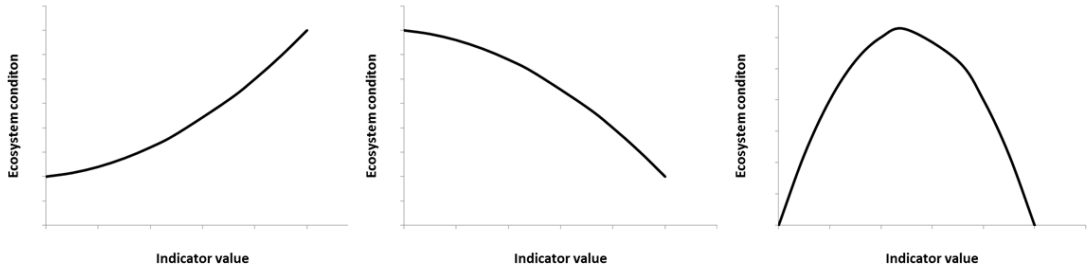

Figure 5. Examples of how ecosystem condition possibly changes with changing indicator values?

3.3. A special mentioning of soil and biodiversity indicators as well as indicators reported under the Nature Directives (nature ecosystems)

Biodiversity is key to ecosystem condition and ecosystem services and this aspect needs to be highlighted in the indicator framework. The presence or absence of an iconic species like salmon is in most literature simply used as a structural indicator for the condition of rivers but in MAES biodiversity-related indicators have a special status due to their high policy relevance. Therefore we highlight species-related indicators as a special case of structural ecosystem indicators.

Ecosystems are not in good condition if their soils are not in good condition. This essential premise will be reflected by highlighting soil indicators in the condition tables. A set of ecosystem-specific soil indicators have been proposed for inclusion in each ecosystem type. These indicators should be included in the ecosystem-specific tables (insofar they have not been selected already). A more holistic approach for soil as ecosystem will be developed in a separate MAES soil ecosystem report.

Finally, also Nature-based indicators (habitat and species conservation status or indicators that are derived from the Art.17 assessments) will have a special mention in the MAES indicator framework given their high policy relevance

3.4. A core set of indicators based on the proposals in the Background Document for integrated assessment across ecosystem type

The final MAES report on ecosystem condition has to include a core set of indicators which is policy relevant. The ultimate goal of MAES is a final ecosystem assessment which can be used to evaluate progress on the EU biodiversity targets but which also can be used to mainstream natural capital into sectoral policies.

Therefore it was agreed to test the final selection of indicators for policy relevance and balance this selection with data availability. The criteria for policy relevance should predominantly come from EU environment policy, i.e. the EU Biodiversity Strategy to 2020, the seventh environmental action programme and the Agenda 2030.

The proposal by France on ecosystem condition contains a useful approach to ensure that the indicator framework is policy relevant by clearly indicating upfront what the policy objectives are.

This set should be used for an integrated assessment across the different ecosystem types.

3.5. A complete set of indicators available as background information for detailed assessment per ecosystem type

The final MAES report will present a core set of policy relevant ecosystem condition indicators. However, specific ecosystem assessments (e.g. forest condition assessment) may need more detailed information. The background document should therefore be revised in such a way that it is compliant with the MAES condition report and that it can be used to guide specific ecosystem assessments.

3.6. A proposal to organise the indicator tables for the MAES report

Based on the above argumentation, here is a proposal which is consistent with Figure 1. It suggests splitting drivers of change (pressures) from ecosystem condition just as ecosystem services are not included in the condition table.

Ecosystem condition is then measured using abiotic or environmental quality indicators as well as biotic indicators or ecosystem attributes. The ecosystem attributes are either structural or functional. The "horizontal" contributions are recognised in this proposal by including a special row for soil-related indicators, species-based indicators and indicators from the Nature expertise.

The current proposals for indicators contain both single and composite indicators. Composite indicators are available for ecosystem types which are covered by the EU nature, water and marine legislation. They are based on a compilation of individual indicators. Ultimately, every ecosystem type could develop a composite indicator to assess its condition. This process will take time (several years) and needs to be based on data analysis and stakeholder involvement to warrant a proper collection and a proper weighting of individual metrics. Ecosystem types without a composite indicator leave this cell open.

Proposal for organising the condition indicators with examples of indicators.

Pressures	
Land conversion	• Land take (ha per year)
Climate change	• CO2 emissions (ton per year)
Pollution and nutrient enrichment	• Nitrogen deposition (ton per ha per year) • Discharge of urban waste water (liter per year)
Over-exploitation	• Fish catch (ton per year)
Introductions of invasive alien species	• Number of new introductions per year
Other pressures	• Erosion (ton per ha per year)

Ecosystem condition		
	Single indicators	Composite indicators
Environmental quality	• Air quality (number of days exceeding the limit) • Ozone concentration (ug per m3) • Artificial land cover (%)	
		• Chemical status (water)
Ecosystem attributes		
Structural ecosystem attributes	• Percent green space in the city (%) • Tree cover density • Number of crops	
		• Ecological status
of which **species related**	• Number of bird species	
		• Red list index
of which **nature related (from the nature experts)**		• Habitat conservation status • Species conservation status
of which **soil related (suggested by the soil experts)**	• Soil carbon stock (%) • Soil moisture	
Functional ecosystem attributes	• Primary production (ton per ha per year) • Water flow (m3 per second) • Evapo-transpiration (litre per ha per day)	
of which soil related	• Soil productivity	

4. Proposal for the MAES report

The MAES report will contain a core set of policy relevant indicators per ecosystem type. It will refer to a revised Background Document which contains a broader selection of indicators to measure ecosystem condition.

The structure of the MAES report on condition can be inspired by the structure of the 2nd MAES report

- Introduction including policy relevance (Anne, Joachim, Markus)
- Common concept for condition (Anne, Joachim, Markus) based on this note: e.g. to justify the choices we make when proposing the indicator framework.
- Description of the ecosystem type and working procedures (Anne, Joachim, Markus)
- Ecosystem types chapters (Pilot leaders)
    - Indicators (core set)
    - Link to ecosystem services
    - Datasets (links to the datasets but possibly this needs to go in an annex or on CIRCA BC)
    - Policy relevance or sectoral policy applications
- Conclusions (Anne, Joachim, Markus)

The background document should be revised to be fully consistent with the MAES condition report and to allow for specific ecosystem assessments. It will be published on BISE.