State research program: Forest4LV Innovation in Forest Management and Value Chain for Latvia's Growth: New Forest Services, Products and Technologies
(No. VPP-ZM-VRIIILA-2024/2-0002)

Example of restoration: rewetting and consequences for GHG emissions

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Forest disturbances and restoration in the Nordic and Baltic States in the light of European politics
05.11.2024.

Forest amelioration: when it started?

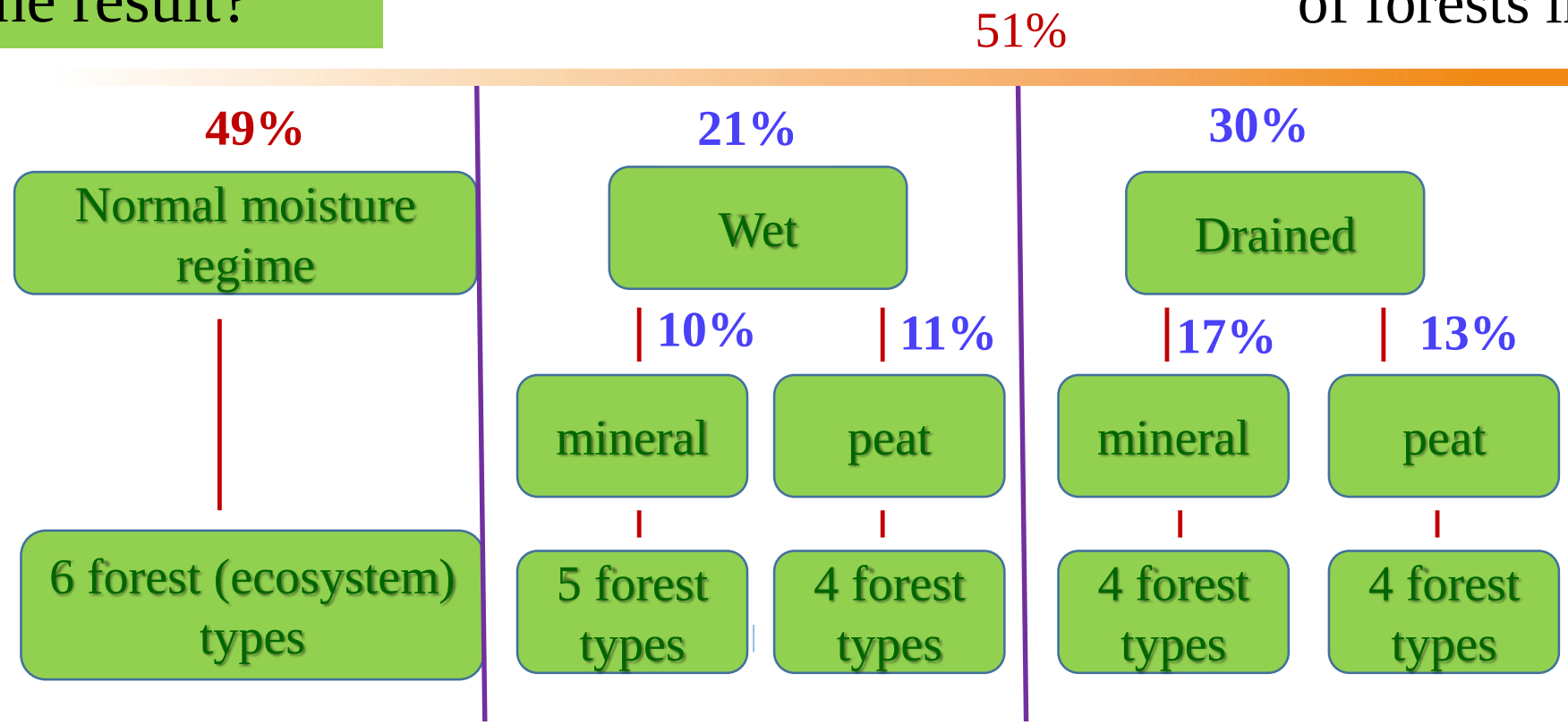
First large amelioration project with a sole purpose to ensure improve forest growth was carried out in Riga forests in 1898, developed and supervised by E. Ostvalds

