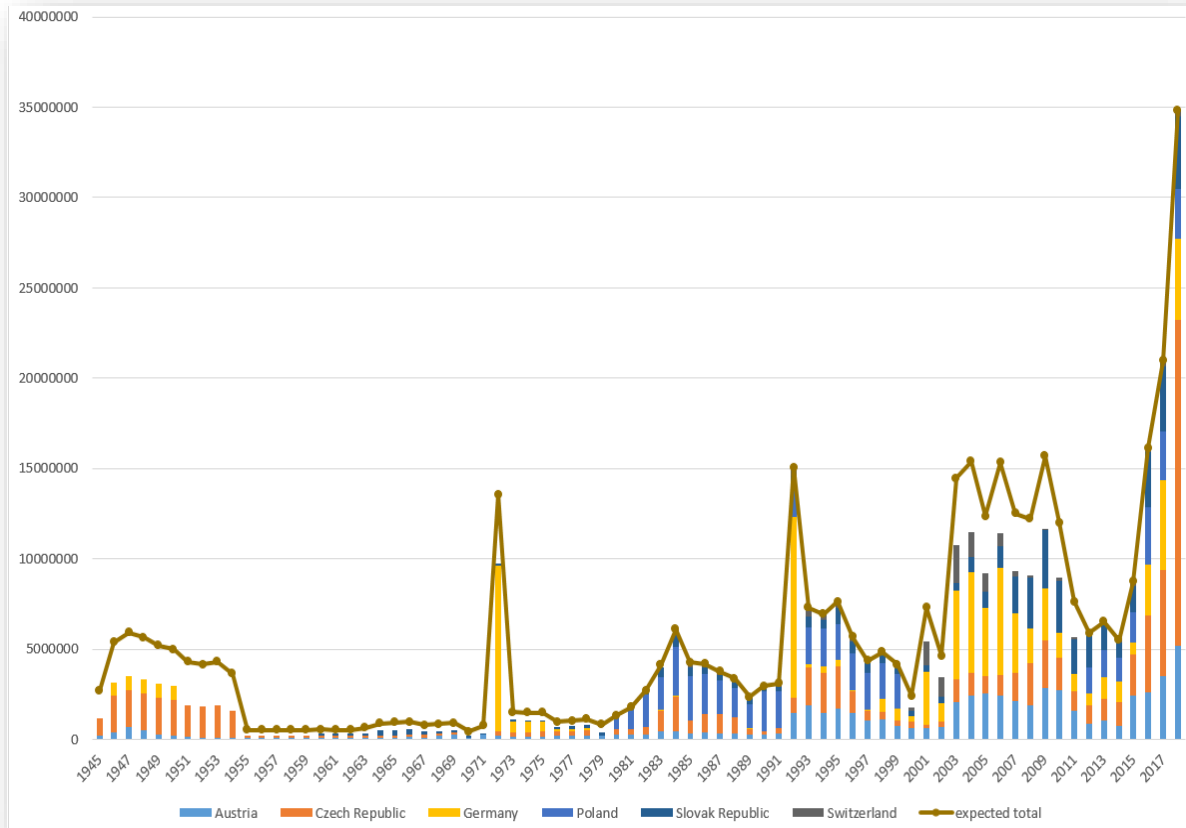


Recent bark beetle outbreaks in Europe – causes, impacts and outlook

TOMÁŠ HLÁSNÝ, CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE, FACULTY OF FORESTRY AND WOOD SCIENCES

What is going on with our spruce forests?



Source: Mart-Jan Schelhaas, Wageningen University and Research



Multiple unprecedented impacts

- cascade of impacts throughout the forestry and wood sector, collapsed timber prices, labour issues ...
- impacts on the environment; air and water quality, soil erosion, etc.
- impact on all ecosystem services, incl. climate regulation, recreation, etc.
- social impacts, incl. public unrests, demonstrations of disagreement with forestry policies, labour market, etc.
- political impacts, e.g. Bialowieza, High Tatras cases



