

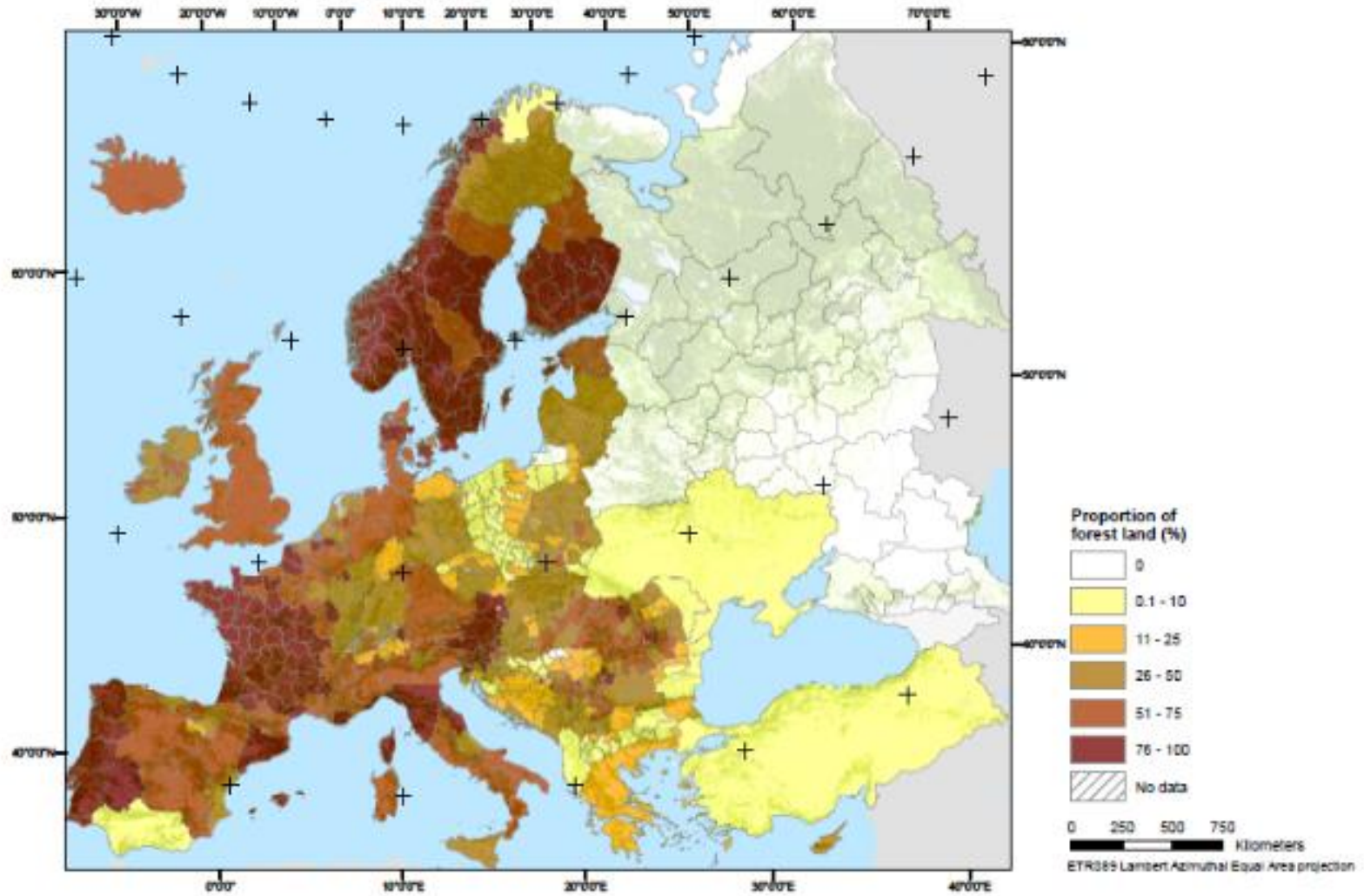


Forest characterization and opportunities

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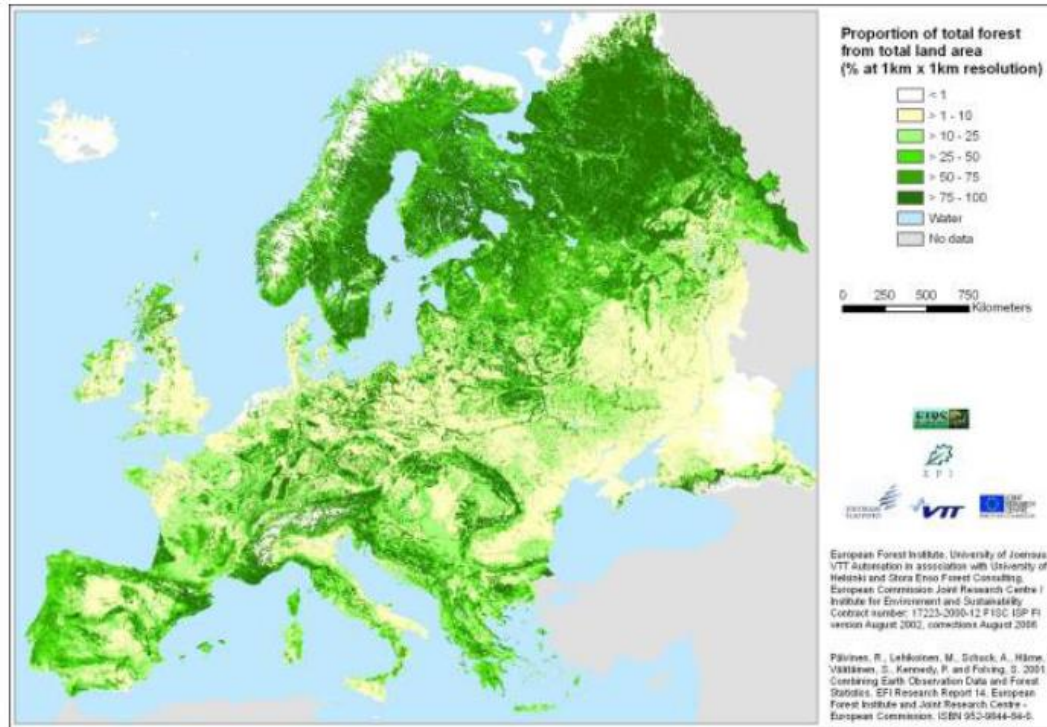
12.03.2024 Jelgava, BioRural

