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UNIVERSITY OF COPENHAGEN

Do we need to manage unmanaged forests?

Jacob Heilmann-Clausen

Setting goals for dynamic nature: paradox or solution?

Center for Macroecology, Evolution and Climate

Globe institute

University of Copenhagen

Conservation of forest biodiversity

Long history of forest loss
Very little primary forest remaining

Quaternary Science Reviews 28 (2009) 3016–3034

Contents lists available at ScienceDirect

Quaternary Science Reviews

journal homepage: www.elsevier.com/locate/quascirev

The prehistoric and preindustrial deforestation of Europe

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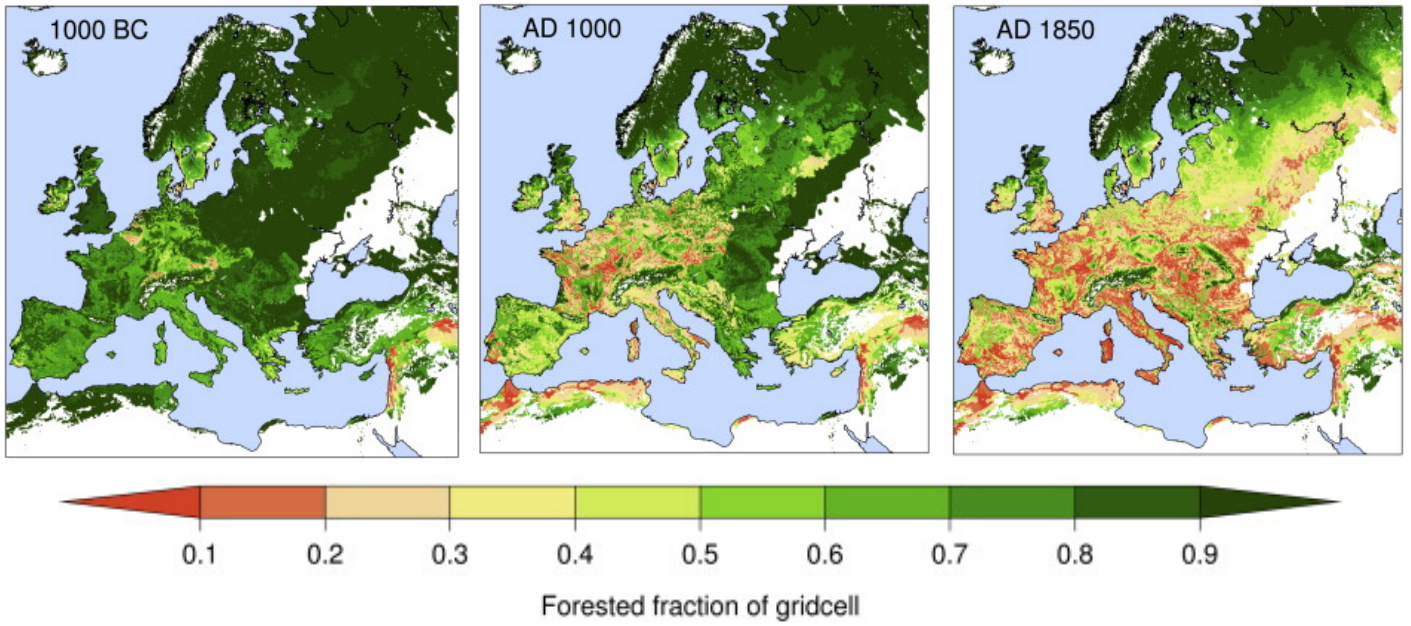
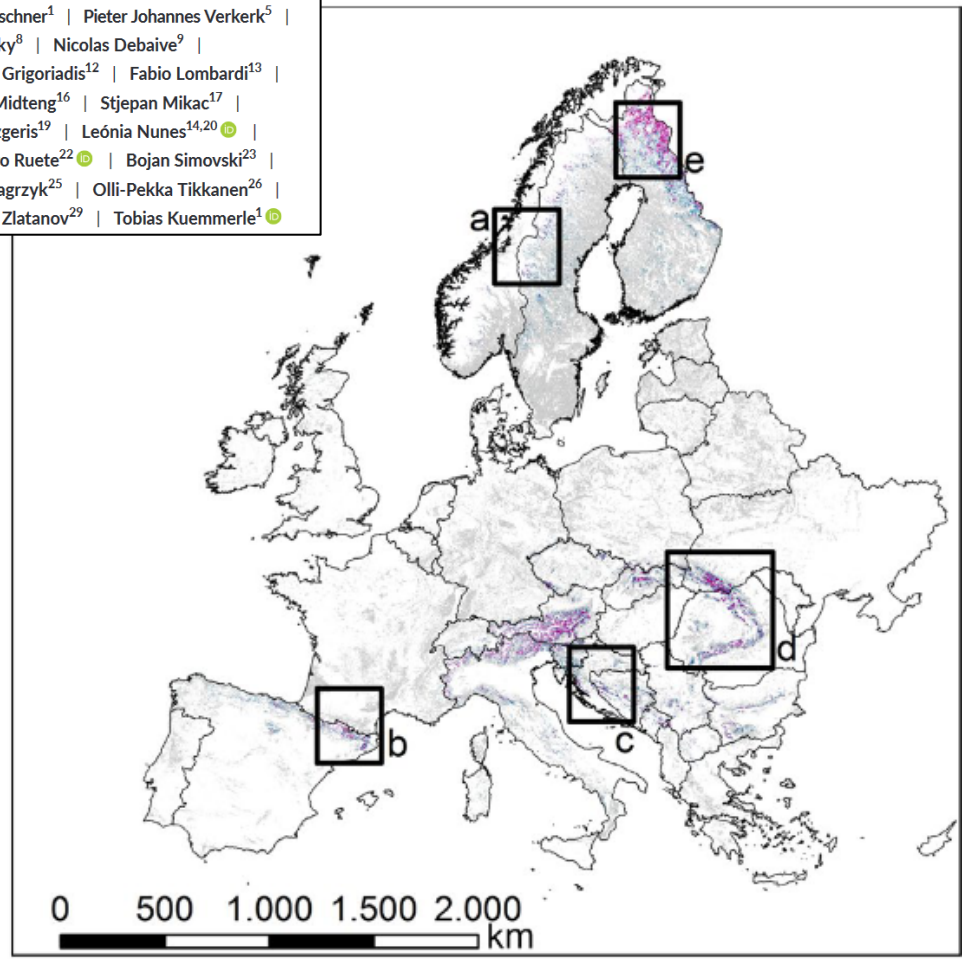