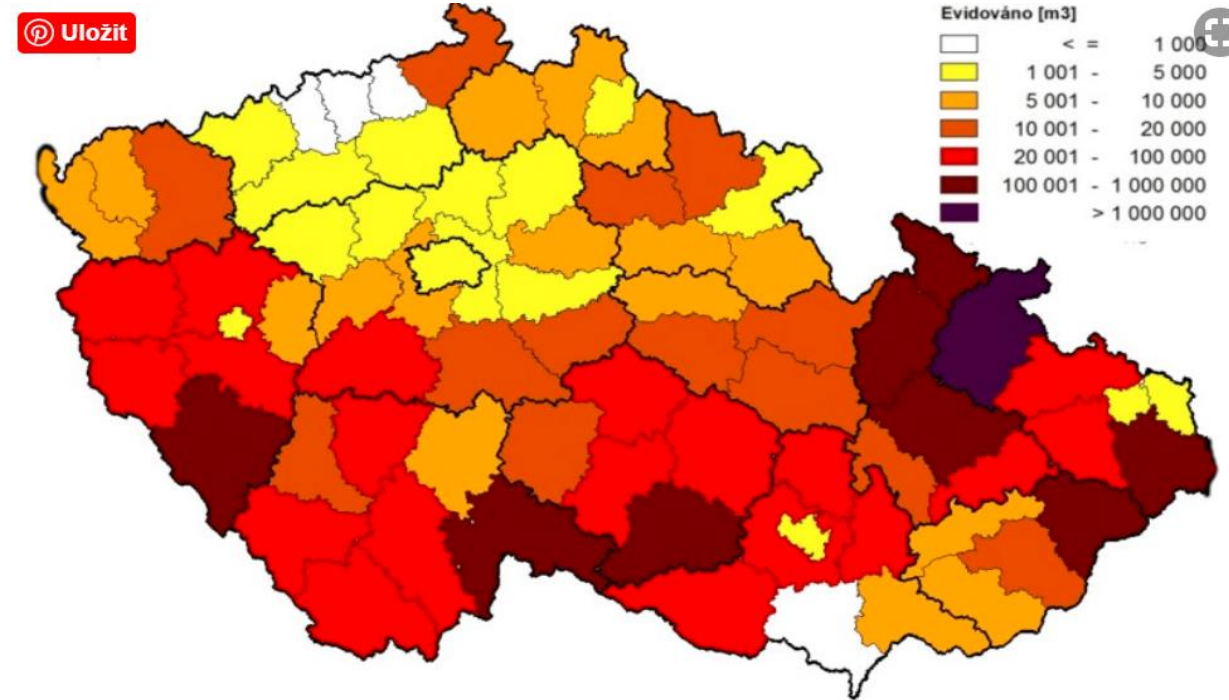
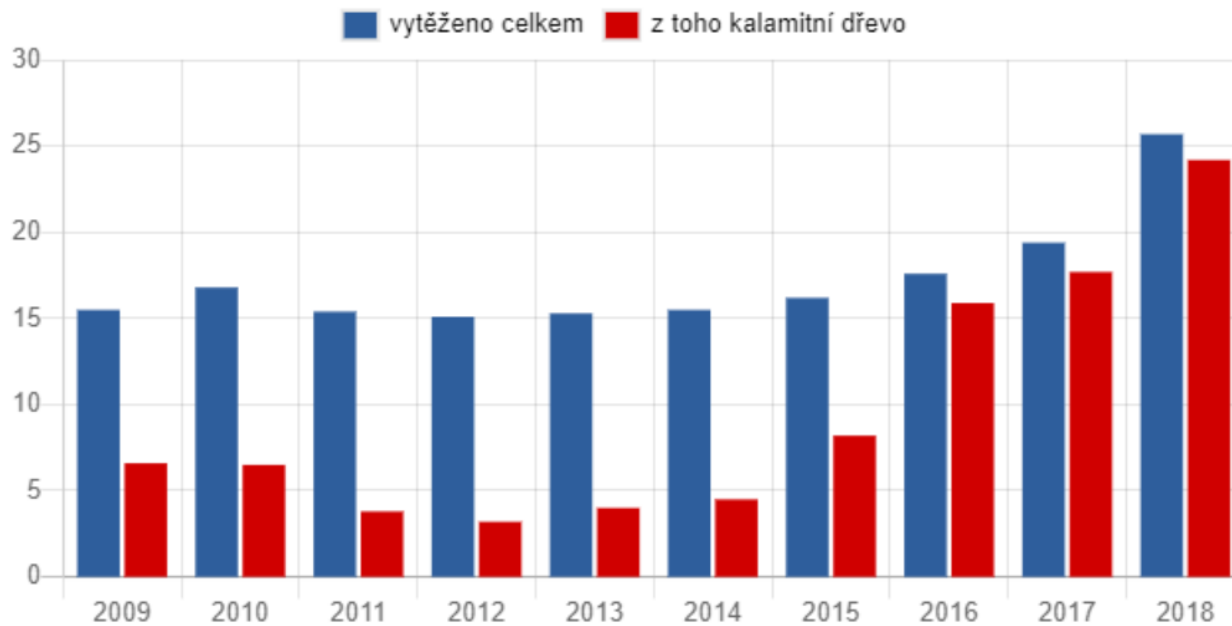
The screenshot shows the top portion of a news article on the EurasiaTimes website. The header includes a menu icon, the site name 'EurasiaTimes', and language options 'FR' and 'EN'. The main headline is 'Germany and France report forestry collapse', dated '23 Jul 2019' and attributed to 'Eurasiatimes'. Below the headline are four red category tags: 'Energy', 'European Union', 'Finance', and 'Industry'. A wide banner image of autumn leaves is positioned below the tags. The article text begins with 'Białowieża Forest Case: Judgement by Court of Justice of the EU. In its ruling of 17 April 2018, the Court of Justice of the European Union found that the Government of Poland has failed to fulfill its obligations to protect the Białowieska Forest and ordered the immediate repeal of illegal logging permits. May 15, 2018'. To the right of the text is a small image of a forest stream. At the bottom, there is a blue link for the full article and a green URL: 'https://www.iucn.org > news > world-commission-environmental-law > biało...'

