What is and what is not an old-growth forest? A case study from hemiboreal Latvia

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Background

The EU Biodiversity Strategy (2030) prioritizes the preservation of Europe's old-growth forests (OGFs). Protected areas should make up at least 30% of the EU land area, with 10% under strict protection, and should encompass all primary and old-growth forests. The mapping of OGFs, however, at EU and Member state level presents a challenge. Though knowledge on OGFs has improved, large uncertainty remains regarding the definition of old-growth due to both the lack of data and broad variation in OGF forest characteristics across MS and forest biomes, including with respect to age. A conceptual approach should be developed which, for each ecosystem, defines what is and is not an OGF. This will permit an adequate mapping of OGF relevant protection areas at the EU and Member state levels.

The European Commission guidelines (COM, 2023), propose 3 main indicators: (a) native species, (b) deadwood, (c) old or large trees and 4 complementary indicators: (a) stand origin, (b) structural complexity, (c) habitat trees, (d) indicator species to define OGF. Considering the diversity of forest ecosystems in Europe, it is possible to adjust for national circumstances, e.g., by including additional indicators. Further, OGF is defined by a threshold value, e.g. a specific age threshold that defines forests as OGF. This estimation, however, should be carefully assessed for each forest type.

Figure 1. Unproductive old-growth forest stands in Latvia

Old-growth forest or old-growth forest stand?

The aim of this study is to assess the definition and presence of OGF stands across the territory of Latvia. Based on the European Commission's OGF Guidance (COM, 2023), we apply OGF criteria and develop indicators and threshold values for hemiboreal forests with the goal of distinguishing, e.g., between patches of old trees which meet some OGF criteria, on the one hand, and forest stands that can be qualified as true OGF, on the other. OGF should not be defined by tree age alone and vary broadly across stands and stand structures.

We hypothesize that many relevant biodiversity components are not dependent on forest stand age, but rather depend on stand characteristics and structure. Deepening our knowledge about these linkages enhances the successful integration of elements important for biodiversity, thus contributing to both biodiversity and bioeconomy, as well as mitigation of negative climate change effects.

For hemiboreal forests the following indicators are considered:

1. Native species, deadwood, old or large trees based on (COM, 2023),
2. Average age:
   (broadleaves 120 yrs; coniferous 150 yrs.),
3. Unaltered forest soil
   (no drainage min. 15% of area),
4. A minimum patch size of 50 ha, allowing for the dynamics of natural processes,
5. Forest continuity defined as established forest prior 1940.

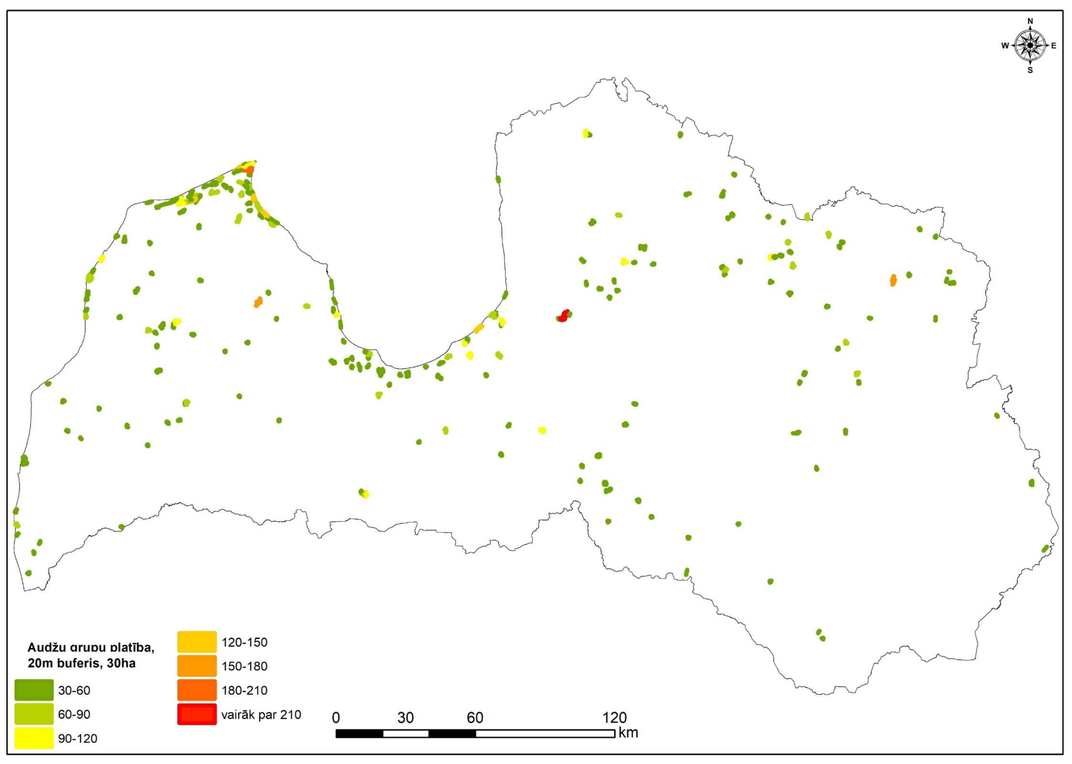

Figure 2. Preliminary evaluation of old-growth forests in Latvia

OGFs in hemiboreal Latvia have now been systematically studied for 8 years (since 2016). Based on empirical data from established OGF research sites, we assess the principal forest stand characteristics (H, DBH, N, M) for coniferous and broadleaved tree species growing on mineral and organic soils. Forest area > 30 ha. Above- and below-ground carbon pools, including the deadwood pool, have likewise been assessed, making it possible to evaluate the climate change mitigation potential of hemiboreal OGFs. The ongoing assessment includes the establishment of over 1000 sample plots to study the relevant indicators.

Conclusions:

1. In Europe, several definitions of old-growth forests are used, therefore it is possible that different sources refer to different old-growth areas that, in some cases, differ significantly.
2. **Old-growth forests and old forest stands are not the same.** In old-growth forests, not only old forest stands grow as a dominant element. It is also possible that, e.g., due to natural disturbances old stands are lost and with regeneration are replaced by young stands as the dominant element.
3. Old-growth forests include both productive, as well unproductive, forests thus representing highly varied stand characteristics.
4. Indicators such as patch size, unaltered forest soil, and forest continuity support the definition of OGF in the hemiboreal zone.

References:

- Commission Guidelines for Defining, Mapping, Monitoring and Strictly Protecting EU Primary and Old-Growth Forests, COM, 2023.
- Doctoral thesis Ķēniņa (2023). Carbon Stock In Old-growth Stands On Mineral Soils In Hemiboreal Forests.

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