



Upscaling adaptive forest management to the European scale from regional cases

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Goal

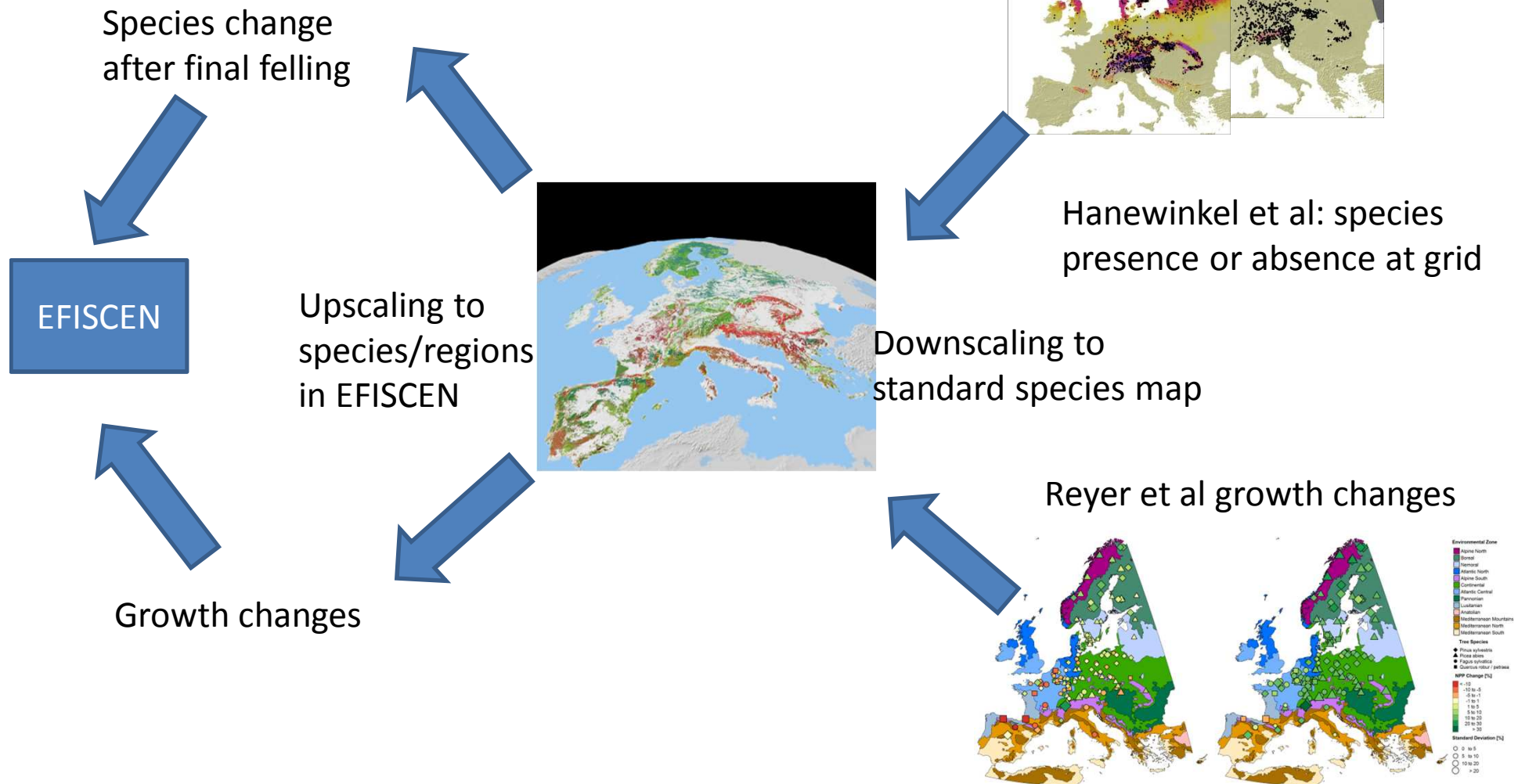
Test European-scale adaptive management effects using MOTIVE results:

- Growth responses by 4C runs (Reyer et al 2012)
- Species shifts (Hanewinkel, Zimmermann et al 2012)
- Adaptive management actions as generalised from the case studies

Baseline derived from European Forest Sector Outlook Studies (EFSOS II)