Czech Republic – the current epicenter

- Culmination in 2018
- 50 th. ha, 23 mill. m3 of killed trees
- estimated loss 1.25 bill. Euro
- prognosis pessimistic



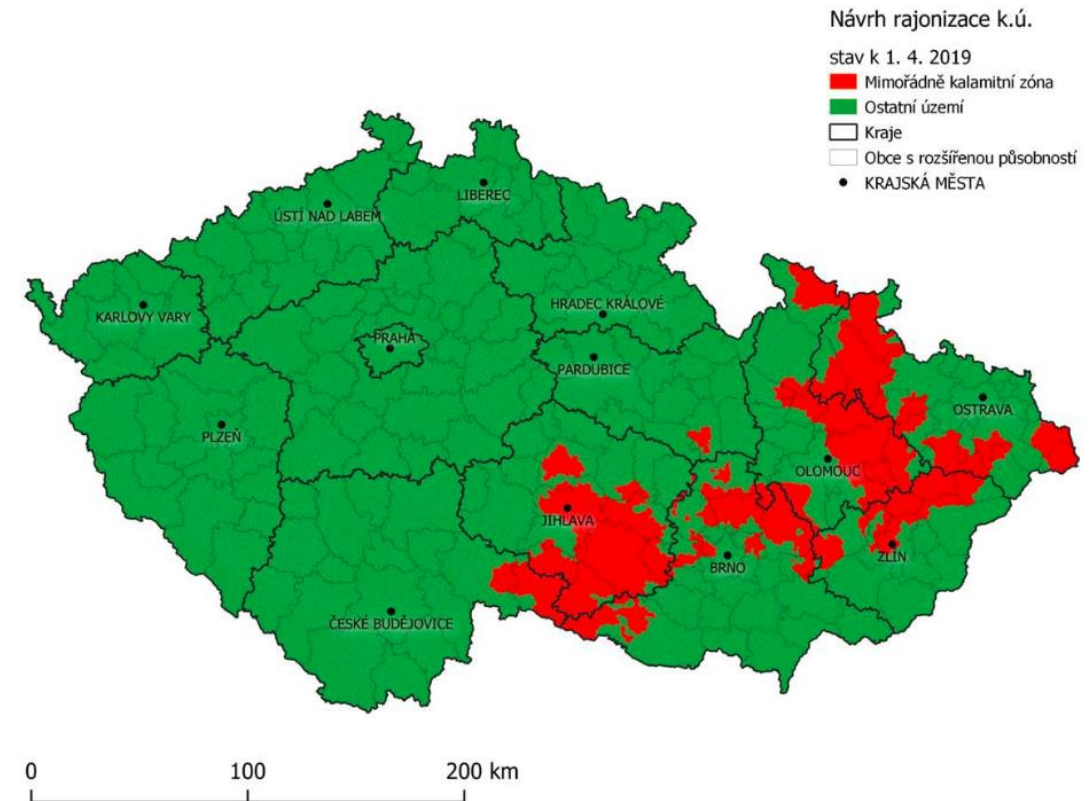
Czech Republic – the current epicenter



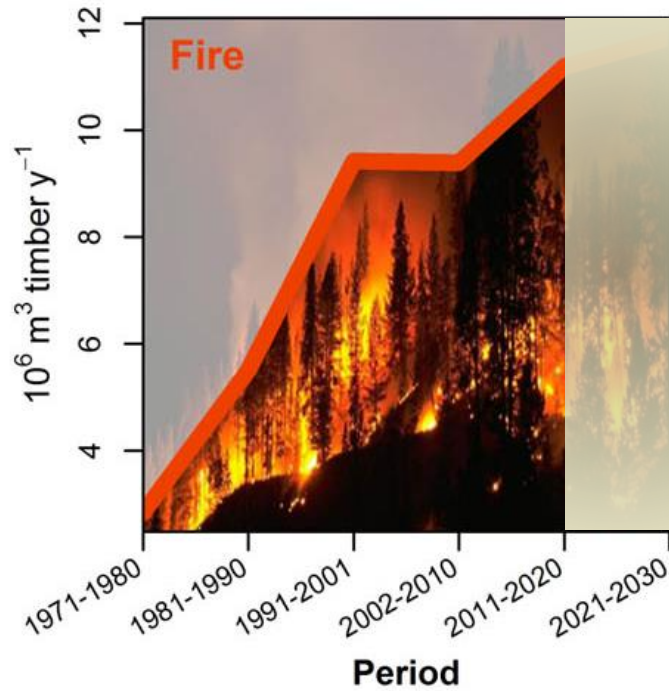
Source: VÚLHM, ÚHUL

Measures taken

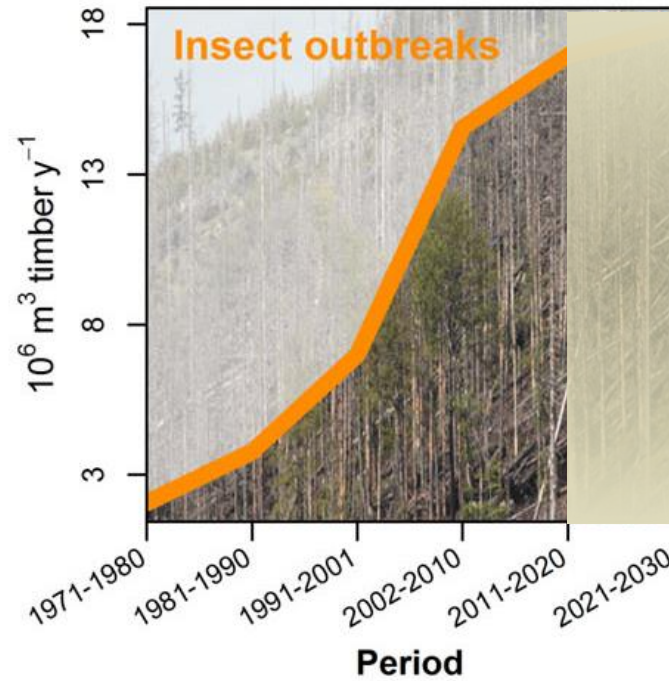
- i. Forest zonation, with different regimes applied in different zones
- ii. Regular harvests stopped in state forests
- iii. Dead trees which are not longer a source of beetles can be left in the forests
- iv. Extended period for regeneration allowed (planting)
- v. Planting of disturbed sites with proper tree species subsidized – lack of seedlings, logistic troubles!!
- vi. Options to use higher diameter trees for energy production discussed
- vii. Compensation payments for forest owners
- viii. New control methods tested