Forest ownership in Europe



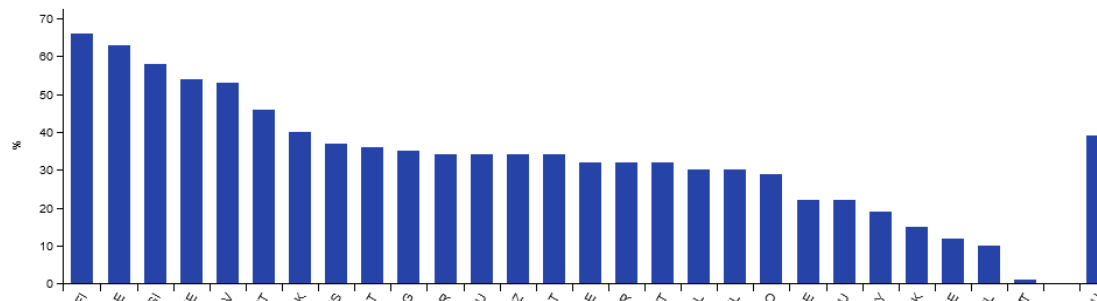
(Pulla et al., 2013)

Forest cover in Europe



(Pulla et al., 2013)

Forest area in the EU, 2021 (share of forest in total area, %)



Forest sector is **the only one**, that can ensure *de facto* GHG sequestration!



Annual CO₂ removals in EU Forest Land

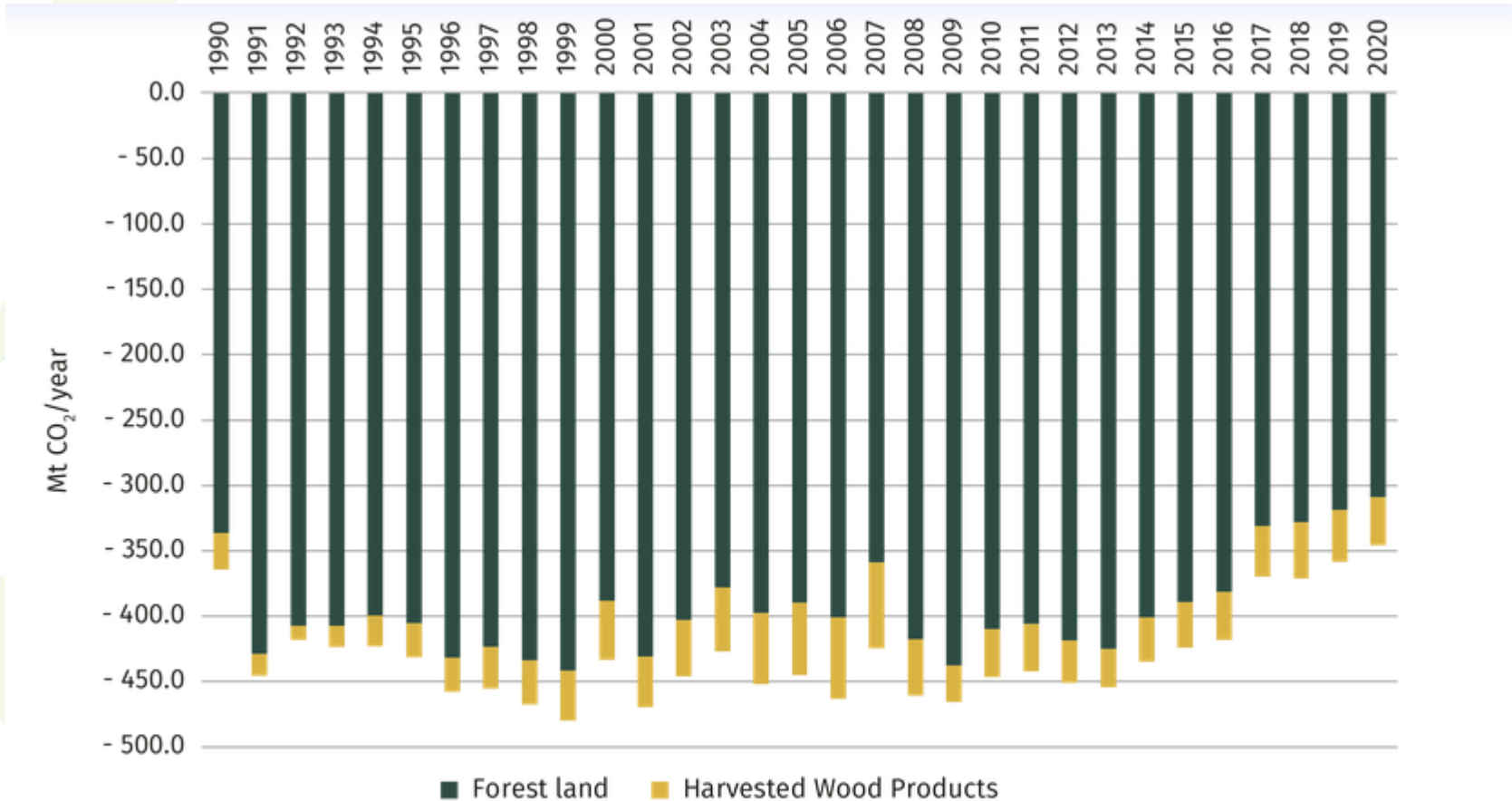
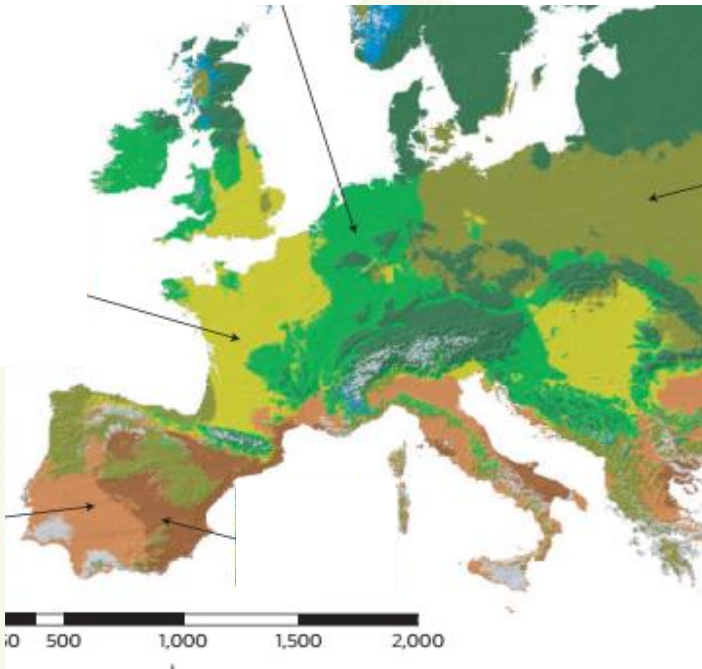