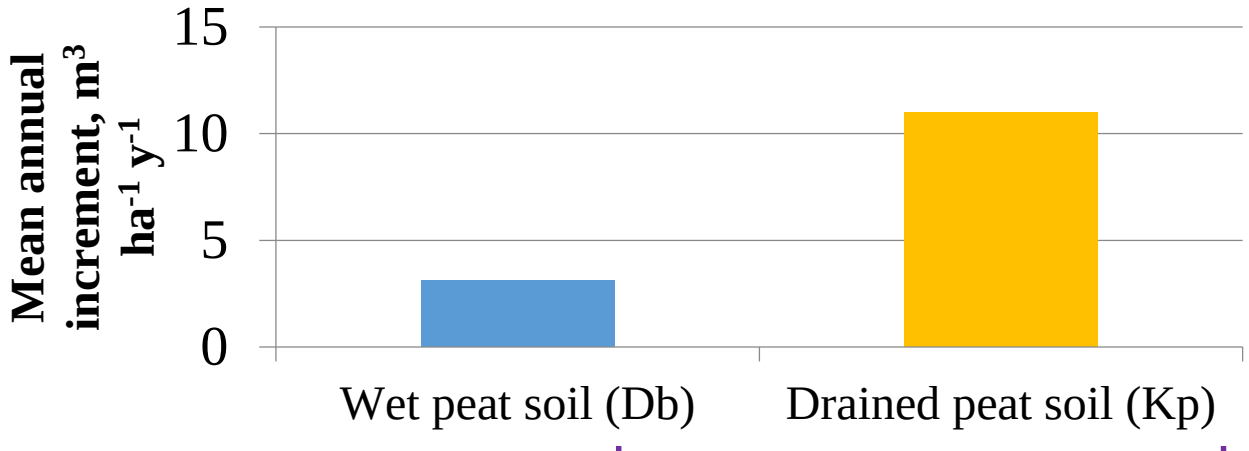
Allowing roots to breathe

Forest amelioration: how it developed?

Forest amelioration: what's the result?

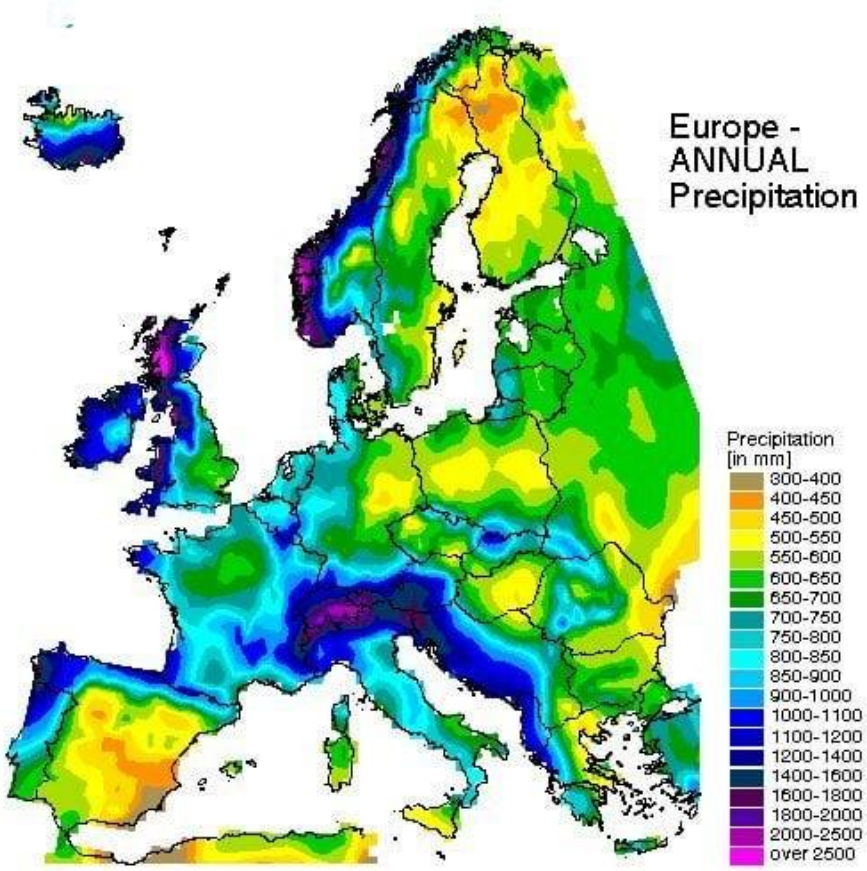
Total 3.3 million ha of forests in Latvia





Drained mineral soil – organic layer less than 20cm, drained peat soil – organic layer more than 20cm

Forest amelioration: why was it necessary?