BIODIVERSITY REVIEW

WILEY Diversity and Distributions

Where are Europe's last primary forests?

Francesco Maria Sabatini[1] | Sabina Burrascano[2] | William S. Keeton[3] | Christian Levers[1] | Marcus Lindner[4] | Florian Pötzschner[1] | Pieter Johannes Verkerk[5] | Jürgen Bauhus[6] | Erik Buchwald[7] | Oleh Chaskovsky[8] | Nicolas Debaive[9] | Ferenc Horváth[10] | Matteo Garbarino[11] | Nikolaos Grigoriadis[12] | Fabio Lombardi[13] | Inês Marques Duarte[14] | Peter Meyer[15] | Rein Midteng[16] | Stjepan Mikac[17] | Martin Mikoláš[18] | Renzo Motta[11] | Gintautas Mozgeris[19] | Leónia Nunes[14,20] | Momchil Panayotov[21] | Peter Ódor[10] | Alejandro Ruete[22] | Bojan Simovski[23] | Jonas Stillhard[24] | Miroslav Svoboda[18] | Jerzy Szwagrzyk[25] | Olli-Pekka Tikkanen[26] | Roman Volosyanchuk[27] | Tomas Vrska[28] | Tzvetan Zlatanov[29] | Tobias Kuemmerle[1]



Sabatini et al, 2018

Vegetation densification

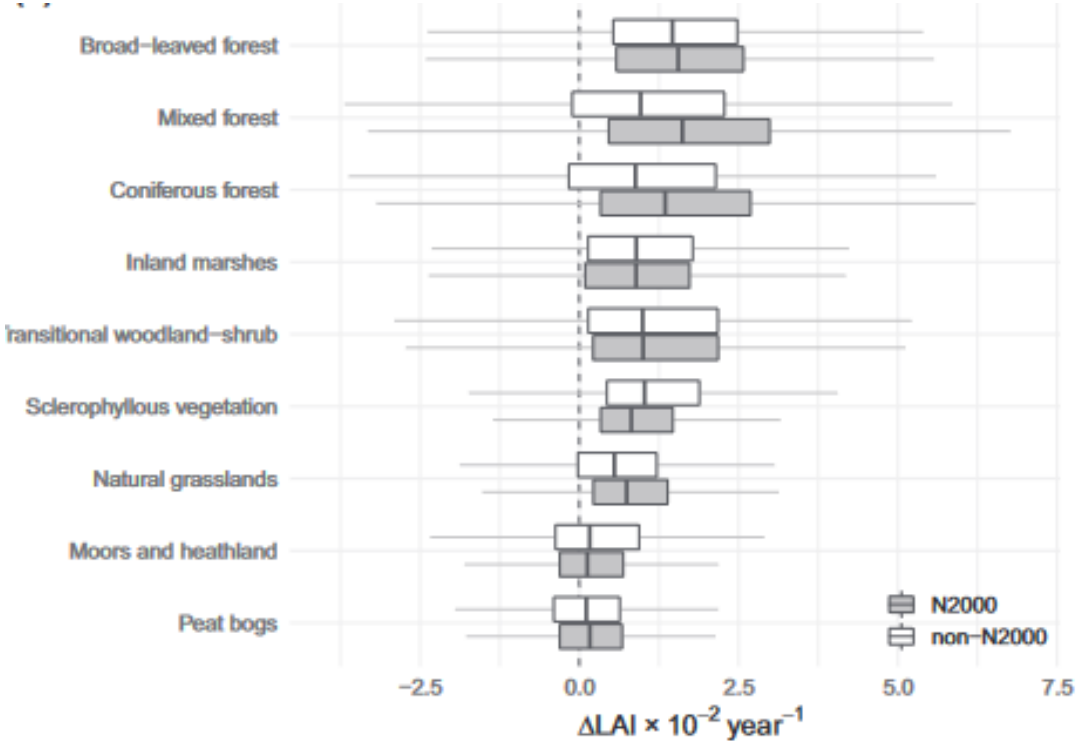
Received: 22 May 2018 | Revised: 27 August 2018 | Accepted: 28 August 2018
DOI: 10.1111/gcb.14451