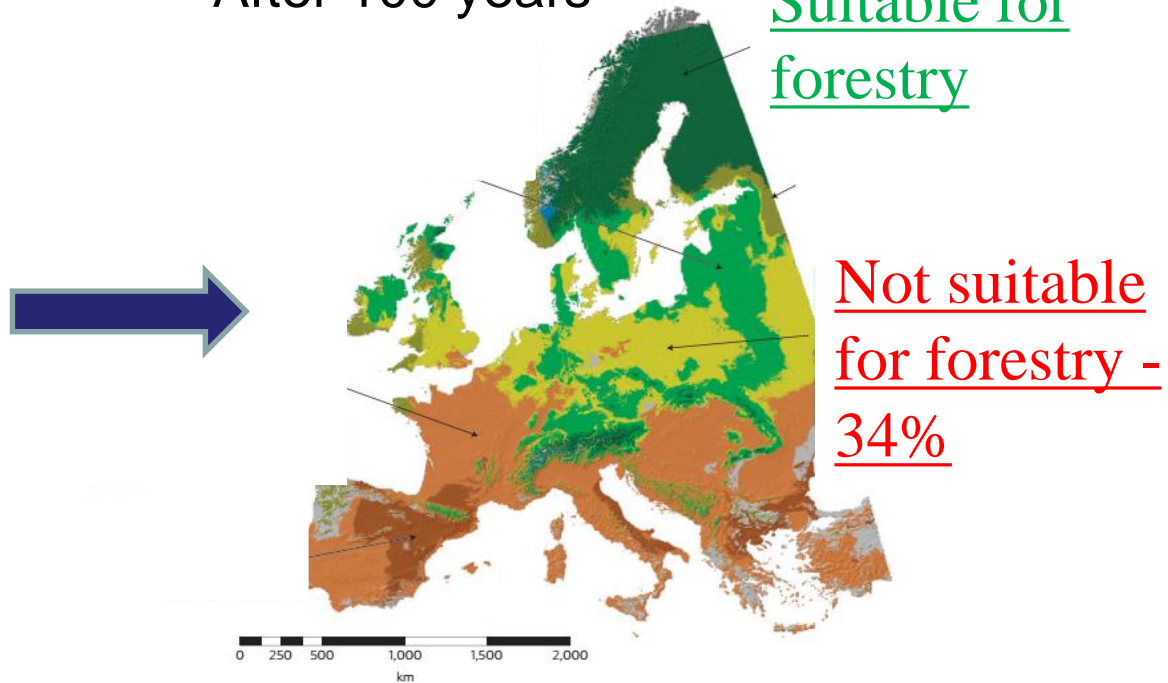
Figure 1: Annual CO₂ Removals by Forest Land and Harvested Wood Products 1990-2020 in the EU (in Mt CO₂/year, data from the 2022 EU submission to the UNFCCC).

