European Environment Agency

# EEA Scientific Committee seminar
# *Ecosystems and their services: building the knowledge base for European assessments*

**Copenhagen**
**01 October 2014**

**Paper on the seminar's outcomes**

## Acknowledgements

This report is based upon presentations and discussions that took place at a seminar of the European Environment Agency (EEA) Scientific Committee, held on 1 October in Copenhagen. Seminar participants included:

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The overall objective of the joint EEA - EEA Scientific Committee seminar on October 1, 2014was to comment on the knowledge base developments for, and structuring of EEA assessments on, *Ecosystems and their services in Europe*, from the triple perspectives of: policy relevance; scientific soundness of assessments; and knowledge gaps (research and monitoring). In particular the seminar aimed to:

1. Clarify the *Ecosystems and their services* objectives of the EEA work and their relevance to the implementation and visions of relevant European Union policies, notably the EU Biodiversity Strategy to 2020 and its Mid-Term Review planned for 2015.
2. Consider to this end the scoping and structuring of ecosystem assessments and their related knowledge requirements to support European assessments on *Ecosystems and their services* by EEA and partner institutions (ENV, JRC, Countries) and how to accelerate the development of this knowledge over the period 2014-2020.
3. Address the developments towards multiple interfaces between policy and science in the *Biodiversity, Ecosystems and their services* area, in particular the programme of work for regional assessments by IPBES (Intergovernmental Platform for Biodiversity & Ecosystems Services).
4. Discuss and identify strategic applied research gaps on the topic at stake and how knowledge can be further aligned to policy needs through Horizon 2020 strategic programming and activities and FP7 follow-up activities.

*The EU headline policy target for 2020 is 'halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss'. The Biodiversity Strategy translates this central objective into six specific targets, with 20 concrete actions to achieve them; the knowledge support is triggered by Action 5 of Target 2 that states that 'Member States, with the assistance of the Commission, will map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020.' It is implemented by the Working Group MAES (Mapping and Assessment of Ecosystems and their Services) – a joint body of the European Commission and Member States with EEA participation.*

The seminar was organised around three sessions to frame the discussions: policies / science / policy-science interfacing. The main outcomes presented hereafter follow this structure. The seminar was attended in full, offering a balanced participation and targeted interventions in the three domains. Thanks to the invited experts and the quality of their inputs, the seminar held rich and informed discussions –all documents and presentations are available here.

The **policy session** was comprehensive, commenting on the main framing (7th Environment Action Programme (7EAP) Priority 1 on Natural Capital) and the key objectives as set by the EU Biodiversity Strategy to 2020: ecosystem-based management strategies and measures, fulfilling conservation targets, restoration and no net loss targeting, green infrastructure and nature-based solutions as tools –thus linking to green economy and transition agendas. The persistent weaknesses in both policy integration and coherence when addressing trade-offs were highlighted.

*Long-term EU target: 'by 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, so that catastrophic changes caused by the loss of biodiversity are avoided'.*

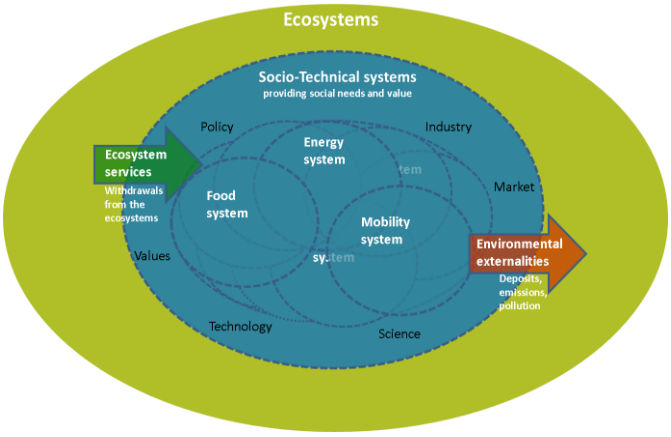
The discussions stressed the following elements:

- There is a clear sense of urgency to know and act more, thus it is necessary to identify and address decision-making gaps. To this effect there is a need to have a complete picture of how different policies relate to the matter at stake.
- It is important to stress that ecosystems and ecosystem services are management concepts (hence the current discussions on Nature-based solutions in the context of the Green[1] and the Bio-economy[2]). In communication terms, it is therefore advisable to start with benefits and then say they come from Nature: social and economic benefits must be mapped and communicated and used as arguments so it is important to collect that evidence. The question of value(s) appears fundamental as currently too much emphasis is put on the monetary elements; we need to think of value(s) in a broader sense, as well as how they can be assessed and integrated in decision-making processes.
- EEA should therefore start from the societal embedding of environmental information, as reflected in the 7EAP objective "Living well, within the limits of the Planet". The story line is rather clear: the quality of ecosystems is in decline, and so is natural capital; moreover, we are locked in unsustainable systems of production and consumption, so we need a different starting point where environmental limits encompass the societal sphere, which encompasses the economic sphere.