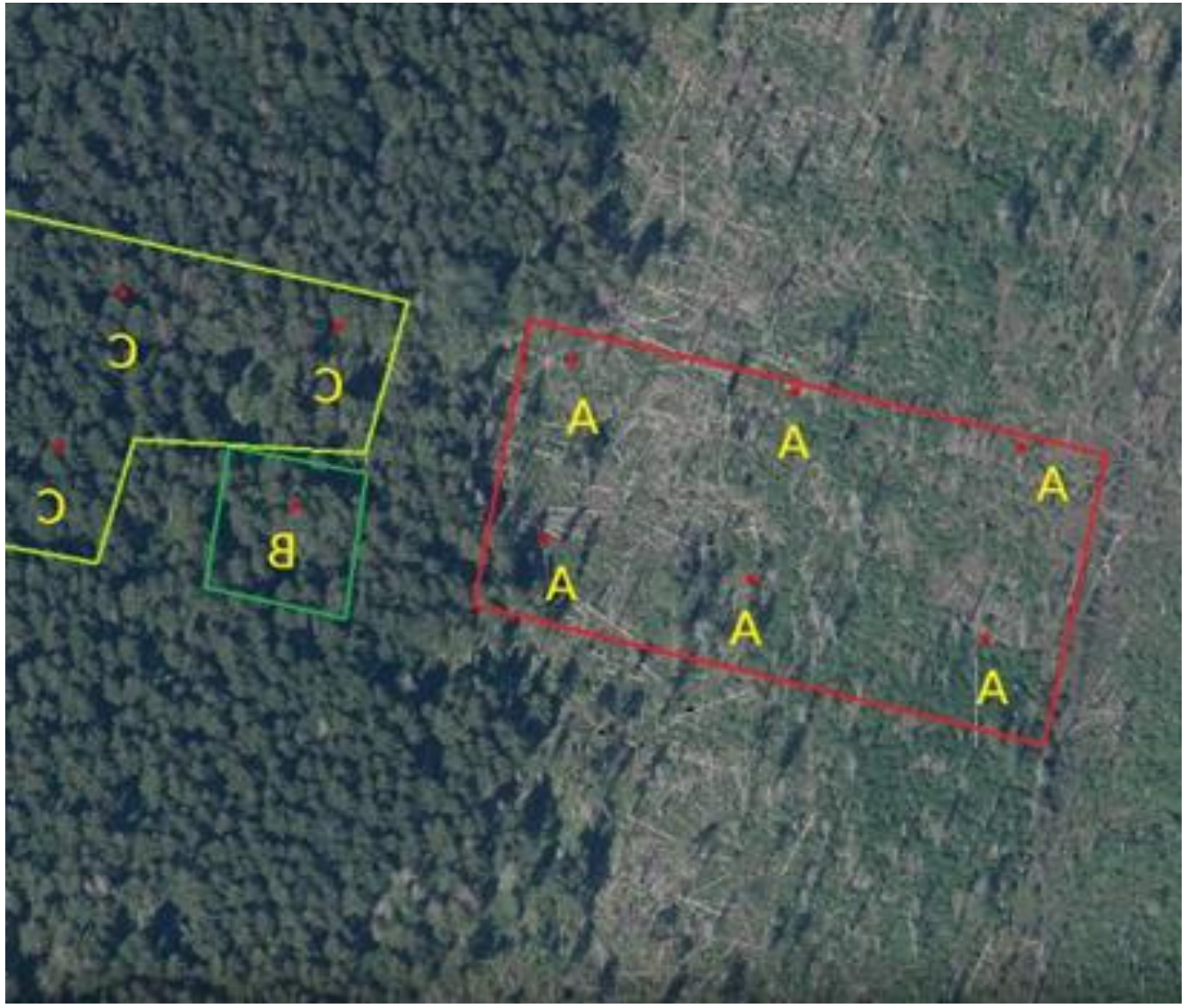


Modified from European Environment Agency

Zālītis, 1999

Forest amelioration: what's next?

