EO 4 Ecosystem Accounting 2022

EU-wide methodology: towards operationalisation of the SEEA EA condition accounts in the EU

Javier BABI ALMENAR [1], Joachim MAES [2], Sara VALLECILLO [1]

1. European Commission – Joint Research Centre (Ispra, Italy)
2. European Commission – Directorate General for Regional and Urban Policy (Brussels, Belgium)

29/11/2022

Outline

- **Policy Context & Background**
- **Key Concepts of Ecosystem Condition**
- **From SEEA EA to EU-Wide Methodology**
- **EO-related Challenges & Opportunities**

Policy Context & Background

EU biodiversity strategy 2030: called for an *EU-wide methodology to map, assess and achieve good condition of ecosystems so they can deliver benefits via provision of ecosystem services*

EU-wide Methodology

to support:

- **Nature Restoration Law**
- **Amendment of the Regulation on Environmental Accounts**

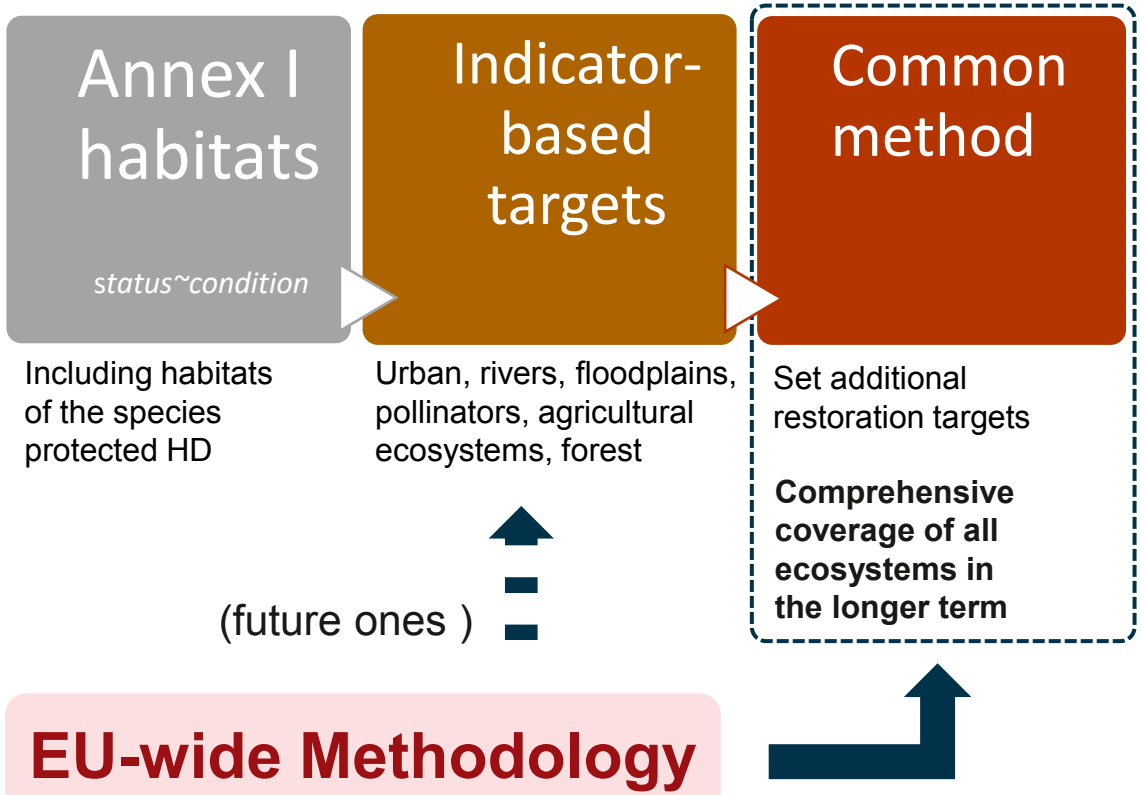
to contribute:

- **Amendment of the Land Use, Land Use Change and Forestry Regulation** (LULUCF)
- **EU Taxonomy Regulation** (sustainable activities)
- **8th Environmental action programme**
- **Sustainable Development Goals** (SDGs)

(Continuity of EU Ecosystem Assessment – MAES condition mapping)
(Alignment of MAES with SEEA-EA)

Policy Context & Background

Nature Restoration Law (NRL)



Amendment of the Regulation on Environmental Accounts

- Ecosystem extent accounts
- Ecosystem condition accounts
- Ecosystem services accounts

EU-wide Methodology

(voluntary variables, increasing mandatory ones, informing on data sources and optimal spatial and temporal resolution)

Key Concepts of Ecosystem Condition

Ecosystem Condition → The quality of an ecosystem measured in terms of its abiotic and biotic characteristics (United Nations 2021).