Future prognoses

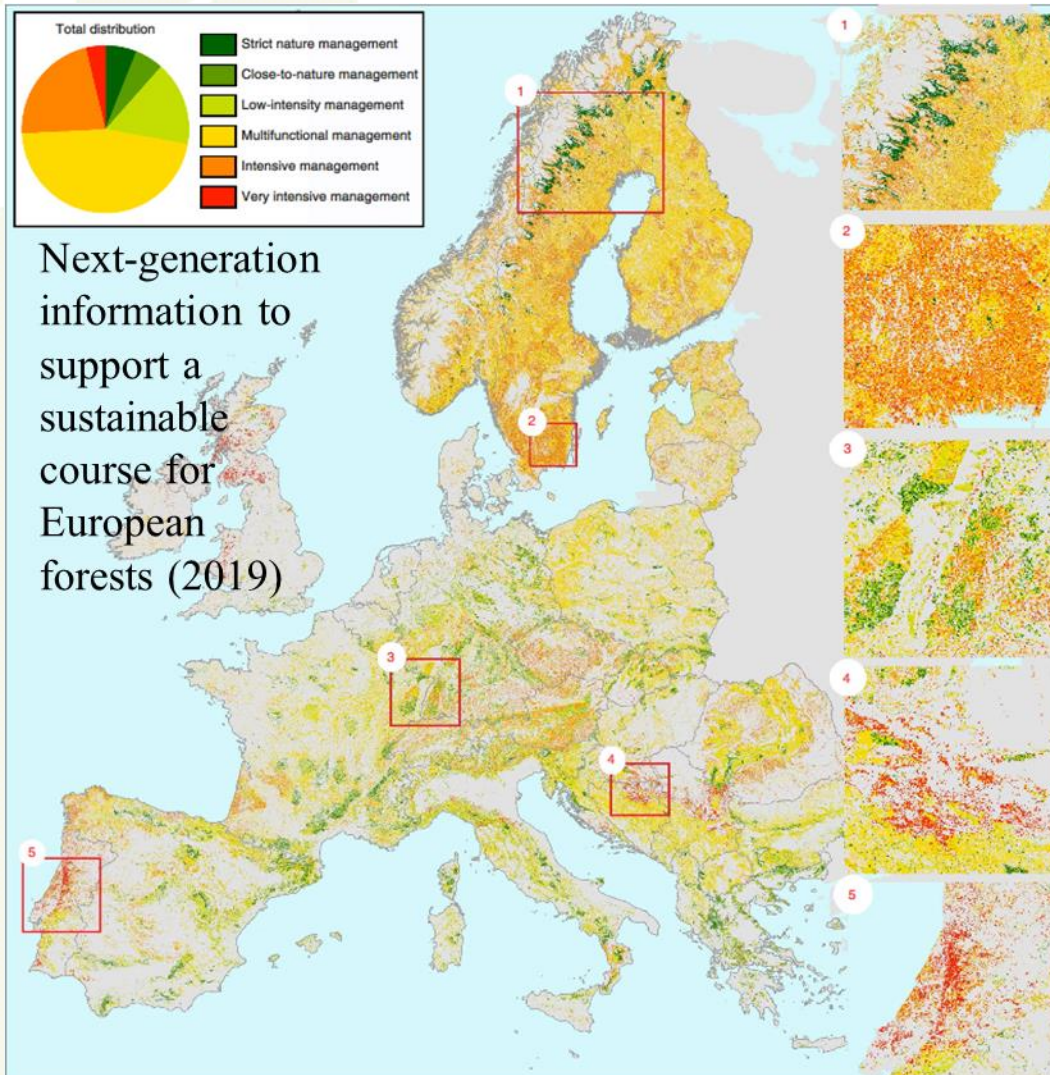
Current



After 100 years



(Hanewinkel et al., 2013; *Nature Climate Change*, 3(3), 203)

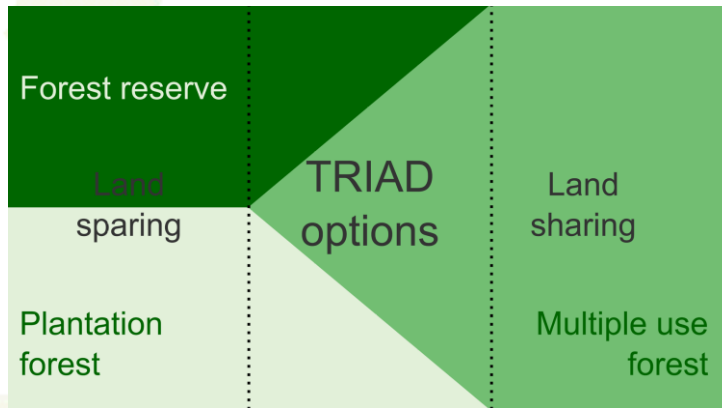


In Latvia we are practicing multifunctional management, leading to:

- 1) small gap sizes, resulting in mosaic structure of forest – average size of final harvest 1,9-2 ha;
- 2) balanced species composition with 45% of coniferous-dominated and 55% of broadleaved tree dominated stands
- 3) increasing proportion of mature and old stands even in areas, where final harvest is allowed;
- 4) increasing share of deadwood, 20 m³ ha⁻¹ on average

Forest protection: how to allocate?

Currently we are moving towards segregation of forest areas in Europe, and application of triada approach



Thus the selection of areas for each of the goals is crucial. The EU Biodiversity Strategy (2030) makes the preservation of Europe's old-growth forests one of its priorities.

The identification of undocumented primary and old-growth forests in the field remains crucial (EK, 2021)

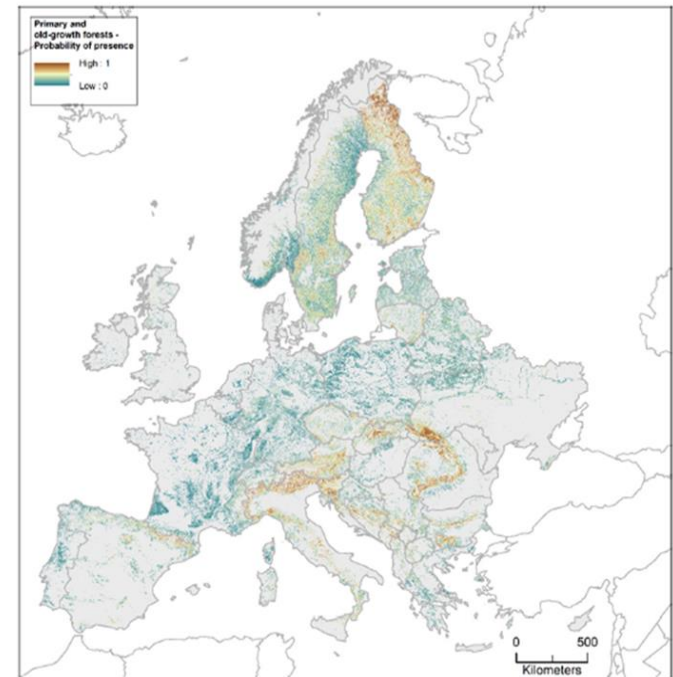
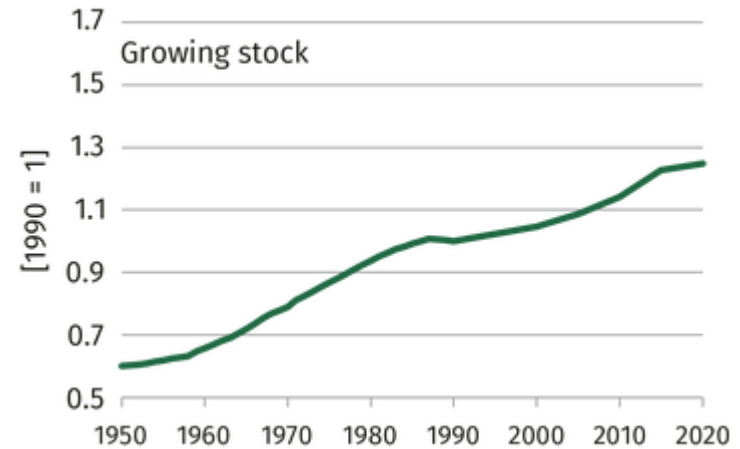
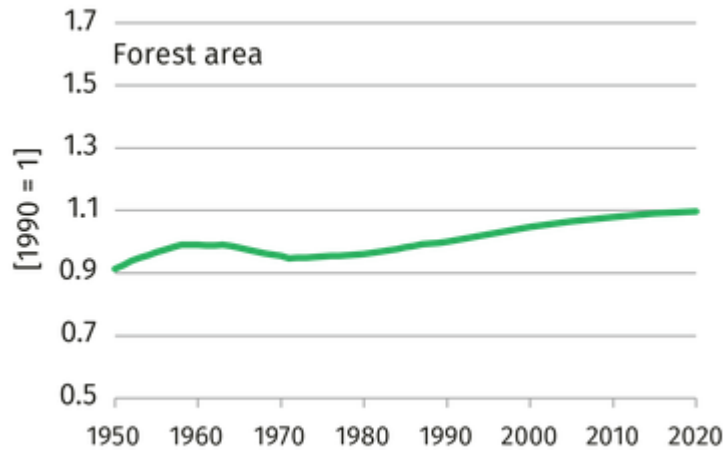