PRIMARY RESEARCH ARTICLE

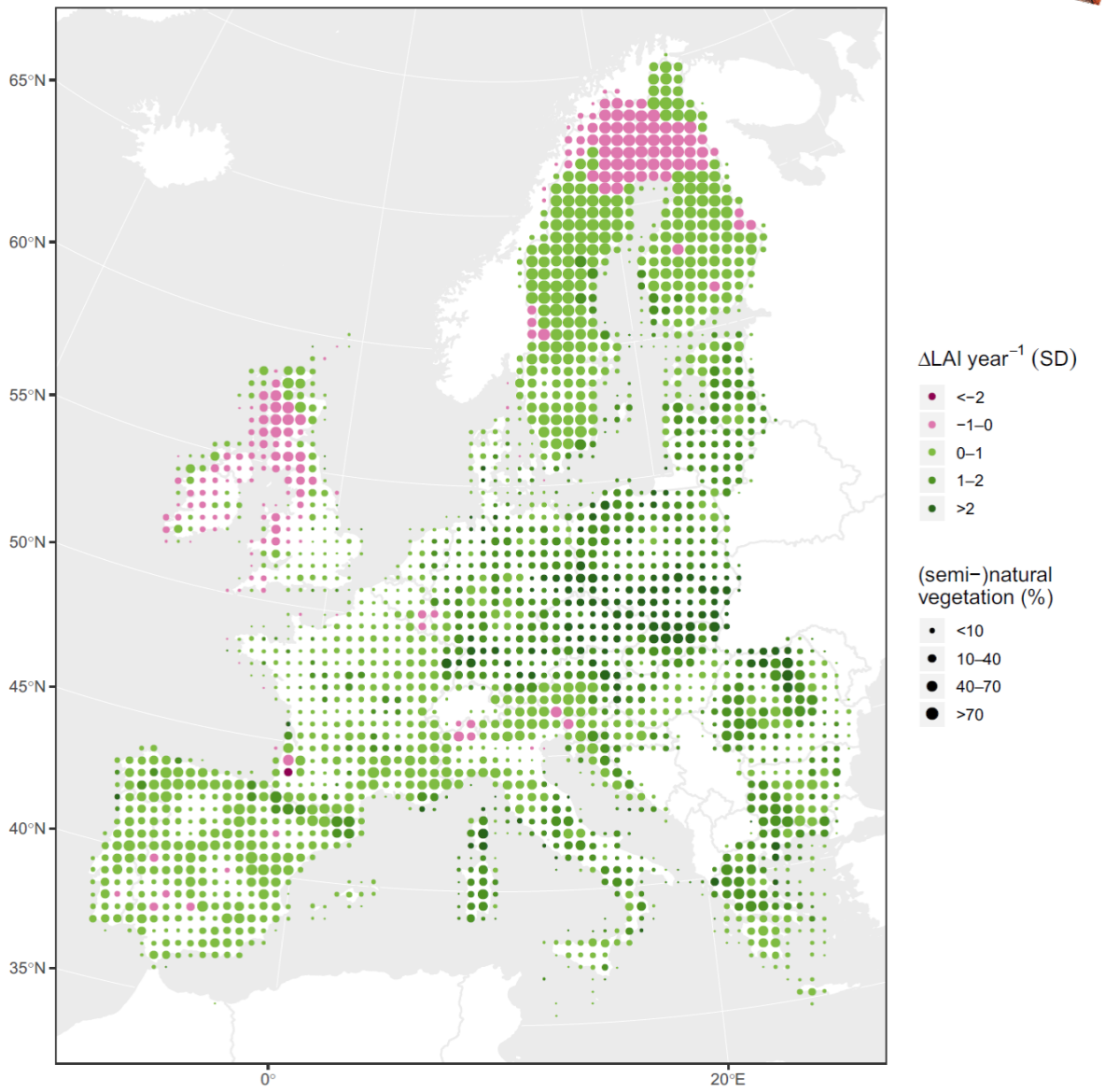
WILEY Global Change Biology

Land surface greening suggests vigorous woody regrowth throughout European semi-natural vegetation

Robert Buitenwerf[1,2] | Brody Sandel[1,3] | Signe Normand[1,2] | Anne Mimet[1,4] | Jens-Christian Svenning[1,2]



Trend 2000-2015



Solution: new hands off forest reserves?

Biological Conservation 237 (2019) 373–382

Contents lists available at ScienceDirect

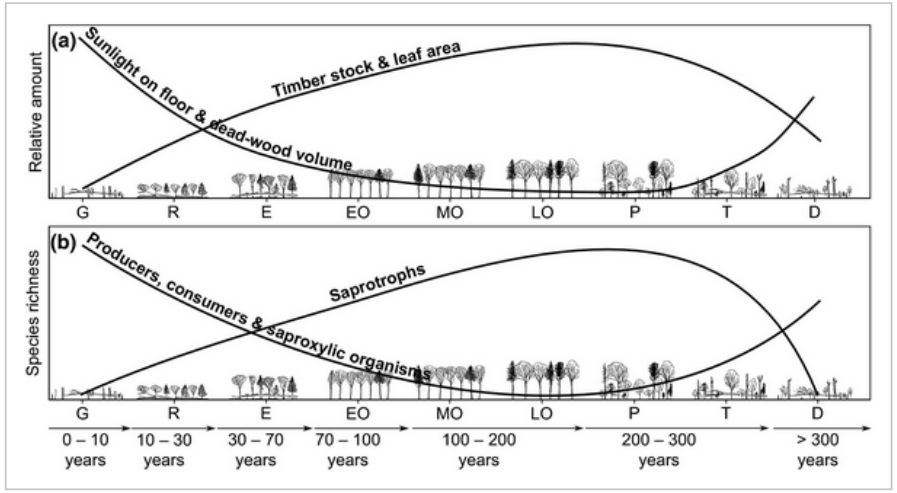
Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

