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Adaptation in Finland, Transformative or Incremental adaptation

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Why we need to think about adaptation:

- Evidence for increased damages
- Bark beetle, transitionally snow, wind, fire
- Increasind demand of Ecosystem services (water quality, biodiversity) because ecosystems are under stress.

Climate change risks, an extreme (?) example

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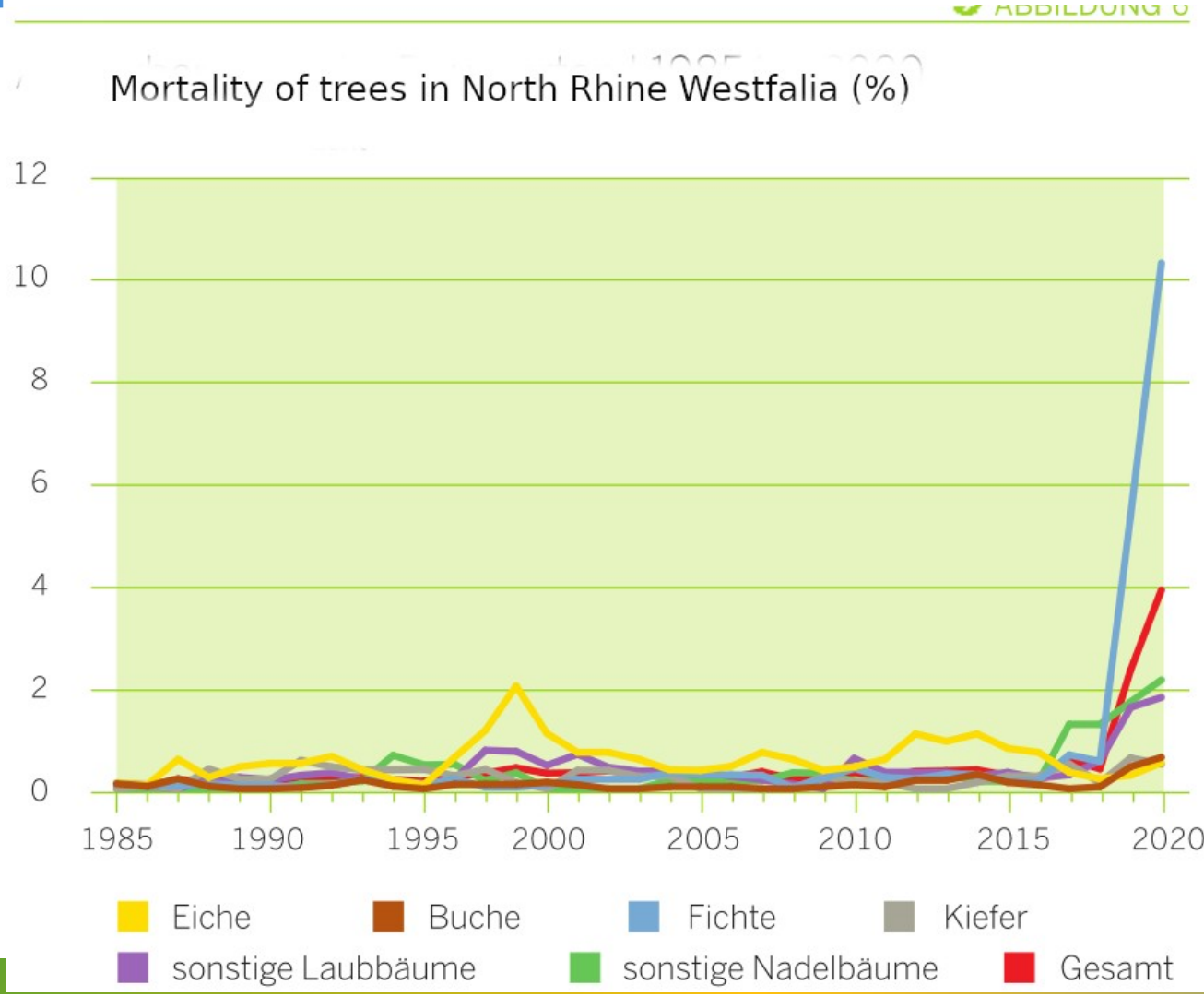
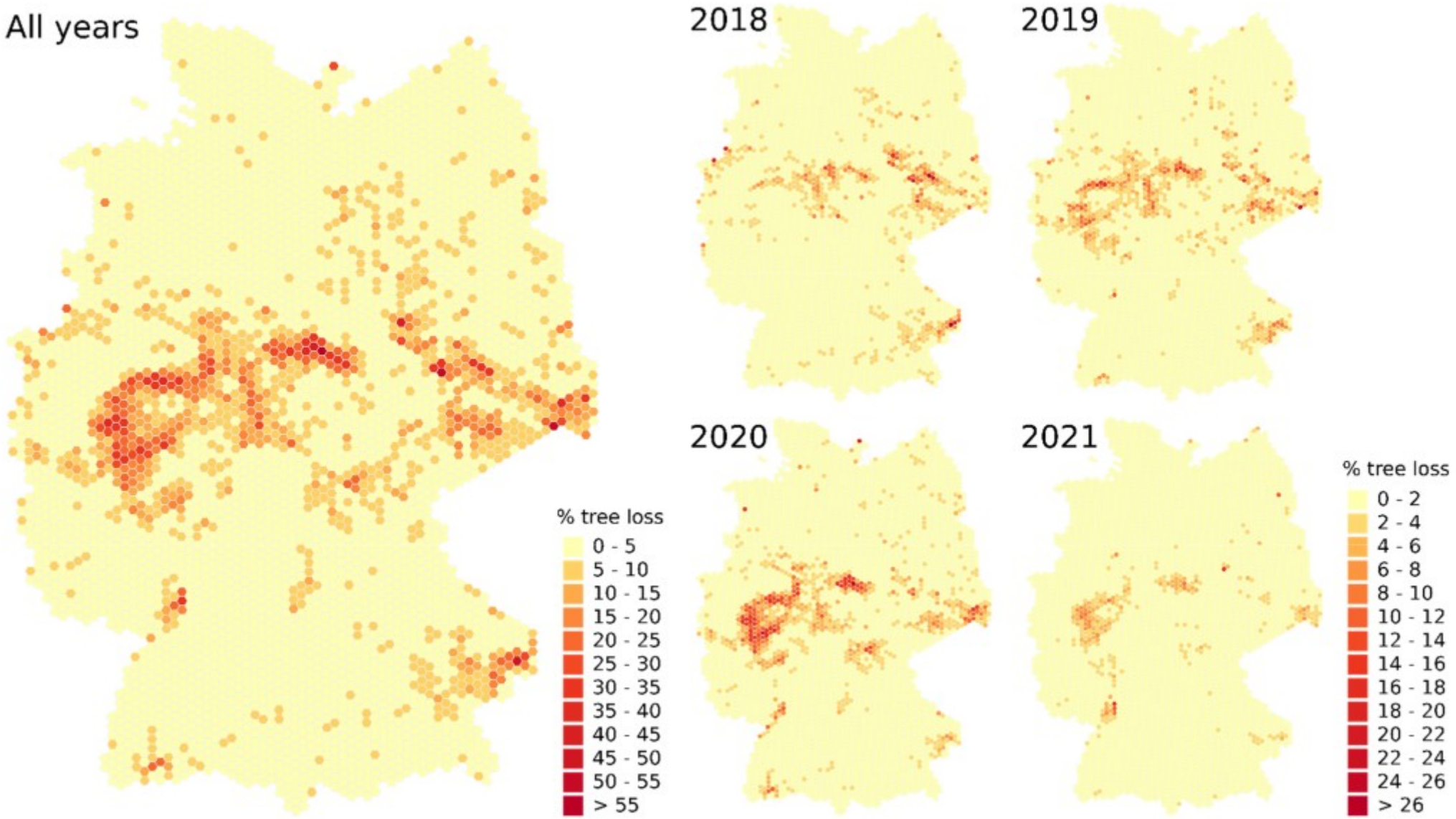