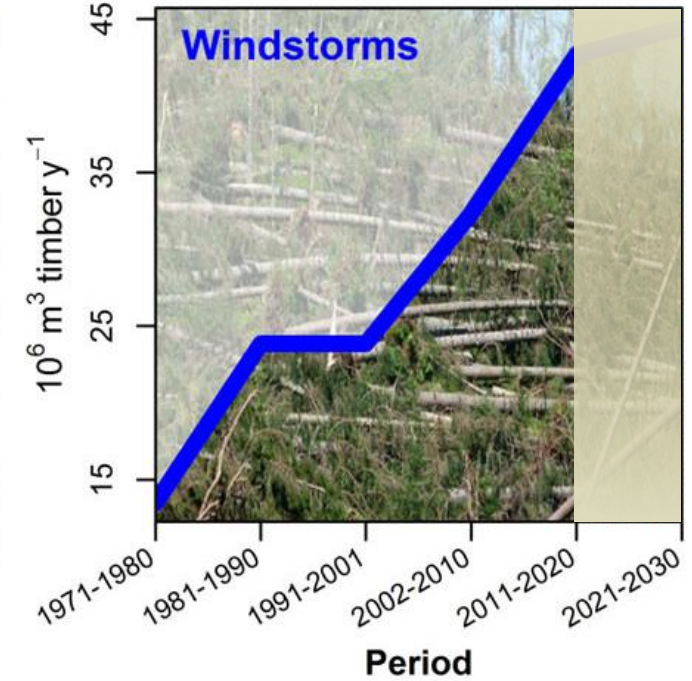
A broader perspective



+ 231 %



+ 600 %



+ 139 %

Seidl et al. (2014, Nature Climate Change)