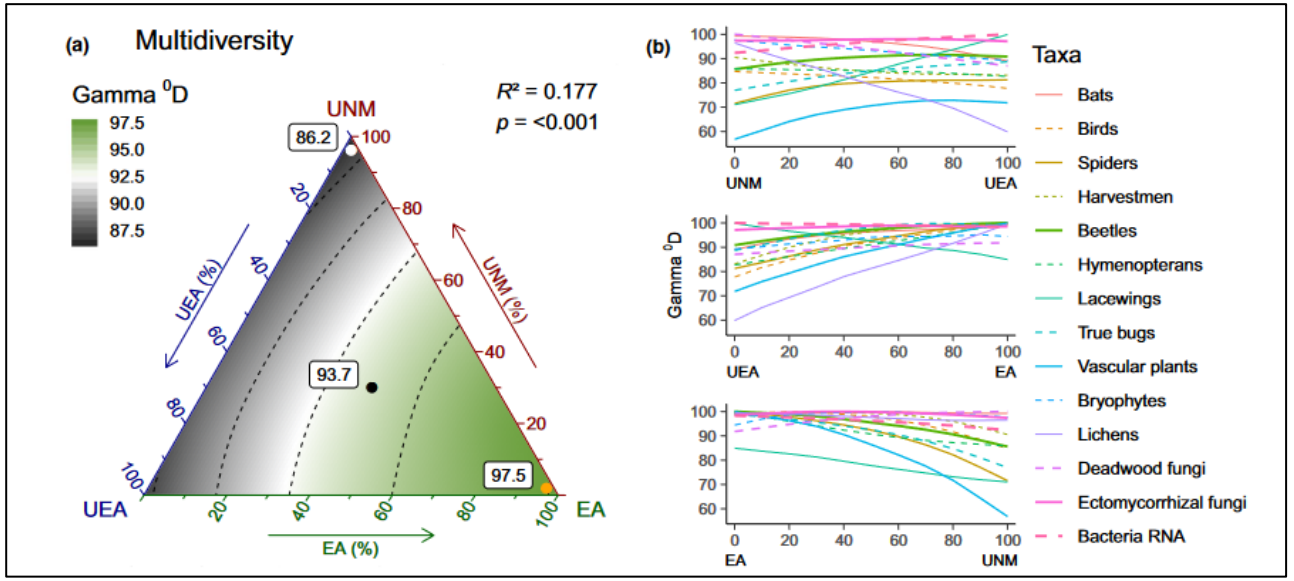
A new wilderness for Central Europe? — The potential for large strictly protected forest reserves in Germany

Sebastian Brackhane[a,b,*], Nicolas Schoof[a,c], Albert Reif[a,c], Christine B. Schmitt[c,d]

- Forests are slow – long way to recovery
- Important natural processes have been lost
- And others have been reinforced



Hilmers et al. 2018, *Journal of Applied Ecology*



EA: Even-aged managed
UEA: Uneven-aged managed
UNM: Unmanaged

Schall et al. 2020, *Journal of Applied Ecology*

- UNM: old coppice with standards, unmanaged 20-70 yrs, no restoration, tree age ~160 yrs, highest timber volume
- EA: All stages in rotation considered, highest amounts of dead wood, lowest timber volume

I.e. highest biodiversity when there is both dead wood and light!

Restoration or active management needed?

Received: 7 May 2020 | Accepted: 5 August 2020
DOI: 10.1111/1365-2664.13754

FORUM

Journal of Applied Ecology

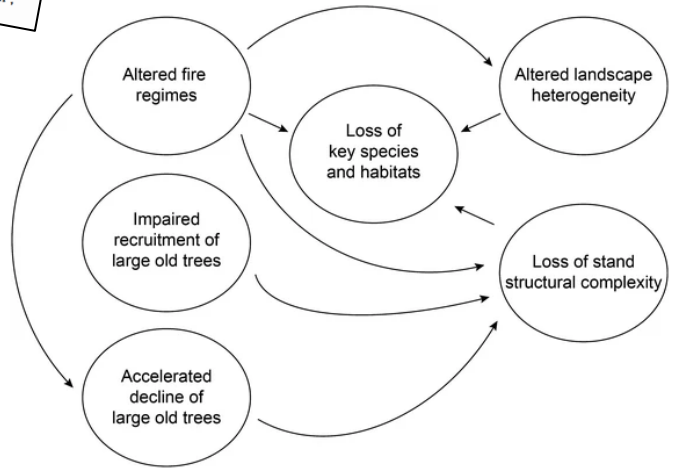
What is unmanaged forest and how does it sustain biodiversity in landscapes with a long history of intensive forestry?