[1] A green economy is one in which policies and innovations enable society to use resources efficiently, enhancing human well-being in an inclusive manner, while maintaining the natural systems that sustain us' (http://www.eea.europa.eu/themes/economy/about-green-economy and EEA, 2012)

[2] The bioeconomy encompasses the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy. The bioeconomy includes the sectors of agriculture, forestry, fisheries, food and pulp and paper production, as well as parts of chemical, biotechnological and energy industries. (Source: Innovating for Sustainable Growth: A Bioeconomy for Europe, COM(2012) 60 final)

- We need the tools to understand what this systemic dimension entails: what we don't have are basic metrics and a common language to allow planning systems to take account of broader (ecological, societal) values. It is very much a matter of disproportionality of impacts: disproportionality is something legislators understand so we need the scientifically grounded arguments to highlight the disproportionality: it has to become apparent that our production and consumption systems are unsustainable.




The **Science session** was very informative on fundamental / applied knowledge developments and gaps. It appears that we study more components of ecosystems as separate topics than their interconnectedness and dependencies in an understanding of ecosystems dynamics, leaving gaps in functions /resilience / changes analysis. Also, -and this was one of the peaks of the seminar- valuation of ecosystems services requires intrinsic-based framing and an integrated valuation of ecosystems and their services that goes beyond monetary valuation.

*Ecosystems are defined in the Convention on Biological Diversity (CBD) as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit' (UN, 1992). Ecosystems are multi-functional. Each system provides a series of services for human well-being either directly, e.g. as food and fibre, or more indirectly by e.g. providing clean air and water. Ecosystem assessment is an instrument for structured and targeted analysis of environmental change and its impact on human well-being. The structural and functional entities of ecosystems are key entry points for our understanding of how species interact with each other and their abiotic environments and how these interactions are affected by, and affect, human activities.*

*Ecosystems contain a multitude of living organisms that have adapted to survive and reproduce in a particular physical and chemical environment. Anything that causes a change in the physico-chemical characteristics of the environment has the potential to change an ecosystems condition, its biodiversity and, consequently, its capacity to provide services. Any activity that removes or adds organisms can change the functionality of an ecosystem. An ecosystem assessment should evaluate all of the relevant factors affecting the ecosystem's structure and function. Spatially explicit mapping is required to capture the different gradients and variations of all relevant components in space and time affecting ecosystem functions.*

The discussions stressed the following elements:

- Ecosystem services are interfaces between ecosystem functioning and society (basic needs, well-being, health). For instance food: this service is so lowly ranked that we destroy its basis but we still get a lot of services; considering that people do not like high tech approaches in food (e.g. GMOs, clones, synthetic meat, nano), food can be a perfect example to carry the 'ecosystemic' language.
- However there is clearly a potential limit with the ecosystem services 'model': if there is a technological fix, then the ecosystem value could be considered to be zero. This highlights the

importance of also communicating that there are often multiple services as well as intrinsic values. Therefore, we need to stress the critical need to have the right messages out regarding e.g. valuation, ecosystem services and natural capital. In particular, how clear is the message on social and economic aspects?

