SUPERB
Upscaling Forest Restoration

Policy brief
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*SUPERB is a €20 million project funded by the Horizon 2020 Research and Innovation Programme under the EU Green Deal to restore thousands of hectares of forest landscape across Europe.

SUPERB's Policy recommendations for the EU Nature restoration Law

Towards biodiverse and adaptive forest landscapes for Europe's people

SUPERB aims at large scale forest restoration in Europe, combining scientific and practical knowledge to drive actionable outcomes. This policy brief is based on the concepts underpinning this approach and provides four recommendations for changes to the proposed EU Nature Restoration law. These aim to avoid undesirable developments resulting from the currently built-in backward looking view on forests, but instead help to realize the full and positive potential of forests for the future.

Europe's forests – what's important to know?

Today's forests and their ecosystem services are under pressure from climate change and related disturbances such as droughts, fires and storms, the introduction of new pests and diseases. Further challenges are land-use changes and fragmentation, intensive management, and continuously high nitrogen deposition. At the same time, demand for forest products and services such as wood and carbon sequestration are increasing. All of these factors directly or indirectly influence forest ecosystems and their ability to meet diverse demands for ecosystem services, including habitat provision for biodiversity and carbon sequestration for climate change mitigation.

Nature Restoration law – main aims?

The **proposed** Nature Restoration law (a) **recognizes the urgent need to address environmental challenges**, (b) presents a much-needed approach **to repair damage to Europe's forest by 2050 and** (c) pledges to **prevent the worst impacts** of climate change and biodiversity loss. It also provides an opportunity to improve the balance of the different functions that forests provide by prioritizing the restoration of ecological functions and biodiversity in forests. Finally, it directly links with and contributes to the New EU forest strategy for 2030 with restoration measures that will improve forest biodiversity and safeguard its adaptive capacity.

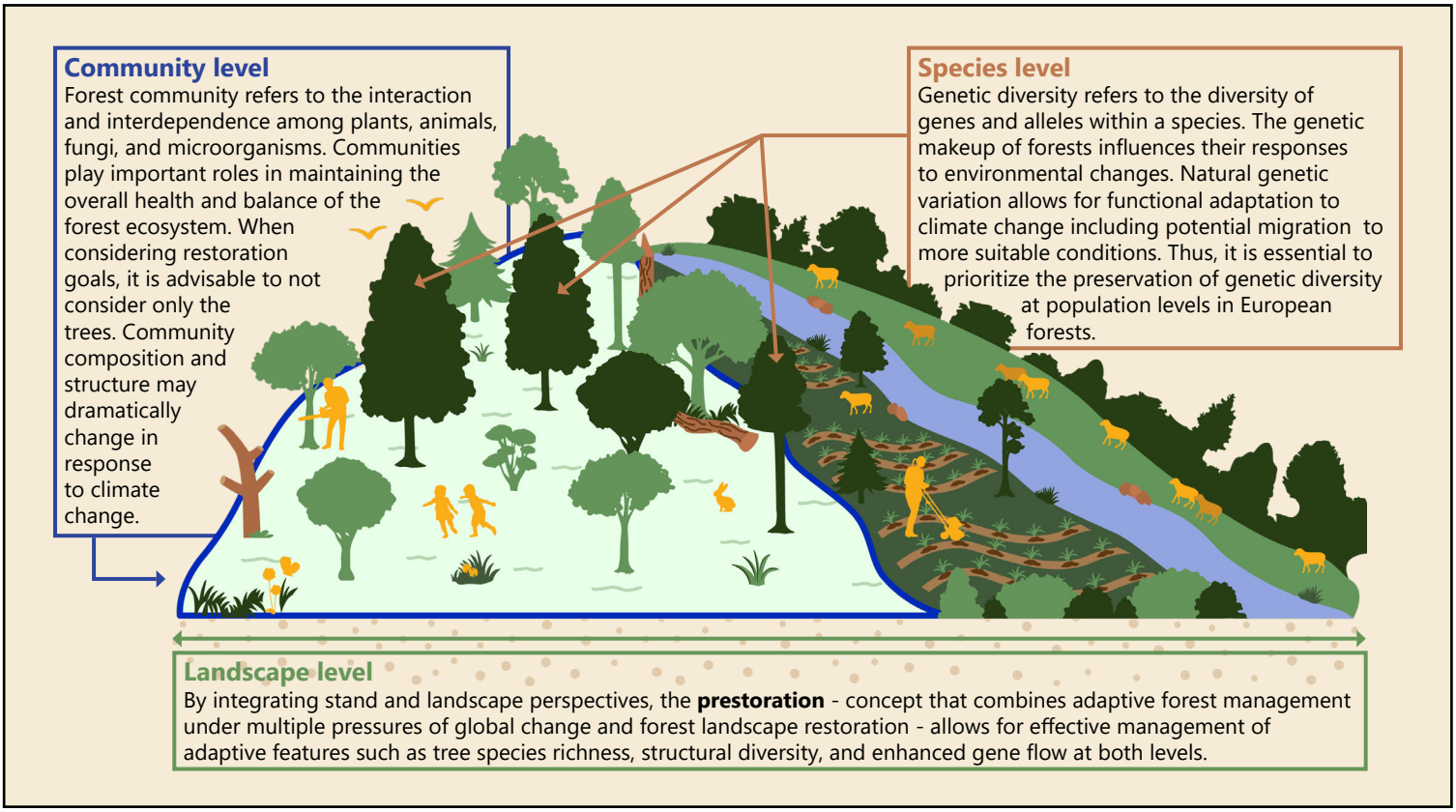

Figure 1: Restoration should tackle the three levels of biodiversity - genetic diversity at species level, species diversity at the community level and ecosystem diversity at the landscape level.