Source
Waldschadensbe
richt 2022


All years
2018
2019
2020
2021
% tree loss
0 - 5
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40
40 - 45
45 - 50
50 - 55
> 55
% tree loss
0 - 2
2 - 4
4 - 6
6 - 8
8 - 10
10 - 12
12 - 14
14 - 16
16 - 18
18 - 20
20 - 22
22 - 24
24 - 26
> 26

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- Tipping points, rapid transitions in a high damage regime are possible
- Norway spruce is the species that bears most of the risks

Tools

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- What does present Finnish guidance say about adaptation
  - Suggests that silviculture can be maintained as usual
  - Focus on the management after damages have occured
  - Indication for preventive methods is not very clear
  - Line of thought: Doing the silviculture treatments in time following the guidelines will provide sufficient resilience.

- Tools:
  - Rotation
  - Mixtures
  - Continuous Cover Forestry
  - New tree species
  - Changing the modus operandi (complex systems)

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- Rotations
- Age increases risks for damages in spruce

Predicted probabilities of barkbeetle

	barkbeetle		
Predictors	*Log-Odds*	*CI*	*p*
(Intercept)	-6.65	-6.71 – -6.59	**<0.001**
meanage	0.01	0.01 – 0.01	**<0.001**

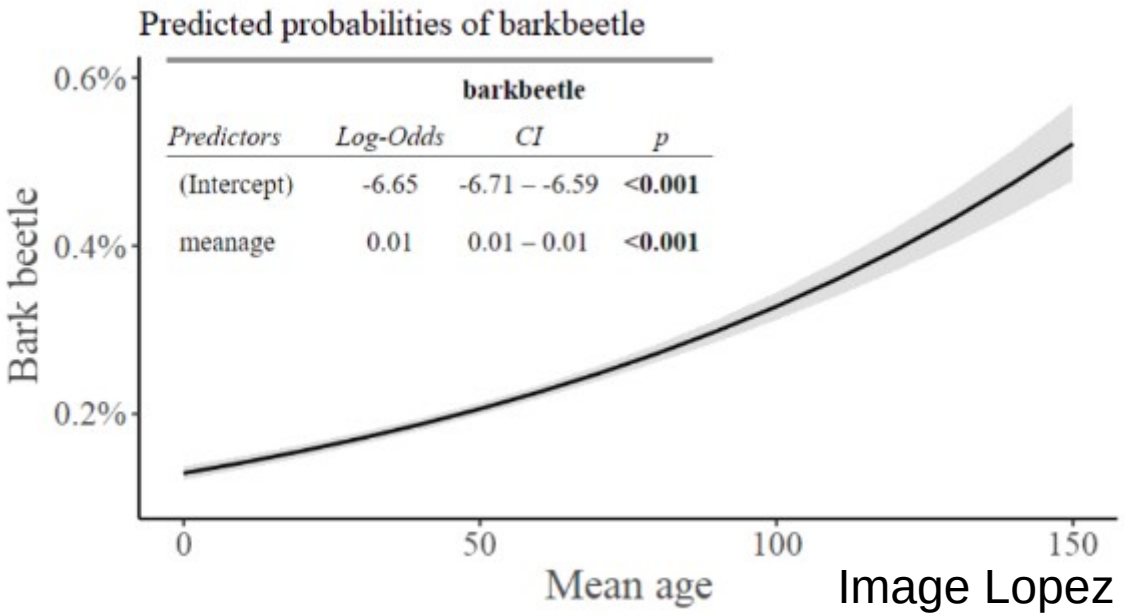
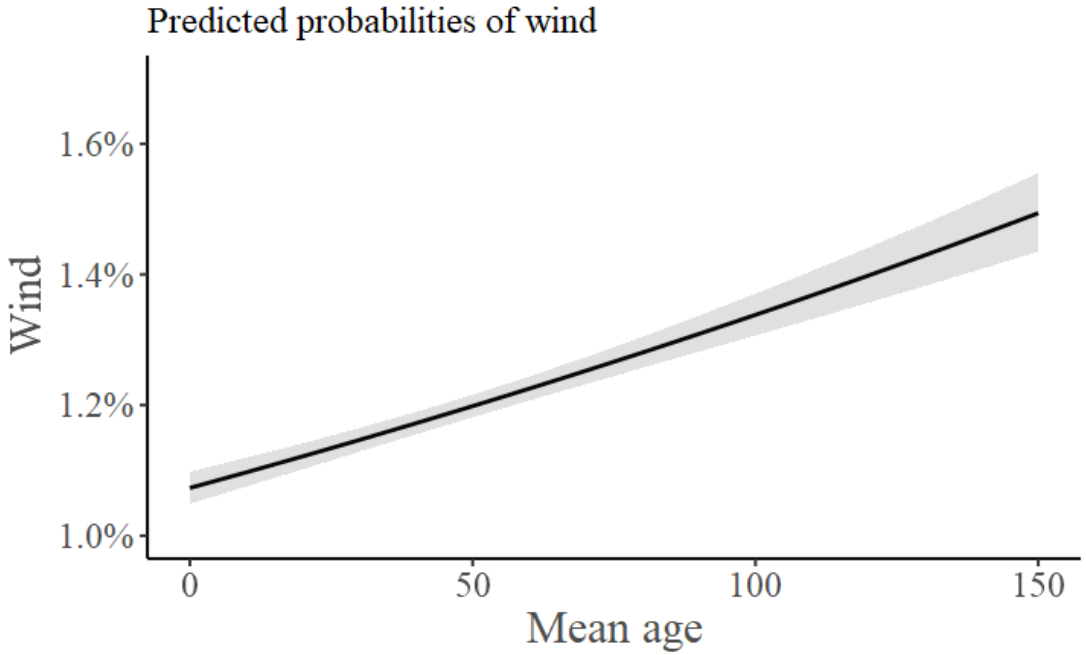


Image Lopez unpub.