Climate change effects





Adaptive management

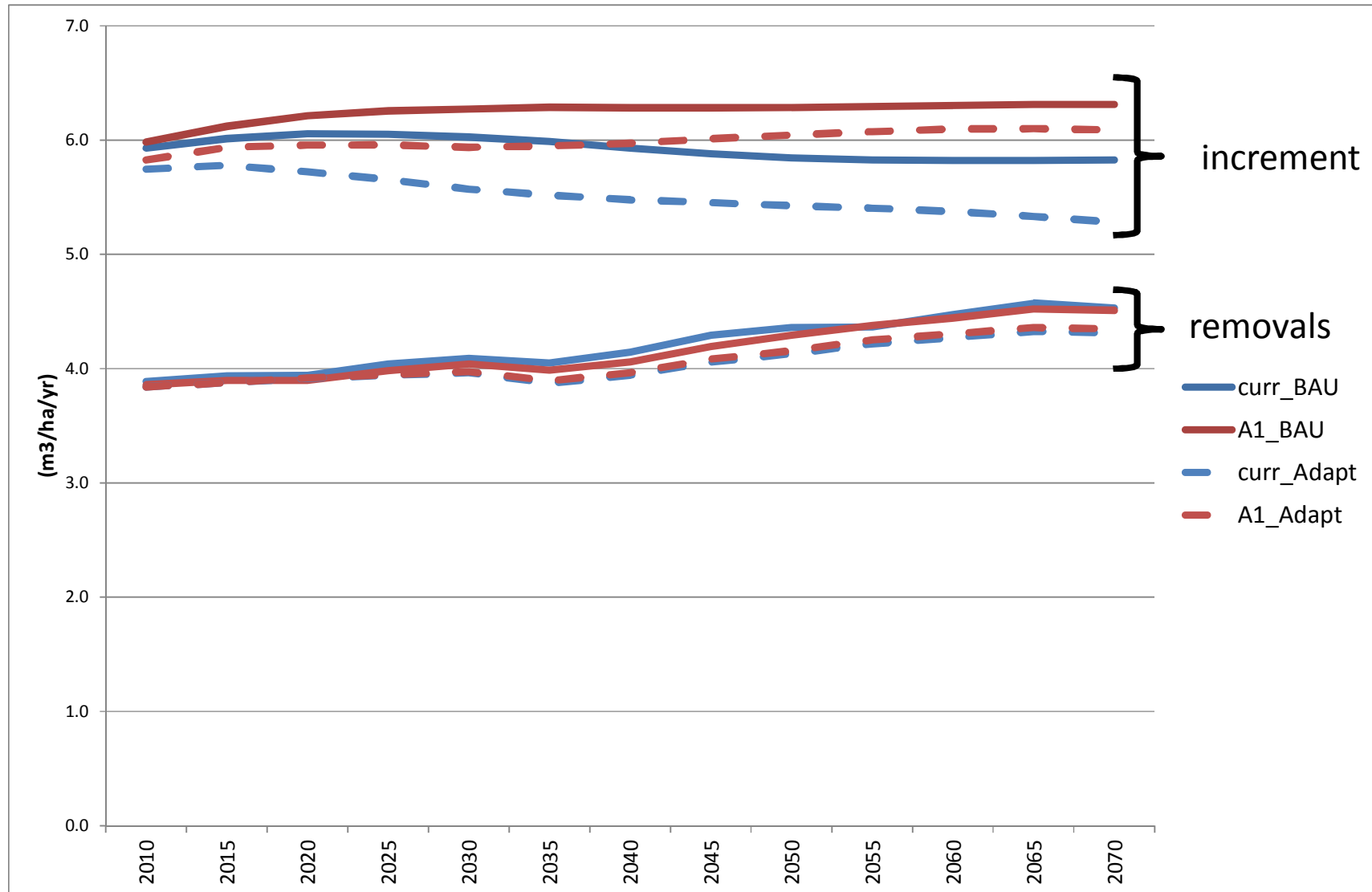
- Shorten rotation ages by 10-20 years for species with decreasing suitability
- Start species conversion 30 years earlier (ie look 30 years ahead when regenerating)



		BAU
Current Climate No growth change No Sp. Change BAU	A1b Growth change Sp. Change BAU	
Current Climate No growth change Sp. Change – 30 Adaptive management	A1b Growth change Sp. Change – 30 Adaptive management	Adaptive
Current	A1b	