Hans Henrik Bruun[1] | Jacob Heilmann-Clausen[2]

"We call for discarding the current orthodox view of non-intervention when new forest reserves are created... Active reinforcement of natural disturbance regimes and active habitat creation may lead to faster recovery"

- Lack of old trees and dead wood
- Lack of wetlands
- Lack of glades and transition zones

- Restoration of natural forest structures
- Restoration of disturbance regimes



Restoration project in Gribskov 2014

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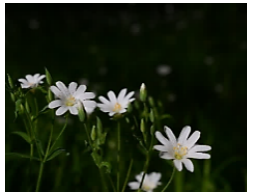
Goals:

- More deadwood
- More tree microhabitats
- More varied stand structure

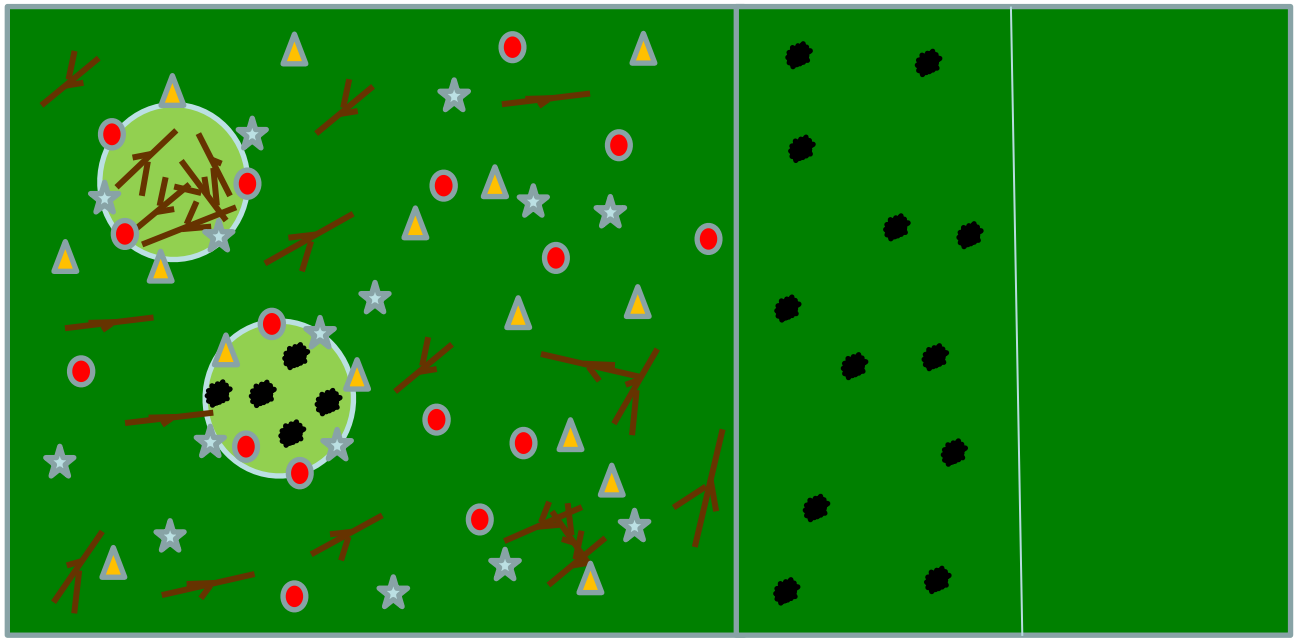
Response:





+ Epiphytic lichens & bryophytes – no response monitoring yet

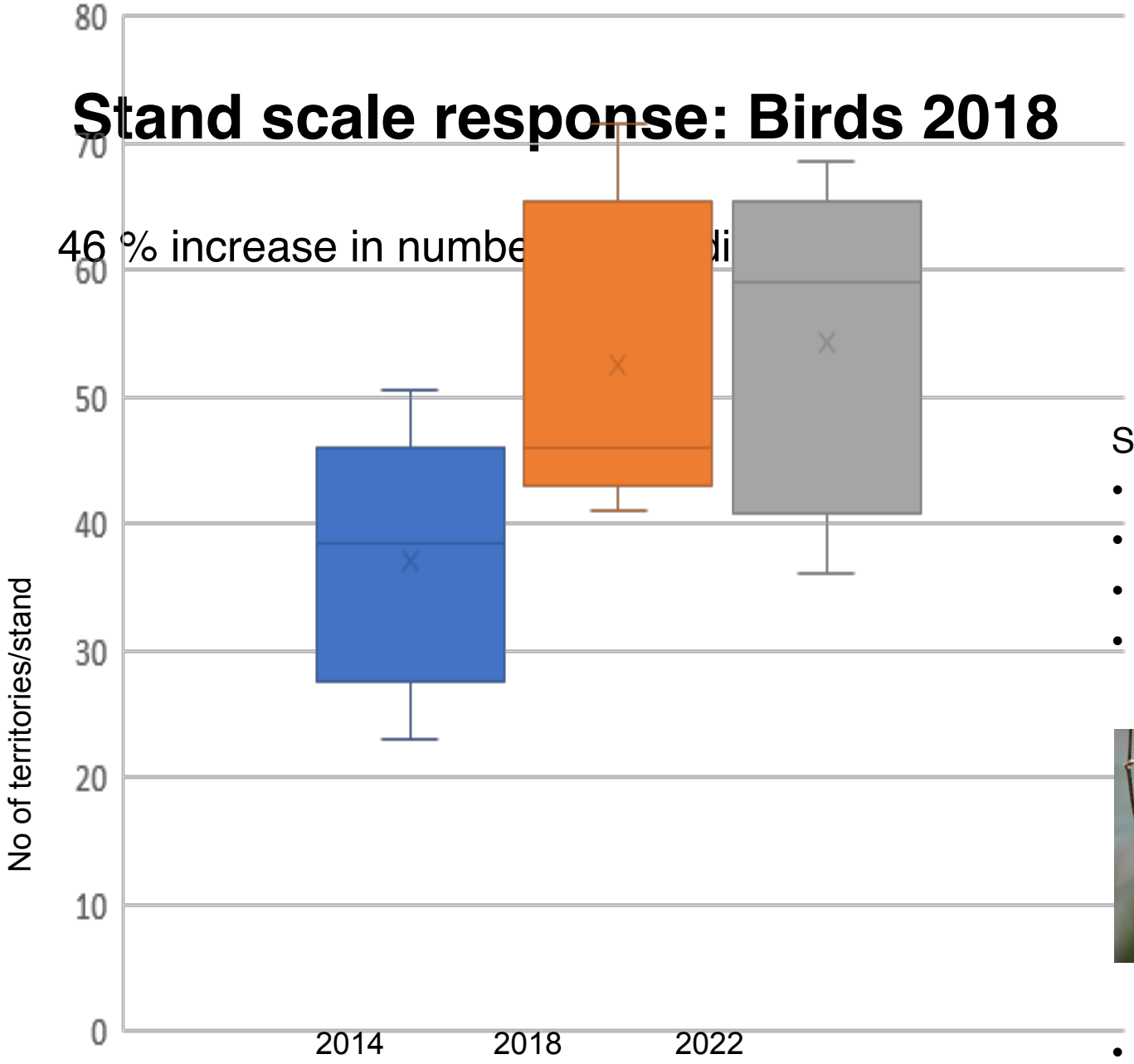
Interventions:



Principal design

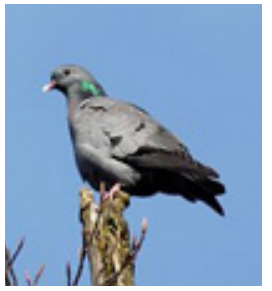
Stand scale response: Birds 2018

46 % increase in numbe di



Species specific responses

- *Columbo oenas*:1 – 6 pairs
- *Dendrocopus major*: 6 – 12 pairs
- *Ficedula hypoleuca*: 0 - 3 pairs
- *Troglodytes troglodytes*: 9 – 15 pairs



- From zero to six breeding pairs of red-listed birds

Treatment scale response: vegetation

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Gap creation enhances herb richness (92 % increase in Gap-DW))

But decreases bryophyte richness (24 % decrease in Gap-DW))

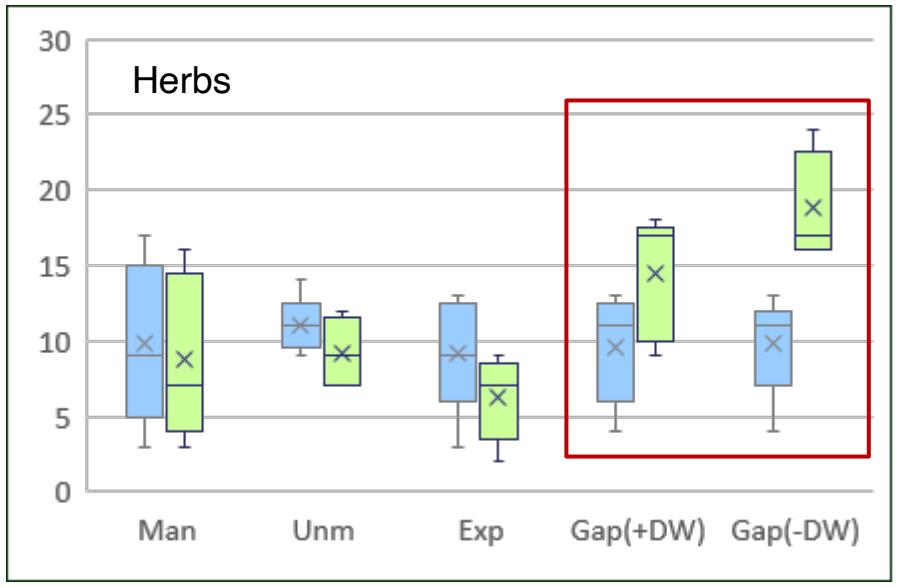
Pre treatment (2014)

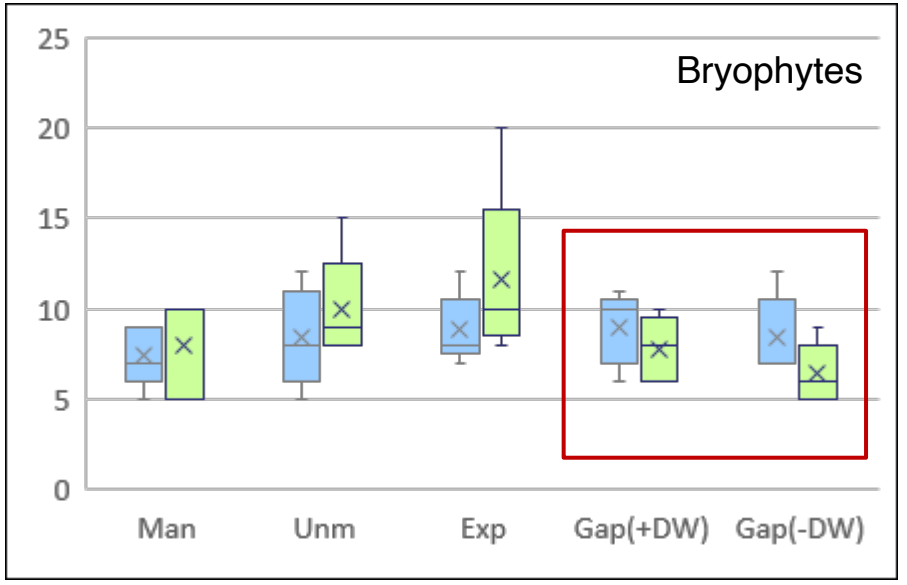
Post treatment (2018)