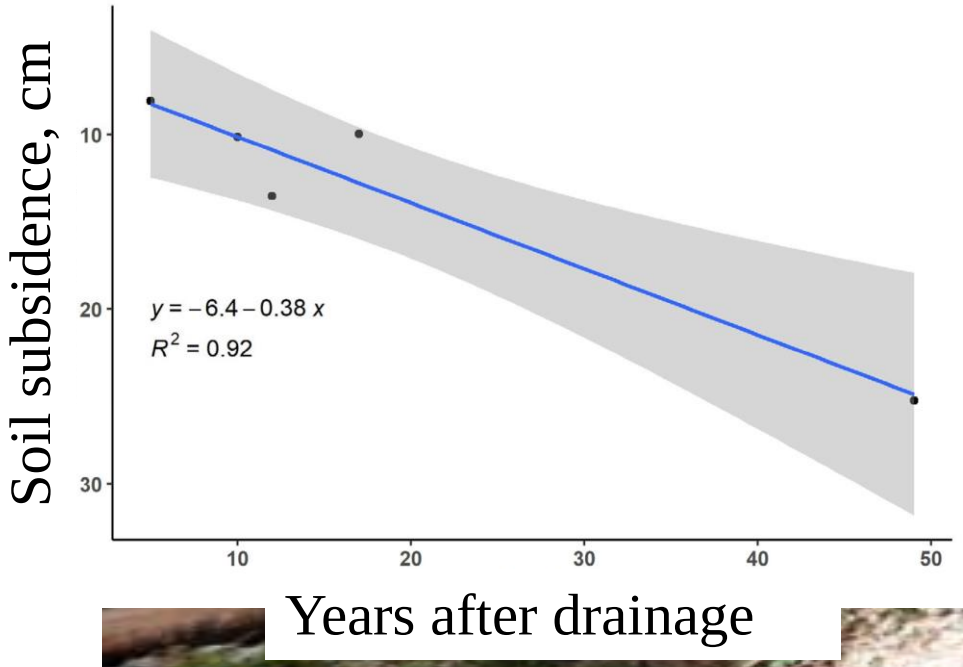
Lets block a ditch!



No gain!

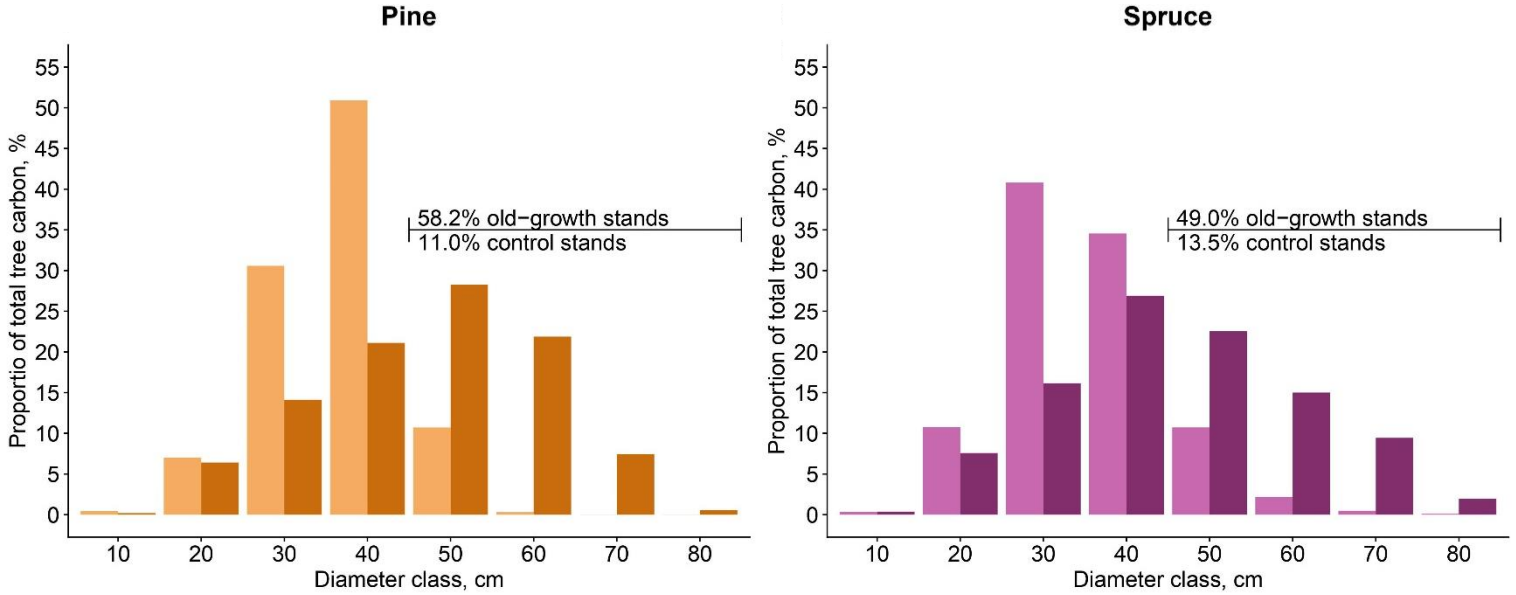
Forest amelioration:
lets look long-term (I) soil- coniferous trees