Nature Restoration law proposal - Article 3 (Definitions):
'Restoration' means the process of actively or passively assisting the recovery of an ecosystem towards or to good condition, of a habitat type to the highest level of condition attainable and to its favorable reference area, of a habitat of a species to a sufficient quality and quantity, or of species populations to satisfactory levels, as a means of conserving or enhancing biodiversity and ecosystem resilience.

1st SUPERB Recommendation for Article 3 (Definitions): Restoration should focus on the adaptive capacity and future functions of forest ecosystems rather than restoring to a past state.

Restoration goals should prioritize forward-looking strategies and emphasize ecosystem self-organization and adaptation to changing conditions rather than aiming to restore past historical states that are impossible to maintain under changing environmental conditions. This entails:

a) **Prioritizing functional and genetic diversity**, while considering assisted migration of tree species better suited for climate change.

b) **Implementing assisted migration for dependent or associated species of low mobility** (e.g., flightless beetles) and incorporating landscape-level planning (including agriculture and pasture lands) and connectivity measures that will facilitate species migration to suitable future habitats (fig.1).

c) **Developing goals and strategies** for the transformation of existing and mapped habitat types to possible future states and considering the long-term timeframe necessary to achieve this transformation (fig. 2).

2nd SUPERB Recommendation for Article 3 (Definitions): Forest restoration should tackle the specific case of sustainably managed cultural forest landscapes

The focus of the legislative text should be broadened beyond reference areas such as "minimally-disturbed" or "pristine" conditions such as primary and old-growth forests, as well as IUCN protected areas (Ia, Ib, and II) with no tree cover loss. This entails:

a) **Including managed forest landscapes**, such as forest pastures, coppice and-traditional selection management forests, and integrated forest management approaches, which harbor unique and diverse biodiversity.

b) **Viewing forests as social-ecological systems** in which the ecological and social sphere are closely and inseparably interlinked.

c) **Recognizing that restoring all forest landscapes to virgin forest-like systems is not realistic and would result in the irreversible loss** of unique biodiversity and a reduction in important ecosystem services.

