

# EUROPEAN FOREST BIODIVERSITY INDICATORS AT A GLANCE

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## Introduction

Biodiversity is currently one of the most prominent topics in forest policy discussions in Europe. There are discussions on how forest biodiversity can be maintained and enhanced in nowadays sustainable forest management (SFM). These discussions are not new, but require a refreshed angle towards balancing different demands on forests in an unstable world, and answers for integrative management in the future.

Already three decades ago, the forest sector, accustomed to integrating the complexity and long-time scale of forest ecosystems into its work, has developed tools for monitoring all aspects of sustainable forest management (SFM), notably the pan-European Criteria and Indicators (C&I) for Sustainable Forest Management. Since the first set of C&I for SFM in 1998 and its improvement in 2003 and a revision in 2015, experience has shown that C&I for SFM are a very important tool for national and European forest policy (Linser et al. 2018; Linser & Wolfslehner 2022; Lier et al. 2021) and the data collection and analysis systems which accompany them, regularly published in the State of Europe's Forests reports.

## Pan-European Criteria and Indicators for SFM and biodiversity

The Forest Europe process referred in 1993 to the concept of biological diversity, and the conservation and appropriate enhancement of it as essential elements for SFM (Helsinki Resolution 1 and 2, MCPFE, 1993<sup>1</sup>), and recalls the definition, objectives and measures agreed upon the Convention on Biological Diversity 1992 (CBD, 1992). In 1997 a partnership agreement with the Environment for Europe<sup>2</sup> process was adopted to conserve and enhance biological and landscape diversity in forest ecosystems (formalized in the Vienna Resolution 4, MCPFE, 2003). It proved to be a valuable tool for the collaboration on forest biodiversity issues between Forest Europe and environmental processes (see Annex 1, Vienna Resolution 4, MCPFE, 2003).

In 1998, the adoption of the Pan-European Criteria, Indicators and Operational Guidelines for SFM brings to light criterion 4 on the “Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems”, and defined a set of indicators Vienna in 2003, and in Madrid in 2015). In Vienna in 2003, particular attention is given to conserving and enhancing forest biological diversity in Europe (see Resolution 3 and 4<sup>3</sup>), and the Ministerial Declaration in Bratislava (2021)<sup>4</sup> additionally highlighted the concern towards deforestation, degradation and fragmentation worldwide which are negatively affecting biodiversity and climate among others. The Forest Europe Criteria and Indicators (C&I) for SFM were designed to monitor and assess progress toward SFM, and to support policy making at the national and European level. The C&I set was revised and amended over the last decades. Forest Europe Criterion 4 focuses on forest biological diversity and lists 10 indicators reflecting ecological, and management traits of forests and forestry at the national level (see Table 1).

Criterion 4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems	
4.1 Diversity of tree species	4.6 Genetic resources
4.2 Regeneration	4.7 Forest fragmentation
4.3 Naturalness	4.8 Threatened forest species
4.4 Introduced tree species	4.9 Protected forests
4.5 Deadwood	4.10 Common forest birds species

**Table 1:** Forest Europe Criterion 4 and its indicators (Madrid Ministerial Declaration Annex 1, 2015)

### New demands on forest biodiversity indicators

While forest biodiversity concerns were already prominent in the 1990s, society is formulating new and complex demands on forests in the light of escalating threats of climate change, habitat change and species loss (Prins et al. 2023). Awareness and ambitions have risen regarding the share of protected land and to biodiversity on all types of forest (i.e., not only those which are protected for biodiversity conservation). Equally, the focus of EU policy instruments on reversing biodiversity loss and protecting Europe’s remaining primary and old growth forests has evolved. Consequently, the existing pan-European indicators for SFM need to be further developed to adequately address these challenges.



Presently, biodiversity indicators are high on the international political agenda and should be in coherence with the main political instruments and goals, such as the Global Forest Goals, SDGs, Aichi-Targets, Forest Europe Oslo Goals & Targets, the Global Core Set of Forest-related Indicators and the EU forest biodiversity-related strategies and regulations. For instance, only about two thirds of all the identified objectives and commitments in the New EU Forest Strategy for 2030 can be monitored at least partially by the Forest Europe indicators, whereas new indicators or approaches need to be developed for the remaining third. Several of the Forest Europe indicators are not linked

1 Helsinki 1993 Resolution 1: General Guidelines for SFM in Europe refers to “the conservation and appropriate enhancement of biological diversity as essential element for Sustainable Forest Management”, reiterated in Helsinki resolution 2.

2 Pan-European Biological and Landscape Diversity Strategy

3 The commitments signed by signatories and observers in Vienna resolution 4 included for example, the promotion of restoration practices, the enhancement of forest biological diversity, the development of protected forest network and the establishment of forest management planning and policy suited to maintain, conserve and enhance forest biological diversity, and the support interdisciplinary research.