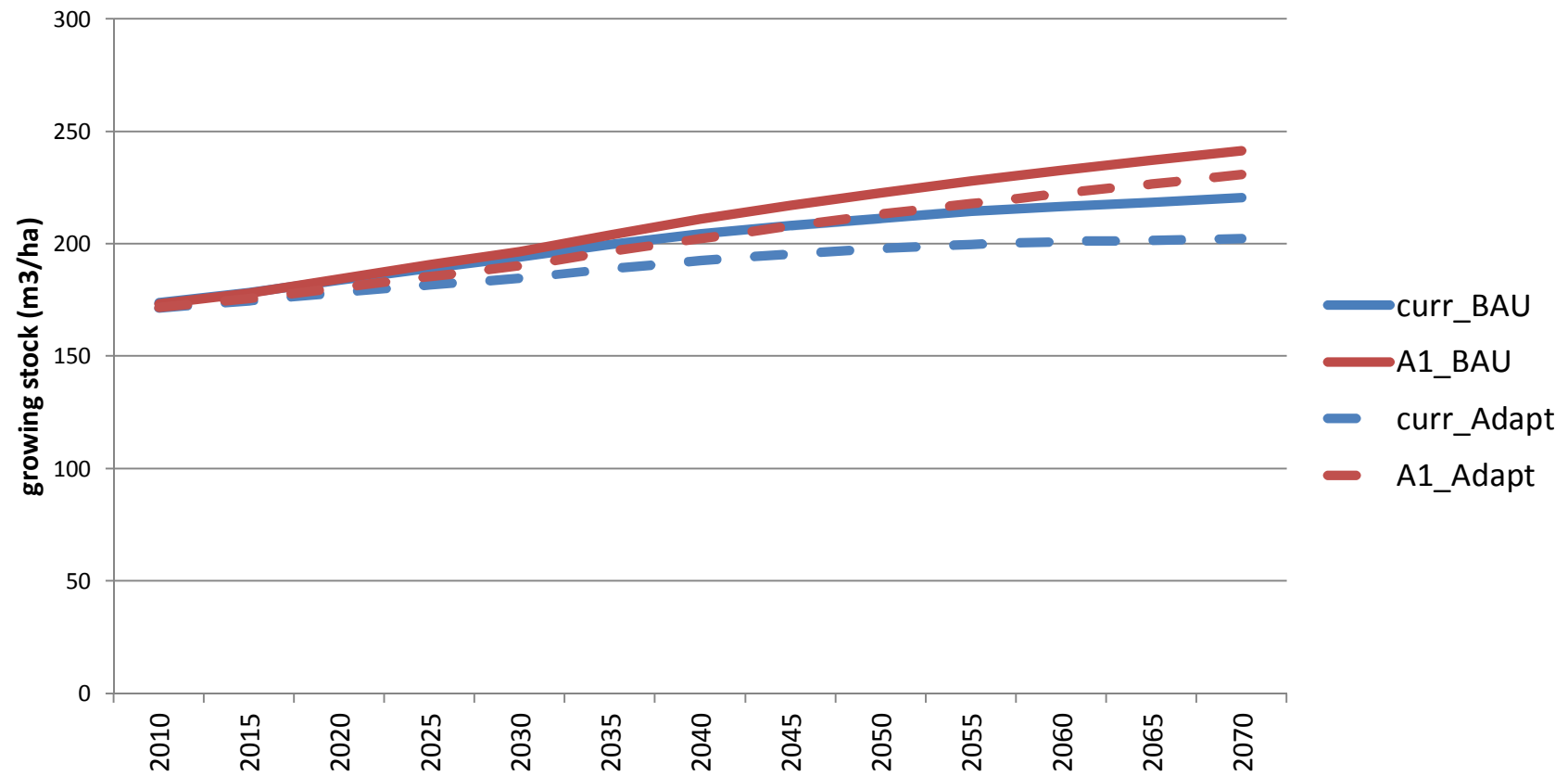


Europe, increment and removals



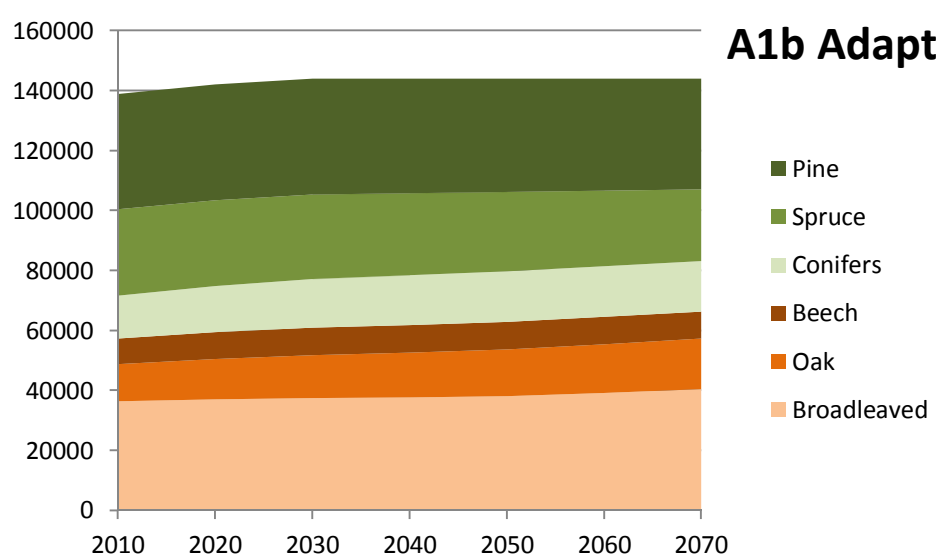