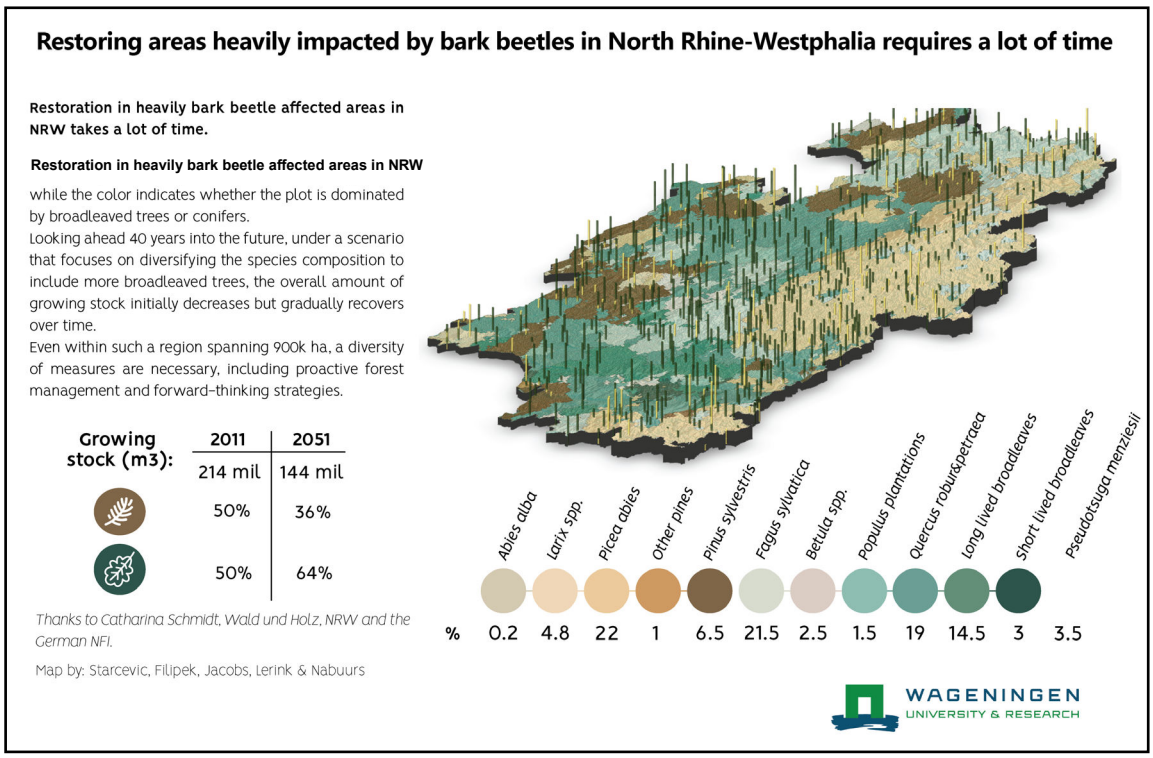

Figure 2: Projected state of a restored forest region under climate change: in 2051 a much larger share of forest resources of North Rhine Westphalia has changed to broadleaves through active management decisions.

Nature Restoration law proposal Article 10 (Restoration of forest ecosystems)
Member States shall achieve an increasing trend at national level of each of the following indicators in forest ecosystems, as further set out in Annex VI, measured in the period from the date of entry into force of this Regulation until 31 December 2030, and every three years thereafter, until the satisfactory levels identified in accordance with Article 11(3) are reached: (a) standing deadwood; (b) lying deadwood; (c) share of forests with uneven-aged structure; (d) forest connectivity; (e) common forest bird index; (f) stock of organic carbon.

3rd SUPERB Recommendation for Article 10 (Restoration of forest ecosystems): Diversity at different scales should be considered

The currently proposed indicators enlisted in the legislative text fall short in capturing the necessary aspects to enhance forest resilience, adapt forests to climate change, ensure forest functionality, and provide a wide range of ecosystem services. Importantly, relying solely on a limited set of indicators for biodiversity restoration does not guarantee the provision of other targeted ecosystem services (such as the cultural services) or the resilience and adaptability of forest ecosystems to climate change. To address these shortcomings:

a) **Indicators should encompass a broader scope,** specifically targeting the **structure, composition, and functional diversity of forests** (fig. 3), while prioritizing forest adaptability and resilience.

b) **Restoration of different land use types should not be done in silos.** Restoration needs to be addressed at the landscape scale and across different land-use forms to ensure certain habitats and important landscape level processes such as migration, gene flow (Figure 2). This needs to be reflected in indicators that address the landscape scale. Mention to forests should be added in Article 9 of the NRL - Restoration of agricultural ecosystems - share of agricultural land with high-diversity landscape features.

4th SUPERB Recommendation for Article 10 (Restoration of forest ecosystems): Use S.M.A.R.T. indicators to monitor forest biodiversity improvement.

Relying on a limited set of only six pre-defined biodiversity indicators to assess the effectiveness of forest restoration is fundamentally flawed. Restoration goals need to consider the wide variety of forest types, as well as the ecological and cultural roles they play. This approach runs the risk of employing generic indicators from Northern Finland to Southern Italy that hold little significance at the local or regional level. Therefore, we suggest to:

a) **Adopt a flexible monitoring approach with adaptable indicators to track trends** and changes, avoiding rigid objectives that vary across countries and forest types and may not ensure full restoration as intended.

b) **Enable the customization of indicator lists** based on national or local demands for forest ecosystem services for the different forest types.

c) **Improve forest monitoring in Europe** by enhancing the combination of field data from NFIs and novel approaches with remote sensing (Nabuurs et al. 2022). Widen the forest monitoring targets to allow a holistic approach including social aspects.

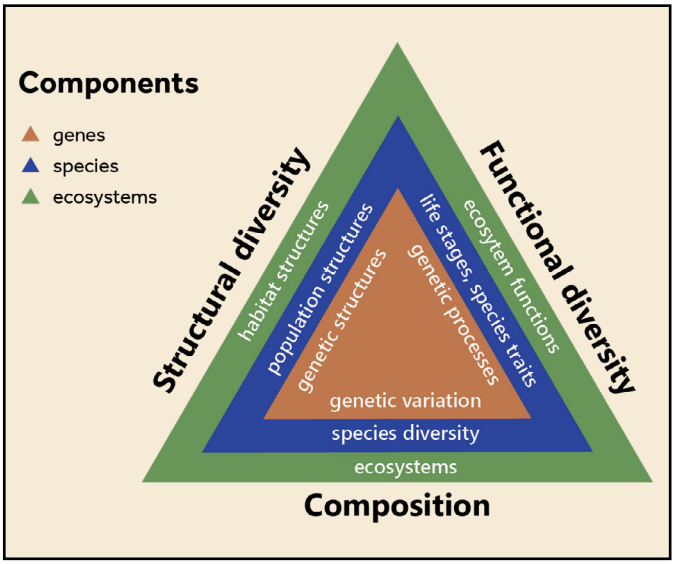

Figure 3: Elements of forest biodiversity to be monitored. Muys et al. 2022

Next steps: The ongoing negotiations on the legal proposal for Nature Restoration should consider these four recommendations, which are to be taken up by both co-legislators, namely the Council and the European Parliament.

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