Only common species

Strong increase for several competitiv
species, e.g.

- *Calamagrostis epigejos*
- *Pteridium aquilinum*
- *Rubus idaeus*





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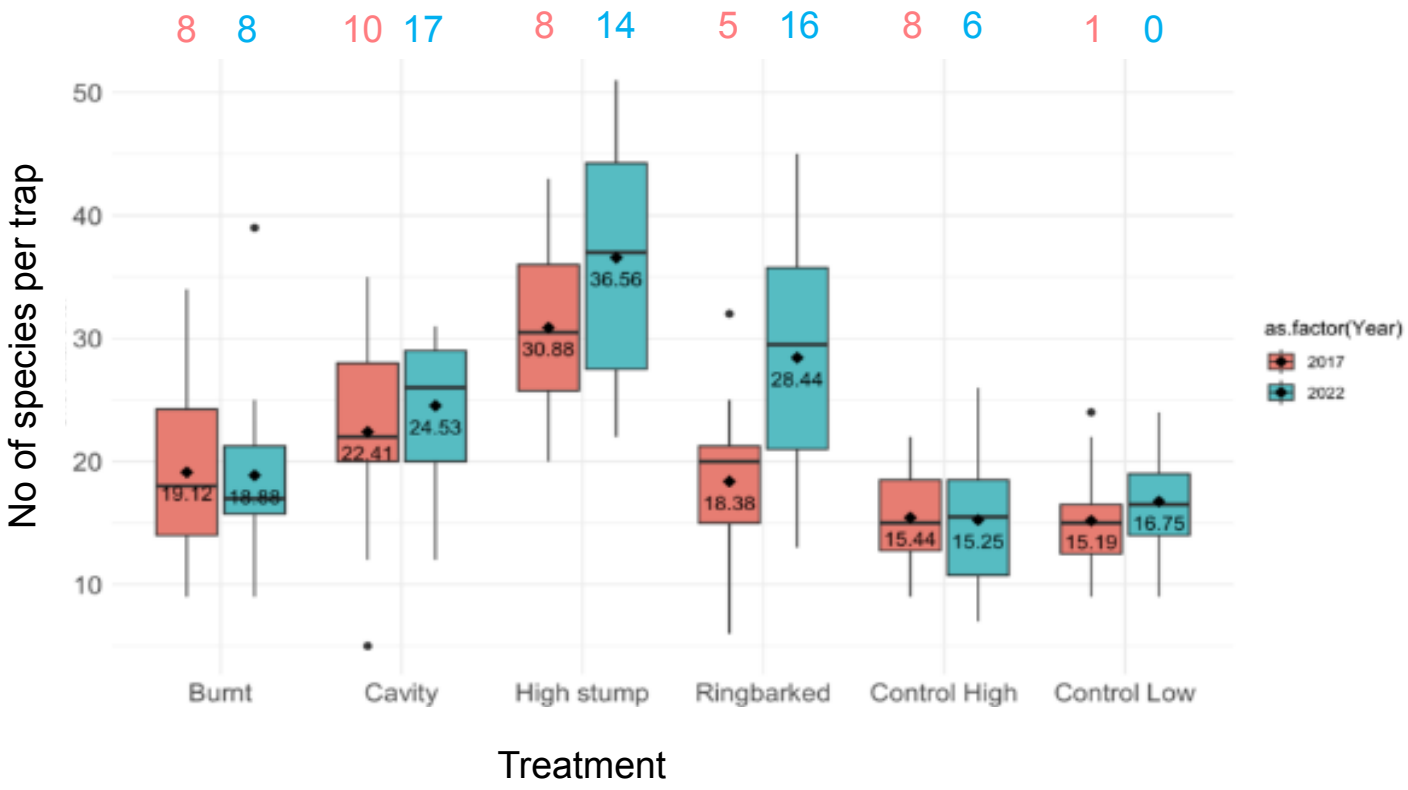
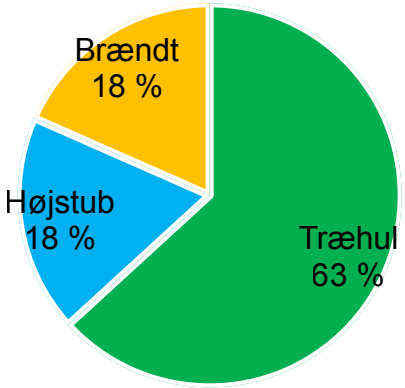
Tree specific responses: beetles

All treatments effective in enhancing beetle richness

- 2017: 20 red-listed species recorded
- 2022: 26 red-listed species recorded



Melasis buprestoides (EN)