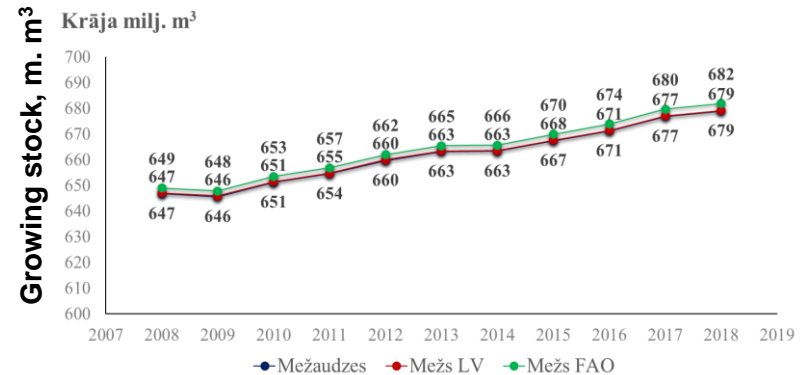
Figure 5. Likelihood of presence of primary and old-growth forests. Map at 250 m grid size implemented by Sabatini et al. (2020b) using a spatially explicit boosted regression trees model relating the presence of primary and old-growth forests and 15 biophysical, socio-economic and historical land use predictors. EU areas outside the domain of the map not included in the model.

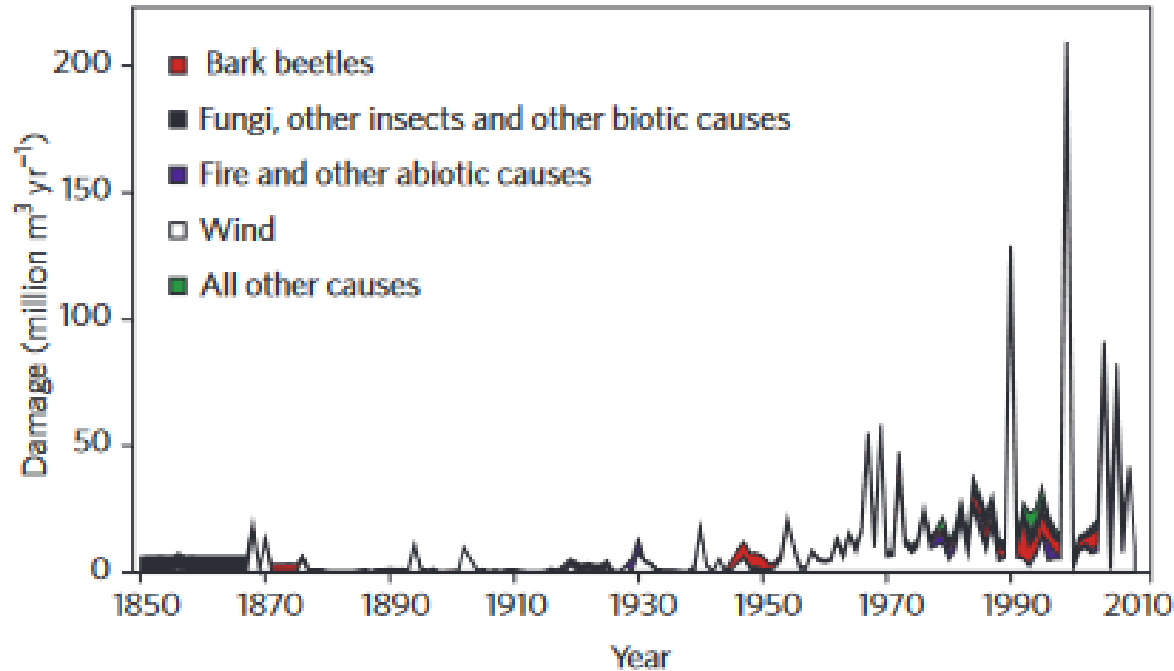
Source: Sabatini et al. 2020

Forest resources in EU and Latvia



Forest resources have increased in the EU in the past seven decades (**forest area +37%**, **growing stock +138%**), while globally forest area and growing stock is decreasing.





limiting factors for forest carbon:

- natural disturbances;
- specific ecosystem potential to store carbon;
- forest management

Nabuurs et al., 2013

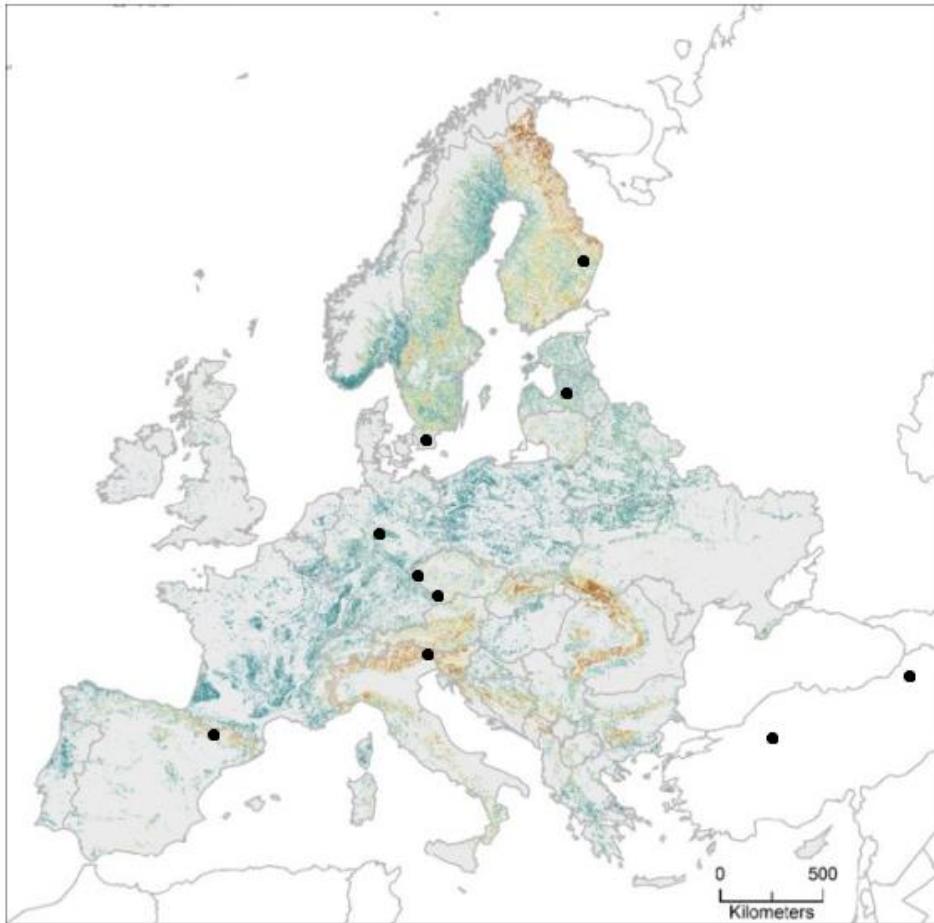
- ✓ **Area expansion** (afforestation) – comparatively less potential for Nordic – Baltic region due to already high forest cover (50% plus)