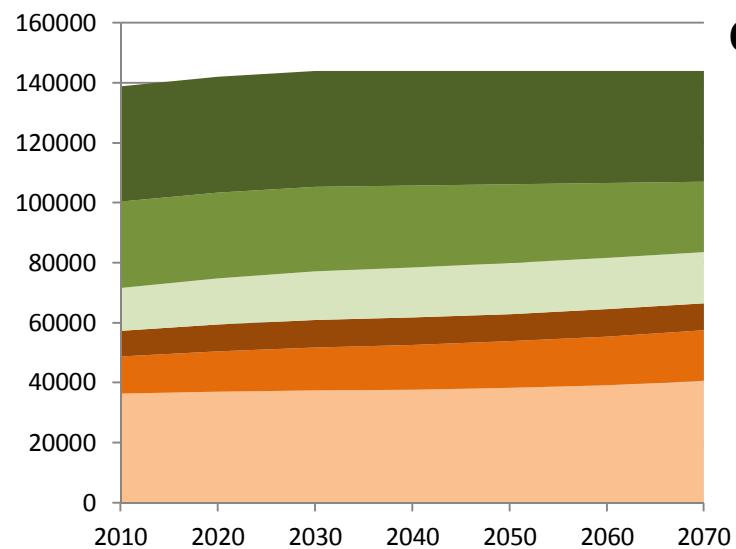
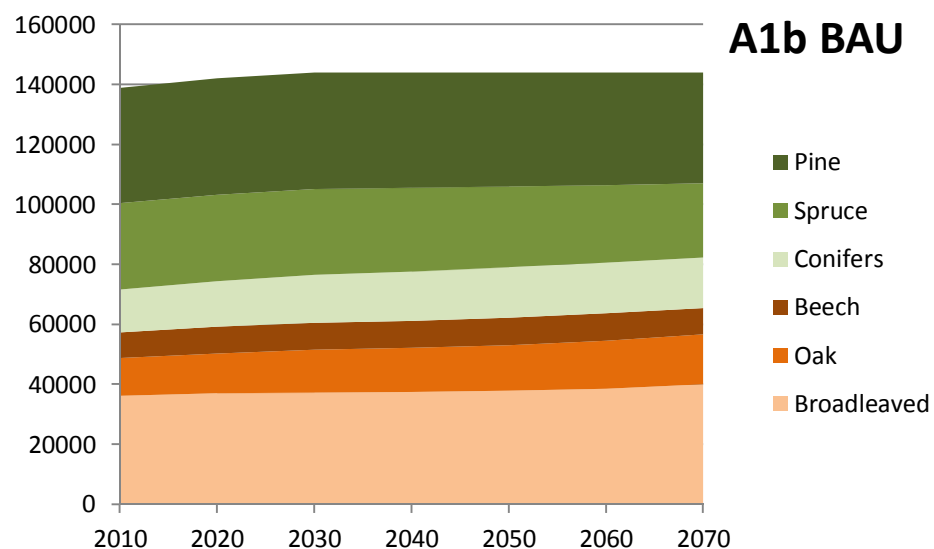
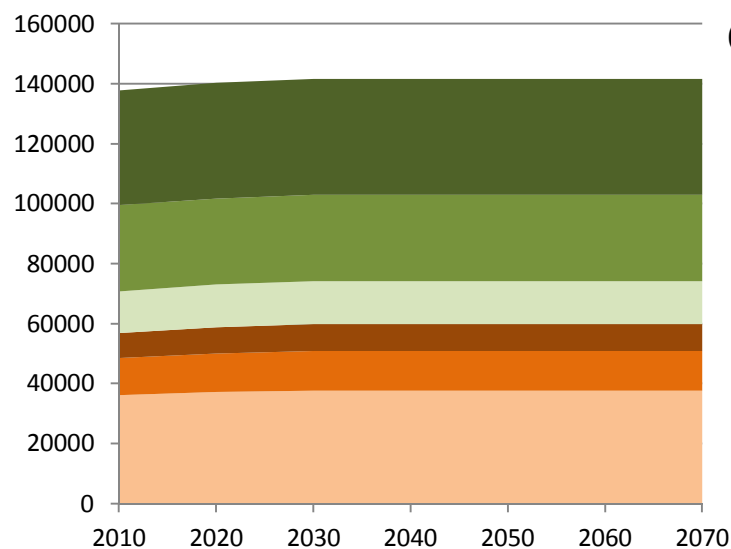


