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Indicators of biodiversity and ecosystem services: a synthesis across ecosystems and spatial scales

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2. Pedro Martins da Silva,
3. José Paulo Sousa,
4. Francesco De Bello,
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6. Ulf Grandin,
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- Abstract
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According to the Millennium Ecosystem Assessment, common indicators are needed to monitor the loss of biodiversity and the implications for the sustainable provision of ecosystem services. However, a variety of indicators are already being used resulting in many, mostly incompatible, monitoring systems. In order to synthesise the different indicator approaches and to detect gaps in the development of common indicator systems, we examined 531 indicators that have been reported in 617 peer-reviewed journal articles between 1997 and 2007. Special emphasis was placed on comparing indicators of biodiversity and ecosystem services across ecosystems (forests, grass- and shrublands, wetlands, rivers, lakes, soils and agro-ecosystems) and spatial scales (from patch to global scale). The application of biological indicators was found most often focused on regional and finer spatial scales with few indicators applied across

ecosystem types. Abiotic indicators, such as physico-chemical parameters and measures of area and fragmentation, are most frequently used at broader (regional to continental) scales. Despite its multiple dimensions, biodiversity is usually equated with species richness only. The functional, structural and genetic components of biodiversity are poorly addressed despite their potential value across habitats and scales. Ecosystem service indicators are mostly used to estimate regulating and supporting services but generally differ between ecosystem types as they reflect ecosystem-specific services. Despite great effort to develop indicator systems over the past decade, there is still a considerable gap in the widespread use of indicators for many of the multiple components of biodiversity and ecosystem services, and a need to develop common monitoring schemes within and across habitats. Filling these gaps is a prerequisite for linking biodiversity dynamics with ecosystem service delivery and to achieving the goals of global and sub-global initiatives to halt the loss of biodiversity.

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