Typical approaches for maximizing carbon in current forest area includes both storing carbon in living trees by e.g.

- **longer rotation periods** (maximize carbon storage)
- enhance CO₂ sequestration by **quicker forest growing cycles by e.g. shorter rotation periods** (maximize CO₂ sequestration).



Carbon stock in old-growth forests: Europe



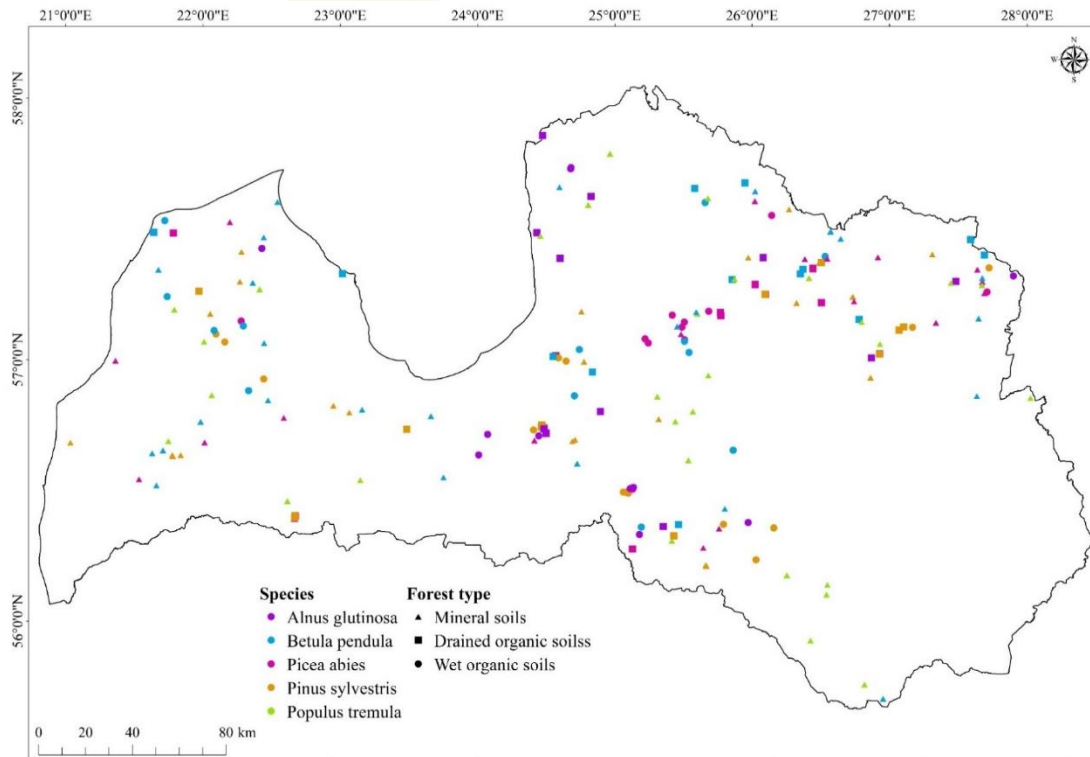
Fragmented and limited information



Gundersen P., Thybring E.E., Nord-Larsen T. *et al.* (2021) Old-growth forest carbon sinks overestimated. *Nature*, 591, E21–E23.

<https://doi.org/10.1038/s41586-021-03216-z>

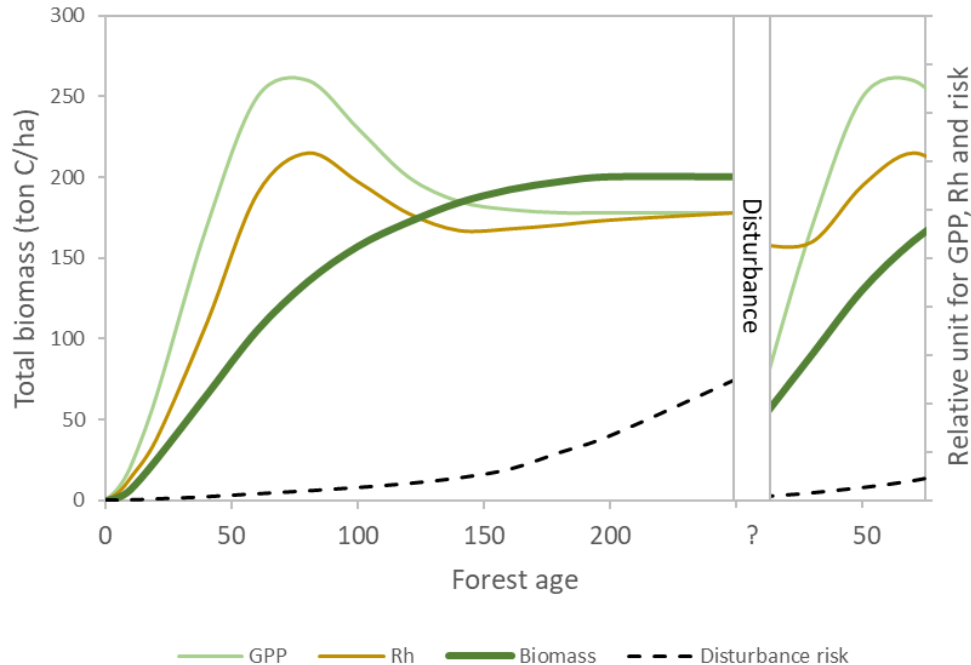
Carbon stock in old-growth forests: Latvia