Europe, growing stock



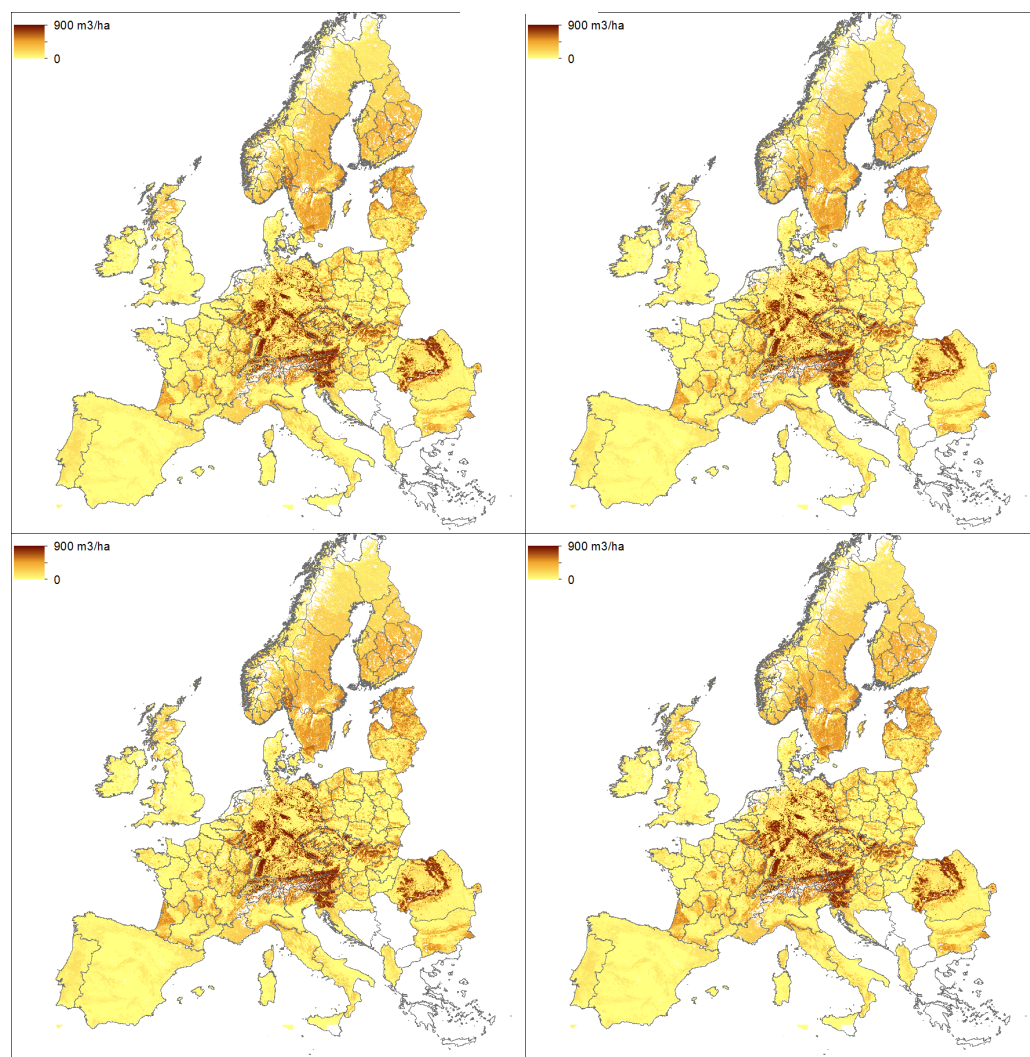


Europe, area per species



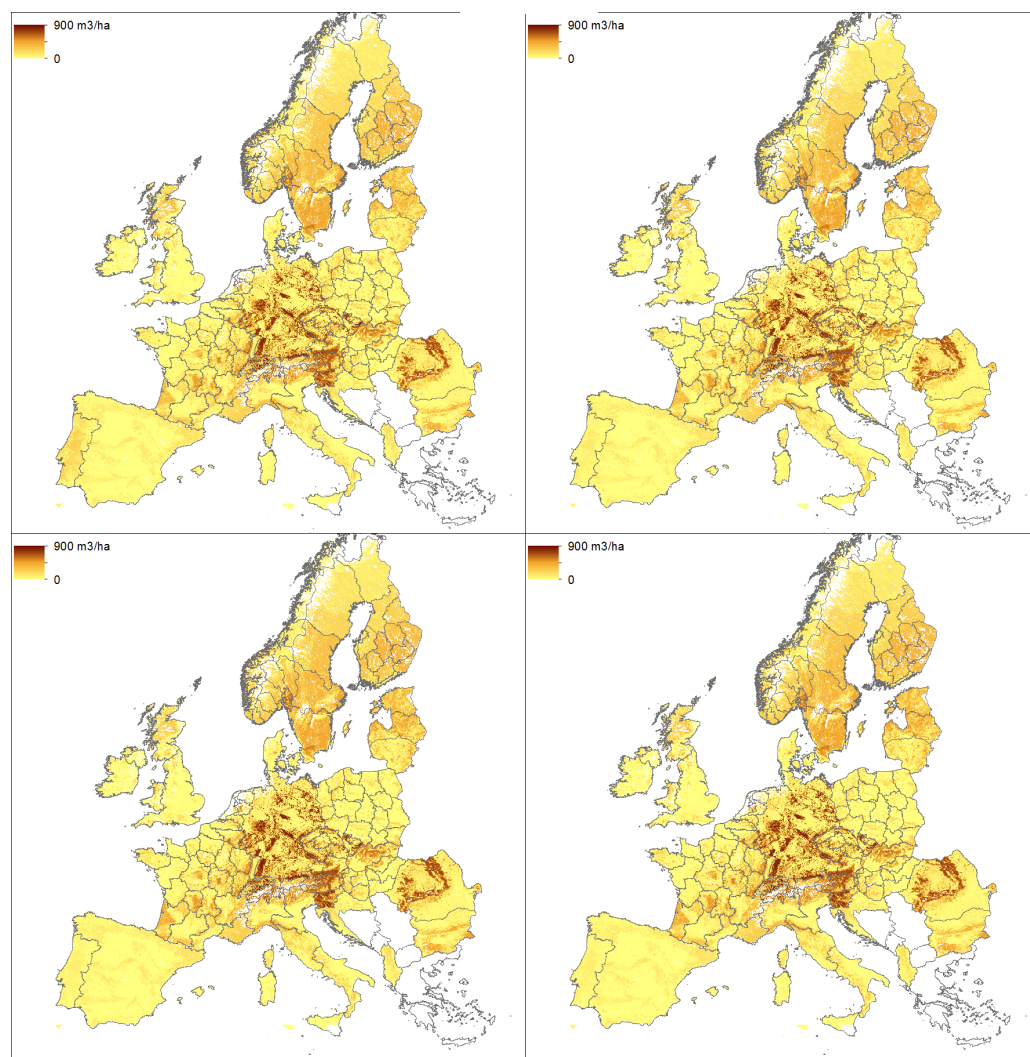


2010



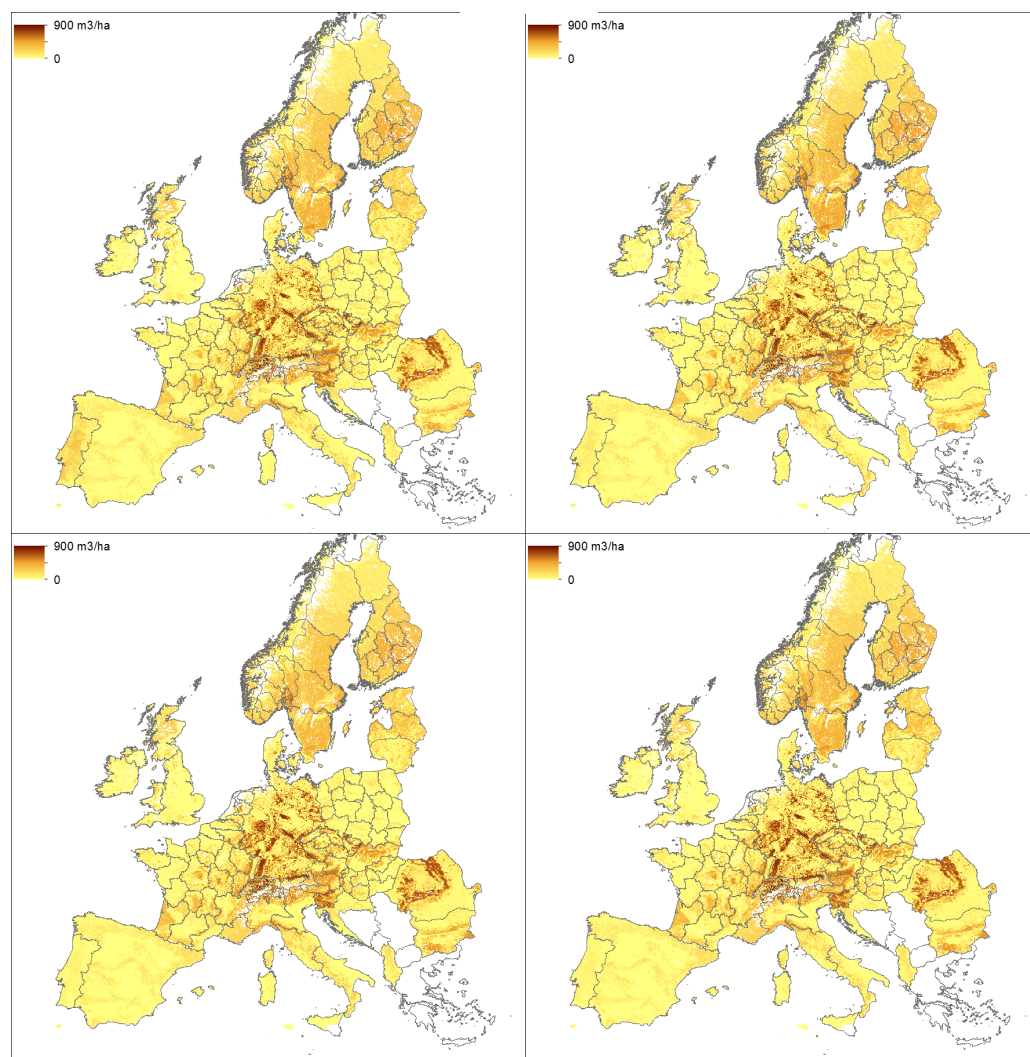


2030



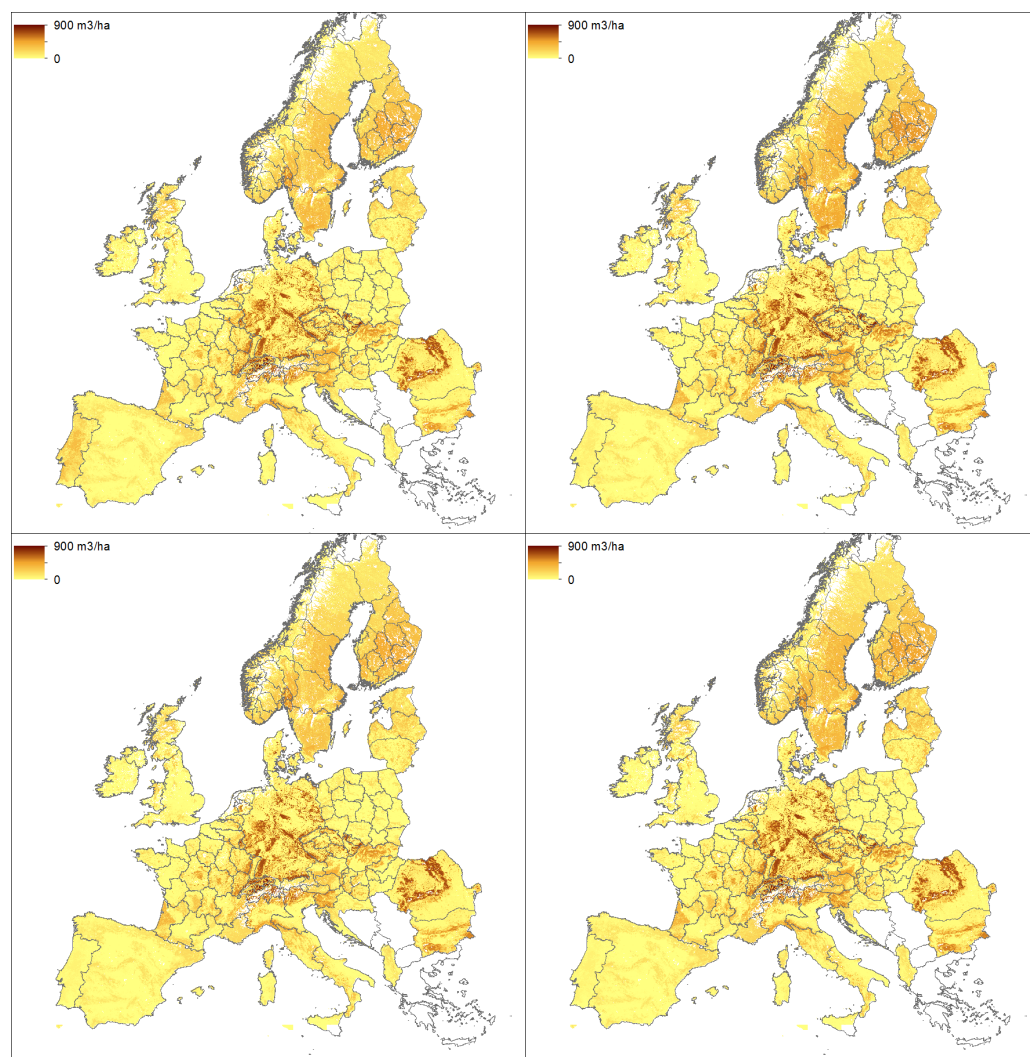


2050



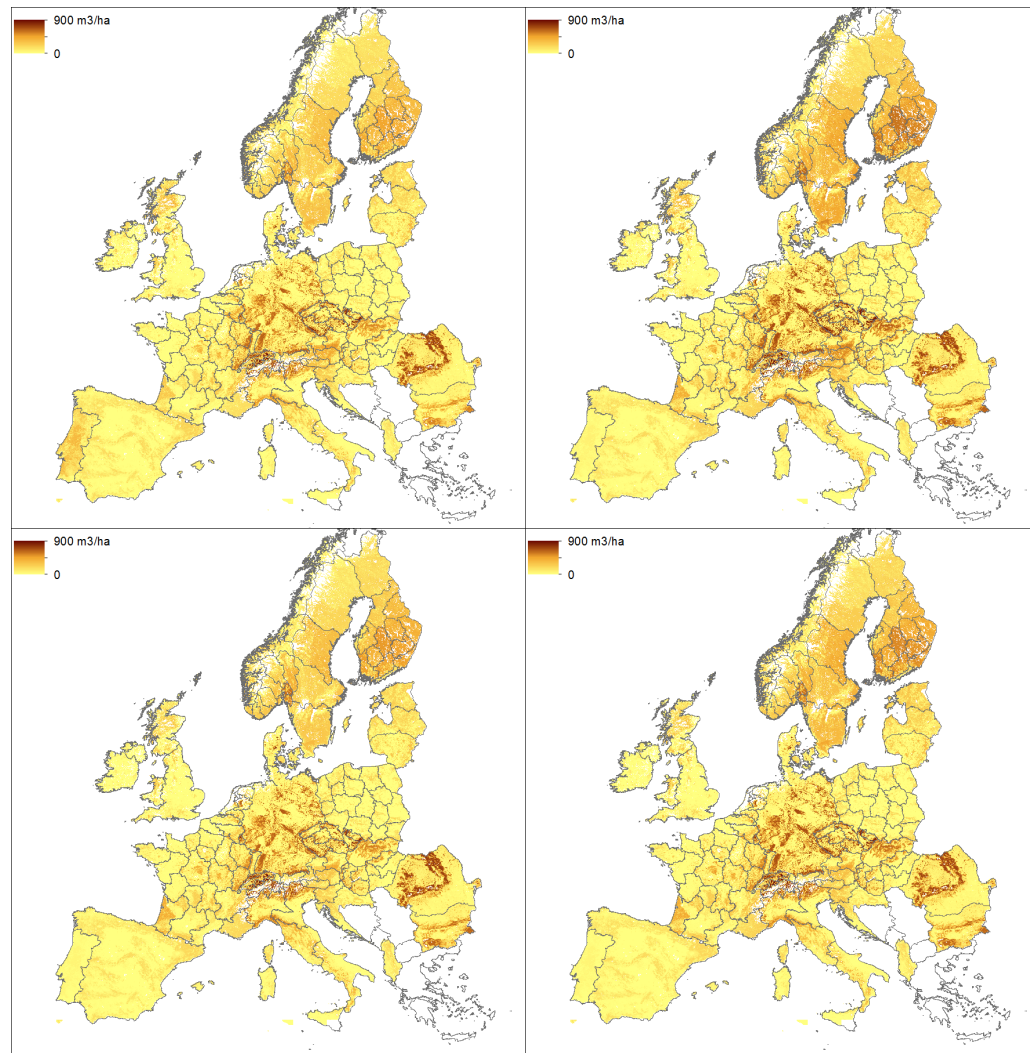


2070





2090





Conclusion

- First time adaptive management is combined with expected climate change impacts on large scale
- Decrease of high growing stocks in Central Europe
- Build up of growing stock in Northern Europe
- Natural development gives ~5.4% area change in species by 2070
- Adaptive mngt gives ~6% area change in spp by 2070
- Conversion much slower than Hanewinkel et al suggests
- No problems with timber supply
- Due to shorter rotations, thinning share should decrease
- If conversion needs to be fastened, fellings need to be increased further, but depends on the country



Discussion

No large scale mortality assumed (trees are plastic)

Forest managers pro actively respond with species change, and speed up change by shortening rotations, and by converting to species which they see in the field benefitting from climate change

Diverse messages from Motive cases

Exotics do not occur in Hanewinkel (2012), therefore douglas suitability is not projected

Discrepancy between envelop models and process based model (Reyer)