4 See Bratislava Ministerial declaration “The Future We want: The Forest We Need”, 2021.



to the New EU Forest Strategy for 2030, and some of them are only weakly linked to the policy issues addressed in the Strategy. A comparison of Lier et al. (2022) shows some significant differences between the comprehensive vision of sustainable forest management formulated in the Forest Europe indicator set and the scope of the objectives and commitments in the New EU Forest Strategy for 2030. In particular, the forest policy concerns reflected in the Strategy address some issues (also biodiversity related) which are not fully covered in the pan-European indicator set. Also, the link to the recent indicator developments of the CBD should be considered, in particular with regard to the CBD Global Biodiversity Framework and the related Monitoring Framework<sup>5</sup>. Developments on CBD level will continue to be a major reference for the further development and application of forest biodiversity indicators and their use for monitoring and reporting.

In other forest-related C&I for SFM processes (e.g. the Montreal Process or ITTO) and countries outside Europe (e.g. Canada and USA) biodiversity is likewise a major focus. By adapting and amending forest biodiversity-related indicators, monitoring and assessment frameworks can be aligned with these global commitments, fostering greater accountability and facilitating the implementation of targeted conservation strategies.

Looking at the actual policy discussions, it is noticeable that new data and information on the current management approaches and their effects particularly on forest biodiversity are required (e.g. on close(r)-to-nature-forest management areas, old-growth forests, plantations, integrative forest management etc.). Advancements in scientific knowledge and technological capabilities have opened up new opportunities for assessing and monitoring forest biodiversity. With the advent of remote sensing and geospatial data, there is increasing access to more precise and detailed information about forests than ever before. By amending and evolving the indicators, the understanding of forest biodiversity can be enhanced to inform evidence-based decision-making, and catalyse effective conservation and sustainable management efforts for the benefit of present and future generations.

## Some potential ways forward

Revising and amending the indicators should consider the accordance with major policy goals and instruments, including the Global Forest Goals, the SDGs, CBD and the Aichi Targets, the Forest Europe Oslo goals and targets, the Global Core Set of forest-related indicators, SEBI and contribute also to measuring EU targets (if possible even so EU ≠ FE) to ease the national reporting burden, avoiding to monitor and report similar but not the same information. Examples for a stronger connection of biodiversity indicators to policy instruments are:

**The Global Forest Target 1.3:** By 2020, promote the implementation of sustainable management by all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.

**Aichi Target 5:** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

**Oslo Goal 5:** The loss of forest biodiversity in Europe is halted and degraded forests are restored or rehabilitated which is closely related to the more normative

**Oslo Target 6:** The rate of loss of forest biodiversity at habitat level is at least halved and where feasible brought close to zero, and measures are taken to significantly reduce forest fragmentation and degradation and to restore degraded forests.

Both Oslo Goal 5 and Target 6 are in line with the **EC 2020 headline target** Halting the loss of biodiversity and the degradation of ecosystems services in the EU by 2020. Goal 5 is also revealed in **SDG 15** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.



**EU Biodiversity Strategy for 2030:** strictly protect one third (representing 10% of EU land and 10% of EU sea) of legally protected areas; legally protect a minimum of 30% of land; strictly protect all remaining EU primary and old-growth forests; ensure no deterioration in conservation trends and status of all protected habitats and species by 2030; plant three billion new trees in the EU; integrate ecological corridors as part of a true Trans-European Nature Network to prevent genetic isolation; continue and further develop biodiversity-friendly practices such as closer-to-nature-forestry; strengthen forest genetics conservation and diversity within species and within populations.

**The New Forest Strategy for 2030:** Protect 30% of EU land area of which 10% strictly; All primary and old-growth forests strictly protected; Common definition for primary and old growth forests and for the strict protection regime; Keep natural processes in primary forests; Ensure all forests sufficiently biodiverse; Essential management practices to support biodiversity and resilience; Caution on management practices which affect biodiversity; No removal of stumps and roots; No logging during bird-nesting period; Restore and reforest better; Secure genetic resources; Guidelines on closer-to-nature forestry; Plant 3 billion additional trees; In public forests strengthen forest protection and restoration efforts.



The EU Forests Strategy also includes a proposal for a Regulation on Forest Monitoring, which is going to be released in November 2023. It will be important to align monitoring efforts also in the field of biodiversity.

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## Outlook

Discussion on biodiversity indicators and monitoring show that keeping them precise, efficient and meaningful is a highly dynamic and political task.

Further next steps in adapting forest biodiversity indicators might entail:

- A revision of Pan-European SFM indicators, and of biodiversity in particular, responding to emerging needs of the biodiversity debate, and the need for fulfilling a variety of different biodiversity objectives, goals and targets,
- Further pursuit of cooperation on EU, Pan-European and global levels (e.g. (FAO, UNECE, Montreal Process, CBD and GBF) to guarantee consistent, comprehensible data and information and demonstrate progress in biodiversity protection in forests,
- The investigation of new systemic approaches to apply and use biodiversity indicators, and clusters of them, representing emerging issues or issues of special interest for forest biodiversity. Causal relationship among indicator might support a better understanding of the reasons, drivers, and effects of biodiversity loss and respective counter-measures,
- In this respect, an 'inventory' of forest biodiversity indicators, direct, indirect ones and proxies, is deemed reasonable for the adjusting, but not re-inventing the indicator approach within the concept of SFM, and create synergies between different relevant processes.

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