- ✓ Significant empirical data amount gathered in Latvia (188 old-growth forests, 1128 sample plots) about old-growth forests
- ✓ In these stands old trees are still dominant forest element (coniferous average age 180 years, deciduous 120 years)
- ✓ No signs and data about forest management in these stands for the past 40 years

Ecosystem carbon potential

Odum's hypothesis



limiting factors for forest carbon:

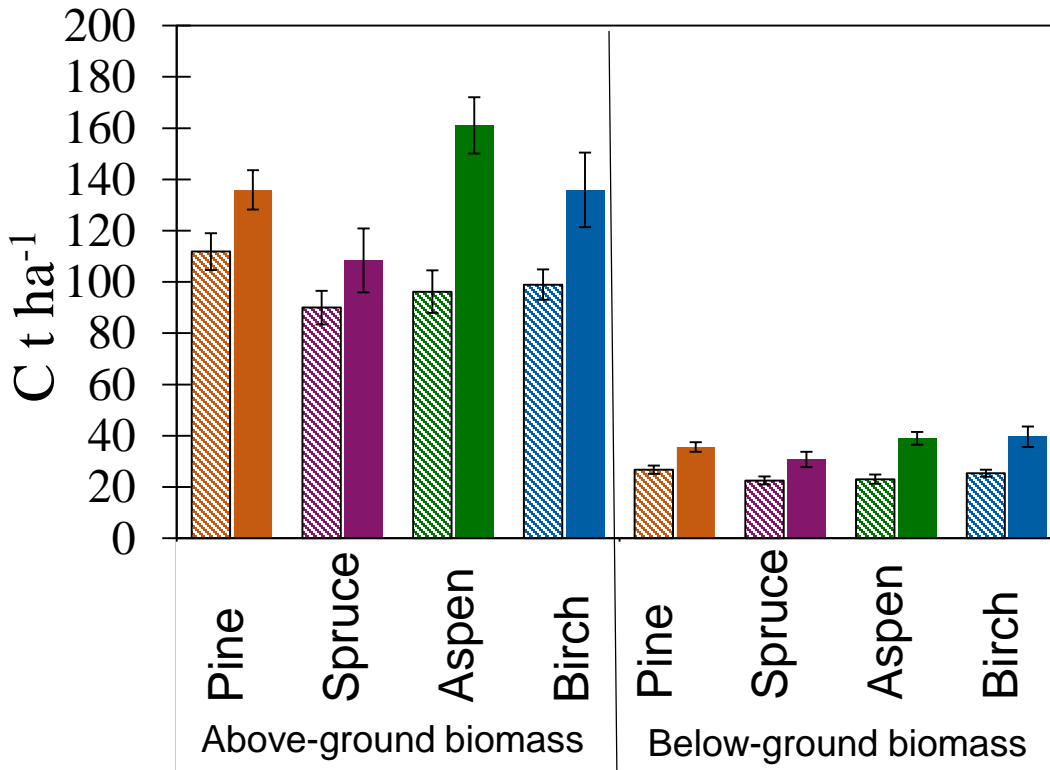
a) natural disturbances;

b) **specific ecosystem potential to store carbon;**

c) forest management

Gundersen P., Thybring E.E., Nord-Larsen T. et al. (2021) Old-growth forest carbon sinks overestimated. Nature, 591, E21–E23. <https://doi.org/10.1038/s41586-021-03266-z>

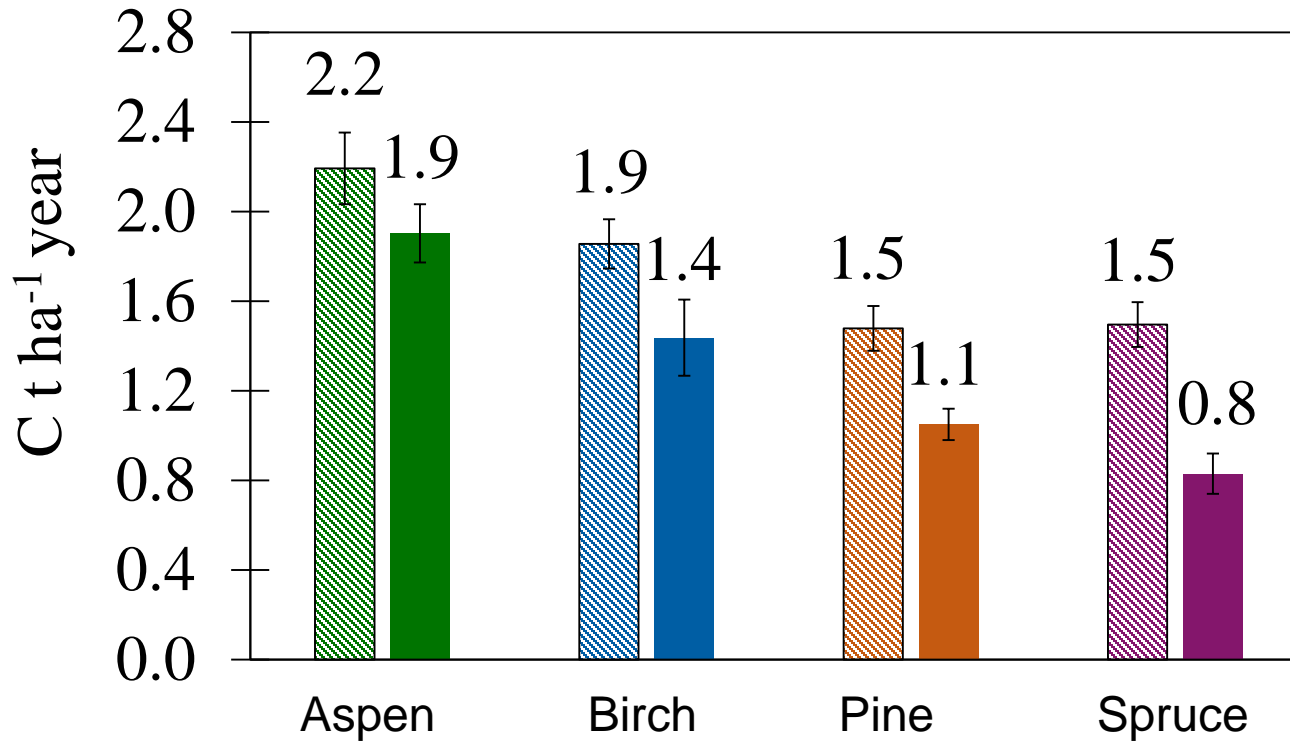
Old-growth forest C stock compared to two times younger forests