Figure credit: S. Thom

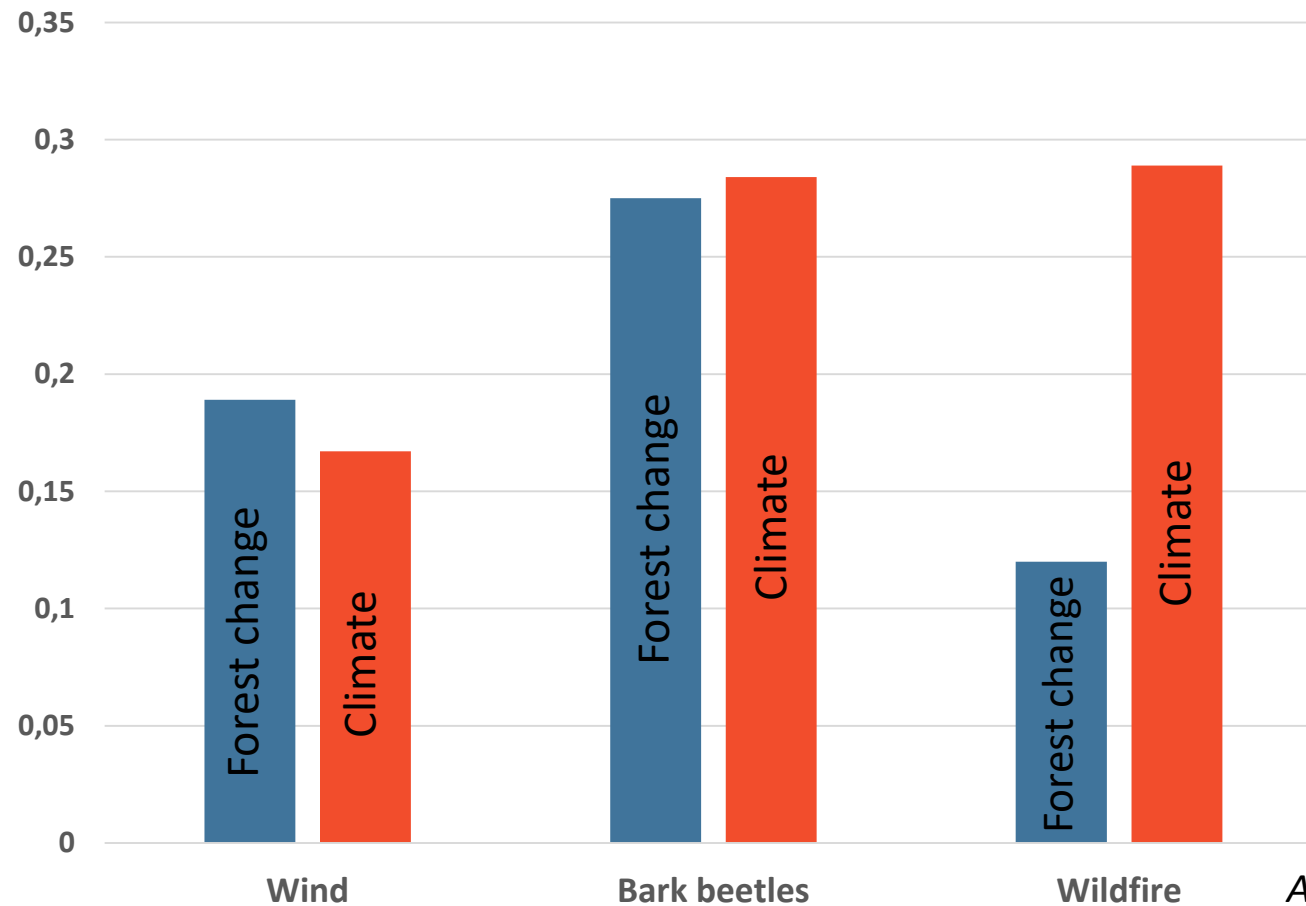
Per cent change relative to 1971-1980

... even worse
situation in
Northern
America



Photo: Kenneth Raffa

What is behind this increase?



Adopted from Seidl et al. 2011

Ecological perspective

Spruce forests reached ecological margins of their persistence and are being driven to collapse

From the view of ecology, this is a reset of the unsustainable state and an effort to start from scratch