Good Ecosystem Condition → When it presents good physical, chemical and biological condition, […] in which species composition, ecosystem structure and ecological functions are not impaired (EU Taxonomy Regulation).

↓

For anthropogenic ecosystems should also bring long-term socio-ecological resilience

(not the same but linked)

Reference Condition → Represents the ecosystem condition used to define 'optimal' end points (upper reference levels) of ecosystem condition variables

Reference Levels → Value of a variable (at Ref. Cond.), against which it is meaningful to compare past, present or future value of that variable

From SEEA EA to EU-wide Methodology

SEEA EA steps for condition assessment

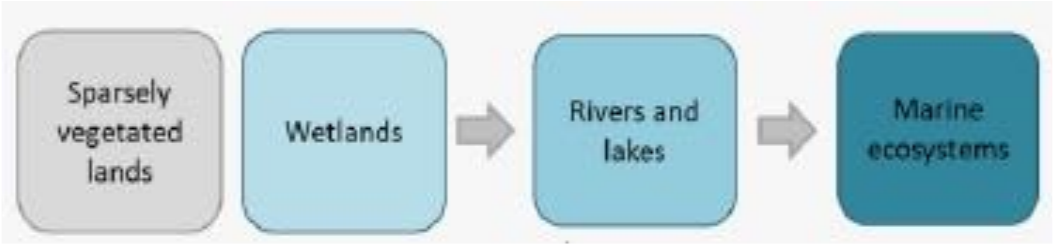
WFD, MSFD

1) Selection of condition variables
   By ecosystem type

2) Definition of **reference levels**
   Recommendation for each condition variable

3) Aggregation scheme to derive a condition index

→ **EU-wide Methodology**



From SEEA EA to EU-wide Methodology

SEEA EA steps for condition assessment

1) **Selection of condition variables*** using the ecosystem condition typology (ECT)

Ecosystem condition typology	
Abiotic	Physical state (soil, water)
	Chemical state (pollutants, nutrients in soil/water)
Biotic	Compositional state (species composition)
	Structural state (veg. cover, biomass)
	Functional state (functional groups, DMP)
Landscape	Land- and seascape (connectivity, land diversity)

* EU Ecosystem Assessment (MAES) → As a starting point

Integration of Data Flows:

- **EU legislation**: Nature Directives, CAP, EU Forest Strategy, …
- Targets of the **NRL** and ecosystem variables in the **Regulation on environmental accounts**
- **Data EU monitoring programs** (LUCAS, Copernicus)
- **Modelled scientific geospatial data**

EO

From SEEA EA to EU-wide Methodology

SEEA EA steps for condition assessment

2) Recommendations on **reference levels*** and most suitable methods

Upper reference level (**optimal condition**)

Lower reference level (collapse)

Definition of reference levels based on data analysis:

EO

- Reference sites
- Modelled condition
- Statistical methods
- Prescribed reference values (sc. criteria
- Contemporary condition
- Expert opinion
- Combination of Methods

* Once homogeneous ecosystem sub-types are defined

From SEEA EA to EU-wide Methodology

Example of how condition variables are characterized in the EU Methodology

Ecosystem Condition Typology	Urban approach	Variable	Units	Source of the variable at EU level	Temporal series available	Spatial Resolution	Type[1]
A2. Chemical state	General & Thematic	Air pollutants concentration (NO_2, PMx, O_3, SO_2, CO)	$\mu g/m^3$	EMEP	2000-2018 (from EMEP modelled data updated)	0.1°	Optimal / Modelled
				CAMS	2018 (CAMS expected to be updated regularly)	0.1°	
				Annual AQ statistics from European Environment Agency	2003-2022 (Annual AQ Statistics)	Ground monitoring points	

(EU Methodology – Urban Ecosystems)

EO-related Challenges and Opportunities

Category	Issues	Guiding questions
Practical bottlenecks for implementation	Few pilot ecosystem accounts, especially for condition, and lack of practical guidance	• Which kind of guidance would be necessary for facilitating implementation? • Should them be also designed for EO professionals?
	Conceptual and technical complexity of ecosystem accounts makes them knowledge, time and resource demanding	• How EO together with automatization of accounts could minimise time effort?
	Lack of consensus and rules on input data, its accessibility, data sampling and data quality standards for accounts	• Do we need standards for (EO) input data used in accounting (including thematic, spatial and temporal resolution) ? • Do we need shared open (EO) databases? • Should we develop highly standardised (EO) inventories for ecosystem accounting such as in other fields (e.g. LCA)?
	Lack of consensus on suitable generalizable models	• Should condition and services models be standardised before develop standards for (EO) input data inventories?

Adapted from Babi Almenar et al (in progress)

Thanks!

Contact details:
javier.babi-almenar@ec.europa.eu

Link to the EU-wide Methodology:
https://publications.jrc.ec.europa.eu/repository/handle/JRC130782