Largest increase from mature to old-growth stands is in the **tree biomass (20-40%)** and **deadwood (20-38%)** – in the **significant carbon pools with more than 50% of the carbon stored**

Published – Kenina et al.
Forests, 10, 911;
doi:10.3390/f10100911
Forests, 9(7), 435; doi:
10.3390/f9070435

Old-growth forest C stock compared to two times younger forests



Annual carbon accumulated is significantly lower in old-growth forests:

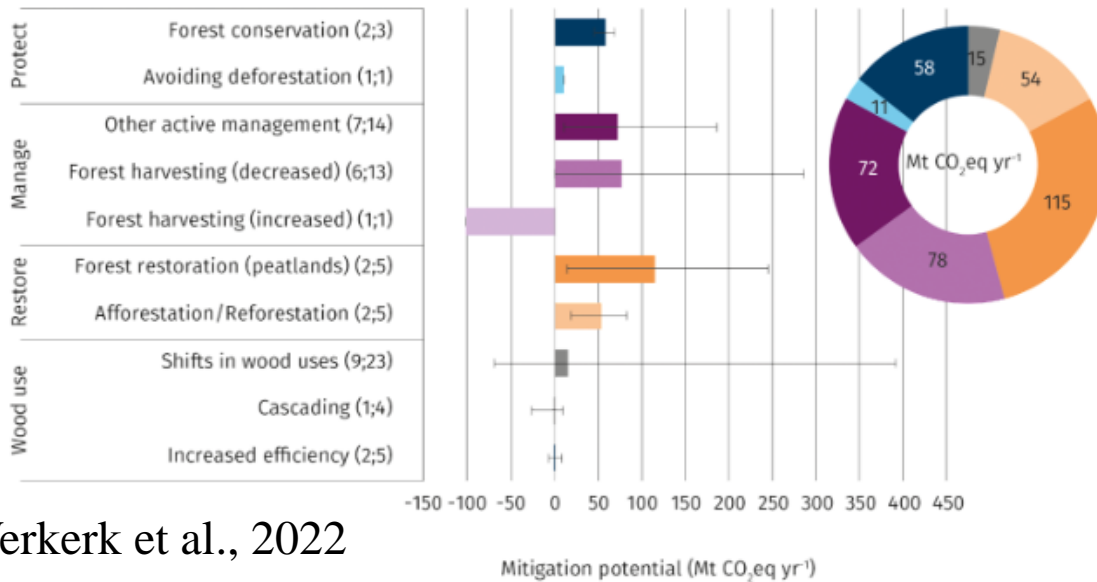
Aspen: -13 %

Birch: -23 %

Pine: -29 %

Spruce: -45 %

Climate change mitigation potential



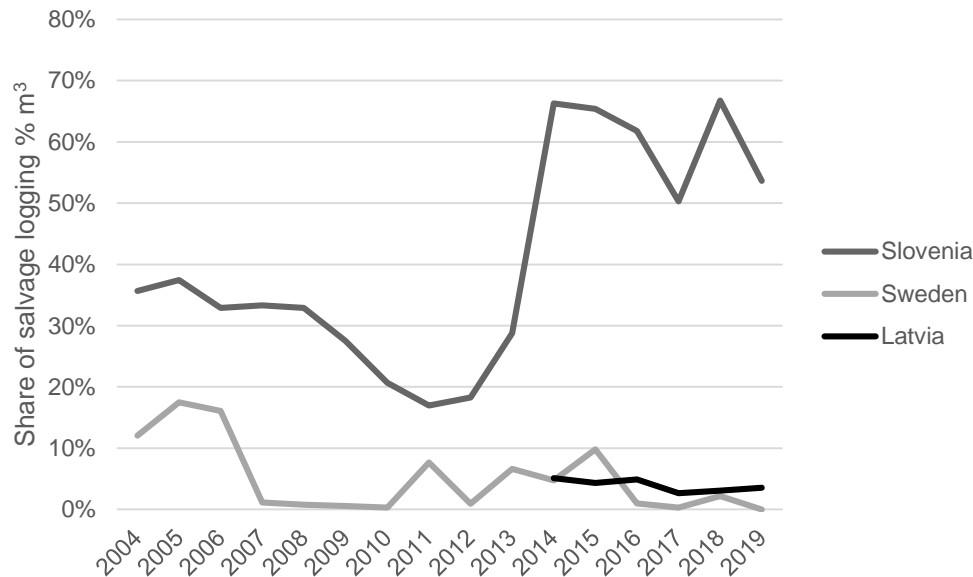
limiting factors for forest carbon:

- a) natural disturbances;
- b) specific ecosystem potential to store carbon;
- c) **forest management**

Verkerk et al., 2022

Forest-based mitigation potential by 2050 in the EU-27, NO, CH and UK by activity type.
 The data sample size (number of studies; number of datapoints) displayed next to activity type.
 Bars = the mean values across all literature reviewed. Error bars = minimum and maximum values of the range

Practical examples



- ✓ “Doing nothing” is not always the best option;
- ✓ Slovenia’s case where clear-cut forestry is prohibited, leads to increased share of salvage logging;
- ✓ Unified understanding and definitions of forest management practices e.g. clear-cut

Possible ways to enhance carbon in European forestry



- ✓ **Area expansion** (afforestation) – comparatively less potential for Nordic – Baltic region due to already high forest cover (50% plus)

**The same forest area,
but different quality, different vitality!
= more carbon**

- ✓ **Productivity of existing forest stands** (climate smart management to maximize carbon sequestration and storage in living tree biomass)
- ✓ **Preventing carbon loss** (resilience to natural disturbances)
- ✓ **Wood products** (substitution effect)

Thank you for the attention!

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