- The knowledge base has to gear up to the needs of the 7EAP, that is to support the transition to sustainability (the current knowledge base and information flow we have is not geared to satisfy the needs of the 7EAP). It is necessary to develop tools for testing different concepts: natural capital, hybrid valuation, cascade models, the limits of the capacity of ecosystems to deliver services, new approaches beyond assessments, etc.
- It would be important to accept that knowledge and methods should be seen as processes, meaning that action can be taken on the basis of imperfect but improvable knowledge. However, we need systemic approaches in research, monitoring, assessments, governance, and management: it is becoming more and more frequent in the rhetoric but not yet so common in practice.
- In consideration to the EU research agenda, more research is required to understand ecosystems; there seems to be limited focus for such in H2020, which looks for solutions - yet solutions must be based on fundamental understanding.
- One of the most important gaps is the knowledge about the functional links between ecosystem condition and biodiversity, how ecosystem degradation affects cross-habitat linkages and how degradation affects species. In addition, European datasets on the condition and trends of biodiversity are still not comprehensive. Specifically, data on marine species and habitats are much scarcer than for terrestrial ecosystems. Information on the distribution of invasive alien species in Europe is not fully available, though it is considered one of the main drivers of ecosystem change.
- European research has provided a wide range of data and indicators that can be used to overcome some of the gaps identified from reported data, but this knowledge is not equally distributed among ecosystems and the European territories. The terrestrial ecosystems seem to be the most widely covered, whereas freshwater ecosystems still contain some serious gaps in validation, especially for groundwater. Marine ecosystems still suffer from very scarce and fragmented information for ecosystem-based assessment as well as lack in ecosystem-based mapping.
- Within Europe, the quality of available datasets and indicators is very heterogeneous. Specifically, datasets resulting from reporting tend to be biased by administrative borders. Future challenges remain in improving the data quality of the monitoring programmes so that information can be updated and improved for robust trend detection, to underpin policy decisions and management. Further research in this domain is urgent.
- Modelled datasets although not commonly used, can be very useful for harmonising and filling data gaps on mapping pressures and conditions. Specific indicators need to be further developed to cover the five main categories of threats to biodiversity: habitat change, climate change, invasive species, land-use management, and pollution and nutrient enrichment.

The **science/policy interface** session, including the role of assessments, stressed that interface processes are gaining pace in Europe (e.g. MAES country-based community; discussions on a possible EU-level mechanism to reinforce the science-policy interface) and globally (IPBES), leading to developing common frameworks, semantics and methodologies and gathering of information and

knowledge that is cumulative and spatially explicit. However, the social dimension of the equation is often absent, by design and data gaps, which needs to be corrected.

*Some key achievements for European wide ecosystem assessment*

- *conceptual framework for ecosystem assessment developed and implementation tested against existing European data;*
- *main pressures mapped and method for mapping multiple pressures outlined;*
- *operational data flow for land-use intensity established (nutrient accounts);*
- *first version of European ecosystem map developed (natural ecosystem conditions); and,*
- *first versions of ecosystem condition maps are available.*

The discussions stressed the following elements:

- There is a 'wagon' where science pushes and society pulls, and if in different directions the wagon does not move: it results in inertia in both science and decision-making, where we often end up with repeated requests for more research of the same kind so as to "be very very sure". Moreover scientists tend to mostly publish the positive findings and may have a tendency to spend too much time on discussing definitions, two trends which also creates inertia. In the hands of vested interests who want to further inertia this can be very dangerous. Scientists and policy making & research funding institutions have to recognise this situation and act to improve it.
- We must consider shifting some of the agenda to more social sciences, law and economics.
- There is a need to stimulate further collaboration on the best models and applying them in the field; this can contribute to fight the inertia on the decision-making side. In particular, green economy concepts should include ecosystems and services; yet it is too often not the case, and the same is true for instance in the scope of the EC initiative to greening the European semester monitoring process.
- Beyond the critique of monetary valuation, there are practical ways to bring in multiple dimensions of values into the picture (and the decision-making processes), e.g. to shift resources from assessment of hypothetical values to real management costs involved in keeping a certain amount of supply of ecosystem service(s)
- From a policy perspective, available information is often complicated for this domain, so there is a need to produce usable information which won't be perfect but is improvable. The needs of usable information would need to be controlled by science and be transparent. However, it was remarked that there is no need for more assessments before starting to act; what we need is to summarize the information that we already have, while further assessments are needed to improve today's strategies.

*Key challenges for European wide ecosystem assessment - Knowledge gaps:*

- *functional relationships between ecosystem condition – habitat quality and biodiversity, the synergistic/antagonistic effects of pressures and the interlinkages between terrestrial – freshwater and marine ecosystems;*

- *functional relationships between ecosystem conditions and ecosystem services;*
- *mapping multiple pressures and conditions;*
- *Interpreting EUNIS species data in context of ecosystem pressures and condition; and,*
- *linking European wide information with Member States assessments.*

The Scientific Committee's seminar concluded that it would be useful for EEA to work further on illustrative ecosystem types such as e.g. wetlands or forests and particular nexuses such as food/energy.

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## Annexes

1. Final agenda
2. List of participants
3. Background document