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- Shortening of the rotation length for spruce is a method to reduce risks at reasonable costs.
- However, this will need a long transition time. Could be an option for certain private forest owners.
- Focussing on sensitive sites?

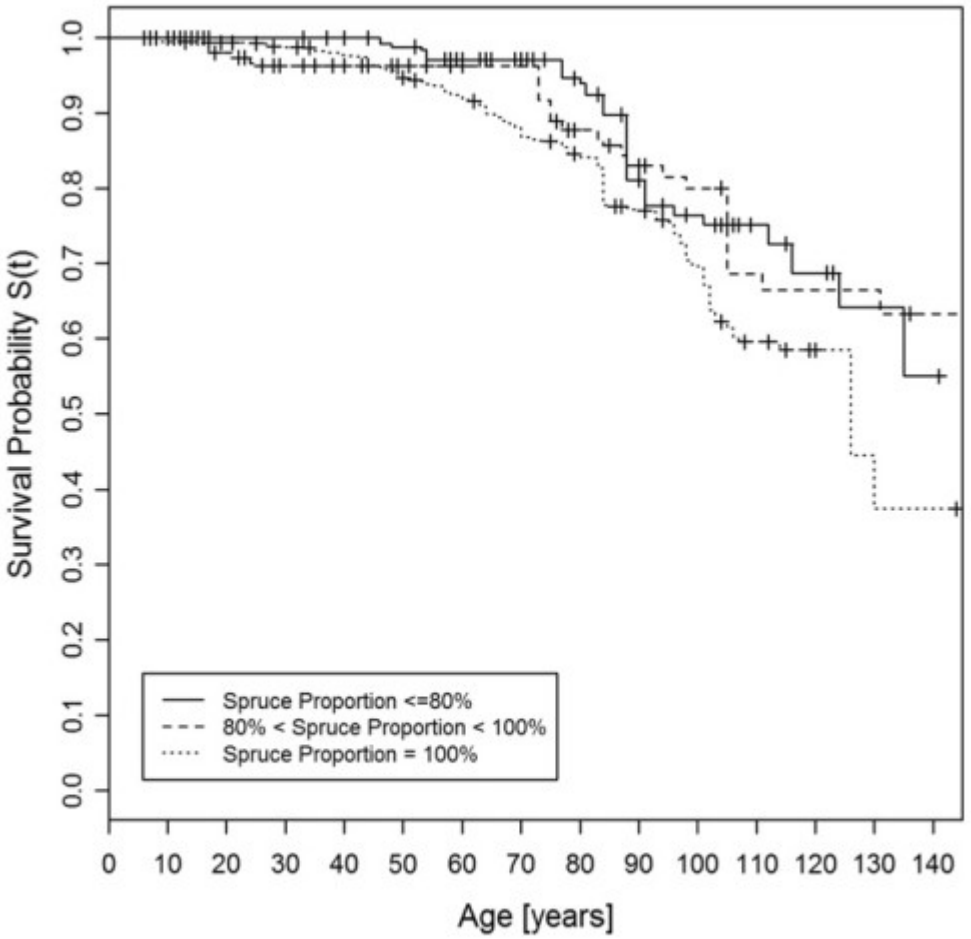

Fig. 3. Survival probability of spruce trees in mixed- and mono-species stands defined by spruce ratio.

Griess and Knoke Forest Ecol. Manage. 2012

Mixtures:

Seem to reduce the risk of mortality
At high level of mixtures “portfolio effect”
Support diversity
More difficult to manage

- Continuous Cover Forestry

  - Limited experience
  - Indications that it may reduce some risks (root rot)
  - Increases biodiversity services
  - Reduces wood production (15-30%) ?
  - Suits especially peatland forests

Summary

Transition subtitle

- There has been little consideration of high impact (low probability ?) scenario.
- Current strategies are based on incremental adaptation
- Transformative adaptation may have high costs and take time.