125 individuals (2017)

Preliminary conclusions

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It works…

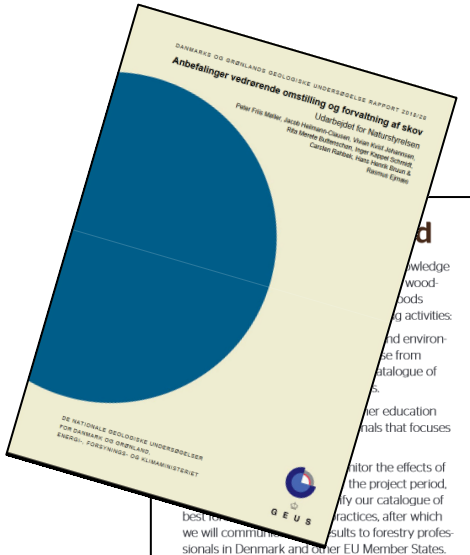
Relevant and measurable goals?

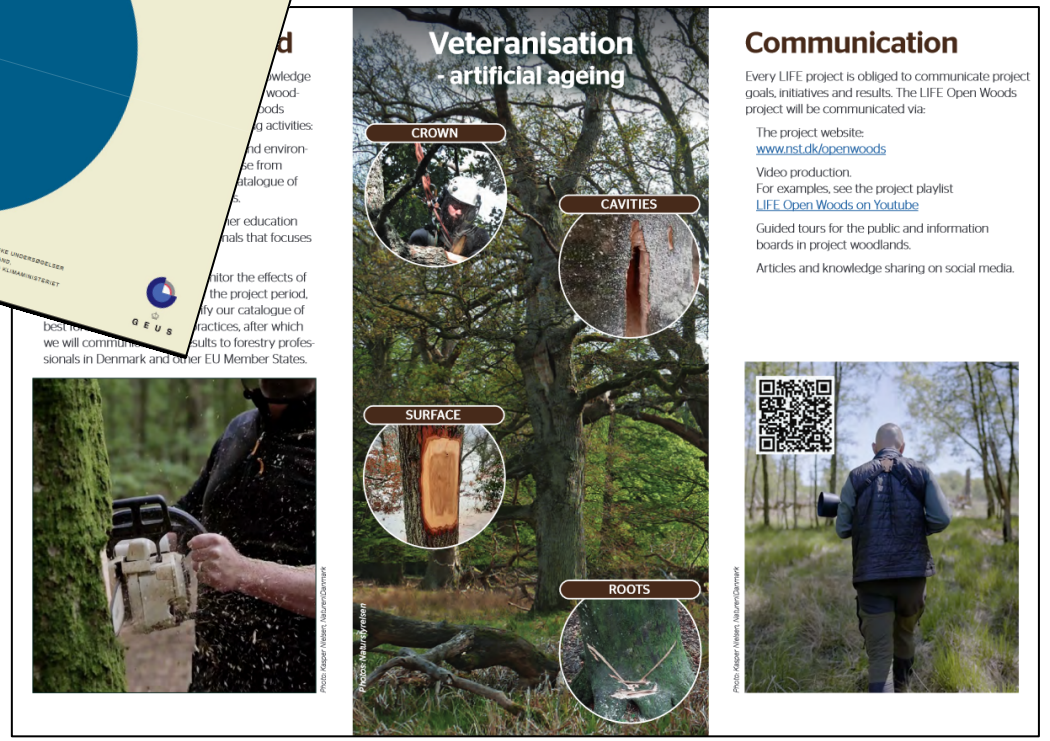
- Amount of dead wood
- Number of habitat trees
- Forest structure
- Reponse in relevant organism groups

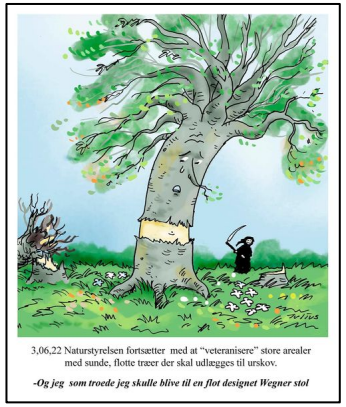
Easy and +/- well tested tools to enhance biodiversity in managed forests

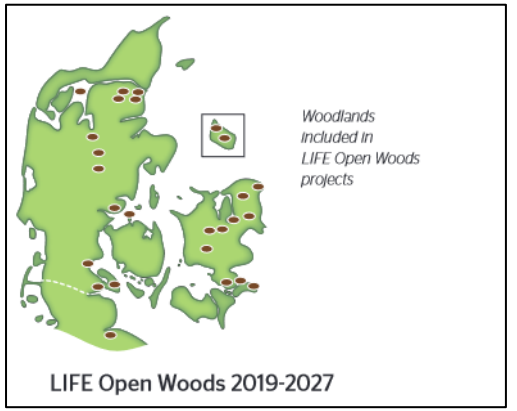
Clear, but more complex restoration potential…

- Uncertain long-term effects (e.g. forest structure)
- Trade offs (future number of old trees)
- Processes (e.g. grazing to maintain glades)









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Aknowledgements

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Project partners:

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KU: Hans Henrik Bruun, Niels Strange

Danish nature agency: Jan Erik Løvgren, Jens Bjerregaard Christensen

15. Juni Fonden