Humans greatly contributed to this situation by creating forests, which are easy to manage but also easy to collapse



Recent study of the European Forest Institute

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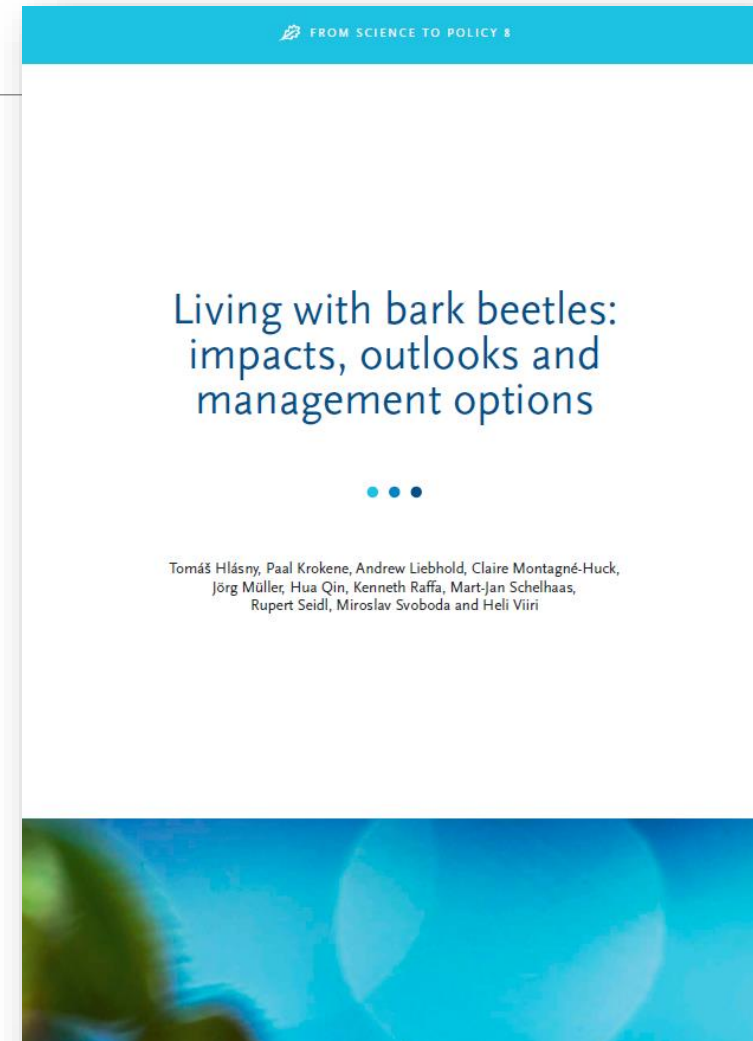
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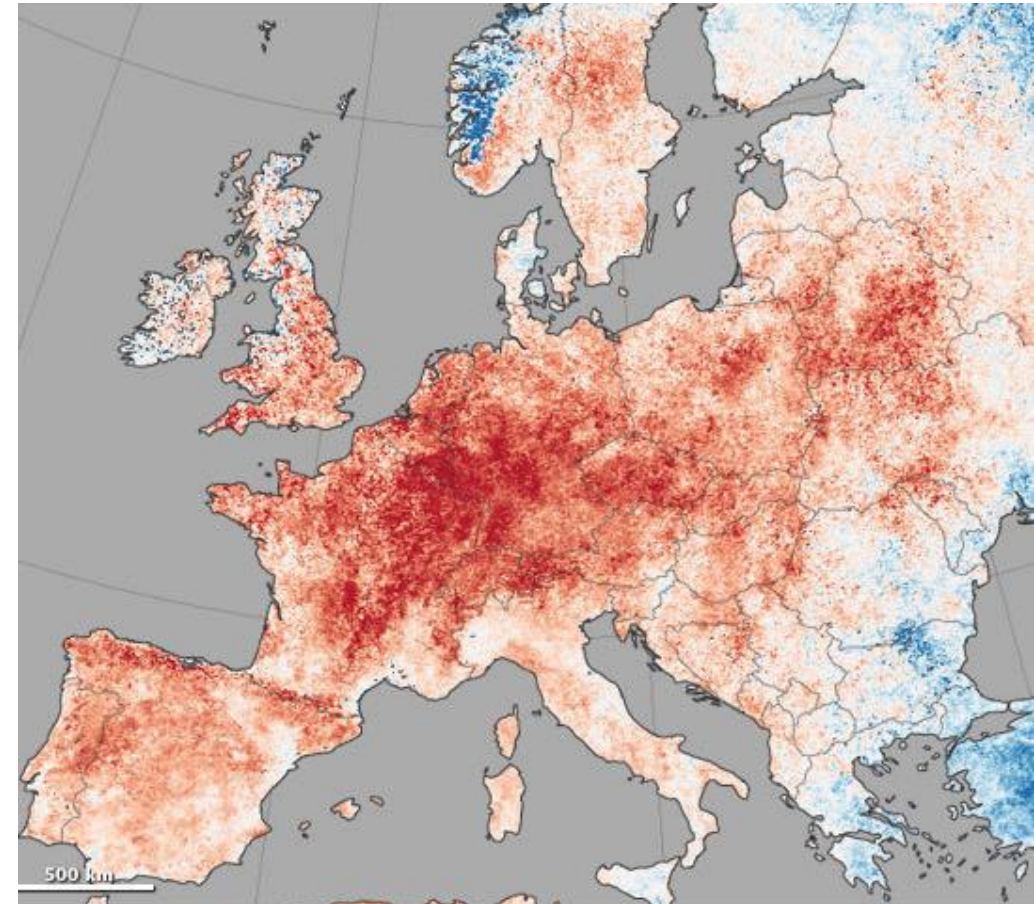
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Main messages of the report

