

Exploring the relationship between ecosystem condition and ecosystem services

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Abstract

The relationship between ecosystem condition and ecosystem services (ES) is often assumed to be positive: ecosystems in better condition are expected to supply more services, and the sustainability of ES flows is thought to depend on good ecosystem condition. Yet this assumption oversimplifies a far more complex reality.

Two aspects are particularly important. First, ES flows themselves may generate pressures on ecosystems and act as drivers of biodiversity loss. Provisioning services such as wood and fish biomass are the most obvious examples, but regulating and cultural services can also reduce ecosystem integrity. In these cases, the relationship between condition and ES flows is non-linear, and may even be inverse. Second, ES flows may in some cases remain sustainable even when ecosystems are far from a reference condition of high integrity. Ecosystems substantially modified by humans often continue to supply services, provided that critical thresholds of condition are not crossed. This highlights the importance of recognising threshold effects and context-specific dynamics rather than assuming a simple linear link.

The SEEA EA ecosystem condition account is designed to organise data on ecosystem characteristics relative to a reference condition, in order to provide insight into ecosystem integrity (SEEA EA paragraph 2.40). It is not designed in the first instance to organise data on how well ecosystems supply services. This framing of the condition account is essential to support multiple value perspectives on nature, ensuring that extent and condition accounts remain central to understanding biodiversity and ecosystem values beyond the narrow lens of service provision.

From an accounting perspective, these insights have at least two implications. First, the ecosystem condition account must be firmly grounded in ecosystem science. Condition indicators are not one-size-fits-all and should be chosen to represent the integrity of specific ecosystem types rather than the services they supply. Second, ecosystem condition and ES flows should be measured independently (although some data requirements may be common to both), so that their relationship can be analysed ex post rather than assumed a priori. By recognising this complexity, the ecosystem condition account becomes a mechanism through which ecosystem science and the plurality of nature's values can have a place in official statistics.

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Ecosystem conditions; ecosystem services; SEEA EA

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