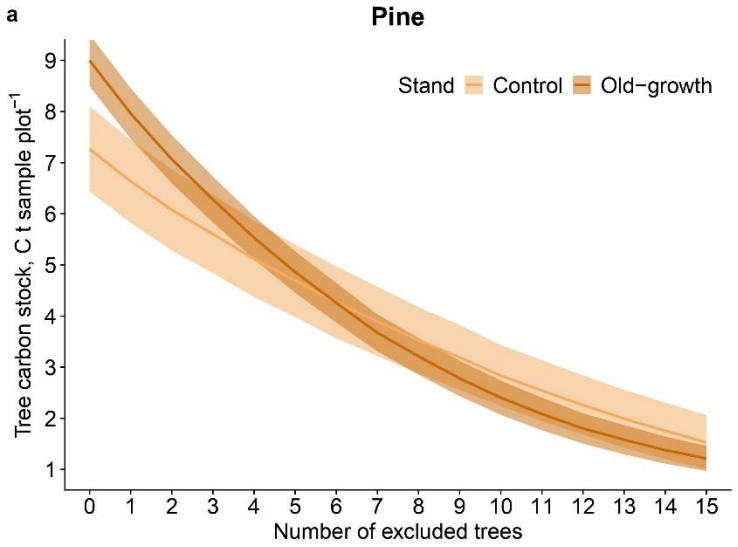
Lets create a ditch!

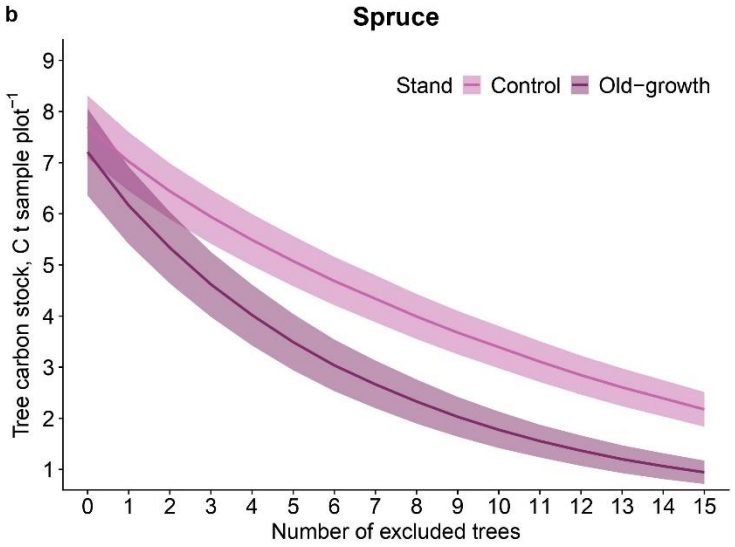


Dubra S, Samariks V, Līcīte I, Butlers A, Purviņa D, Lupiķis A, Jansons Ā. Effects of Drainage on Carbon Stock in Hemiboreal Forests: Insights from a 54-Year Study. Sustainability. 2023; 15(24):16622. https://doi.org/10.3390/su152416622

(Forest amelioration and) no management vulnerability







Large trees (DBH > 50 cm) in **old-growth stands stored 58% and 49% of carbon** in pine and spruce stands, while in control stands, this was significantly lower - 11% in pine and 14% in spruce

Exclusion of few largest trees caused a significant decrease of the mean tree biomass carbon stock between old-growth and control stands, and percentage reduction was higher both in pine and spruce in old-growth stands.

Take-home messages

- Careful consideration should be given when selecting sites for rewetting to ensure the (greatest) benefits. Soil properties are essential to determine the tree growth. Sites with poor tree growth (i.e. the mistakes of amelioration) are the target for rewetting.
- Rewetting projects needs to consider the socioeconomic implications as well as the effect on biodiversity at the forest landscape scale.
- Tree biomass is the most dynamic carbon pool, therefore it resistance and/or resilience to natural disturbances (as well as use of wood) determines the long-term climate change mitigation benefits from the particular forest lands.
- Soil is relatively stable carbon pool and drainage does not deplete it over a long term. Drainage of mesotrophic or eutrophic organic soils, that reduces the excess groundwater, ensures a long-term positive (from a climate change mitigation perspective) effect on soil CH_4 balance.

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Thank you!

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