- Current bark beetle outbreaks will further intensify in the future
- While outbreaks were occurring as isolated events in the past, the forthcoming outbreaks will occur synchronously over hundreds of kilometers
- Most of the current managed spruce forests provide extremely conducive environment for outbreak development
- Present-day management is failing to control the intensifying outbreaks and forestry is largely unprepared to face them /human resources, logistics, legislation, etc./





concept proposed

- See disturbances as opportunity
best to exploit this opportunity

A new management concept proposed



Preparedness

- ✓ Improve monitoring system
- ✓ Build/improve nurseries
- ✓ Adopt legislation
- ✓ Build forest road network
- ✓ Improve education
- ✓ Communicate with public



Prevention

- ✓ Change species compositions
- ✓ Change rotation periods
- ✓ Foster resilience
- ✓ Create landscapes that prevent spread of pests
- ✓ Improve tree vitality

Response

- ✓ Salvage logging
- ✓ Reduce planned harvests
- ✓ Consolidate storage and transport. capacities
- ✓ Subsidies
- ✓ Ad-hoc changes of legislation



Recovery

- ✓ Control ungulates
- ✓ Use natural regeneration
- ✓ Adapt composition to climate change
- ✓ Foster resilience
- ✓ Etc.



Some implications

- Huge amounts of disturbed spruce timber in the coming decades, some volumes probably left in the forest, very much depending on national legislations
- Large inter-annual variation, depending on actual weather
- Salvaged timber coming in pulses, which are difficult to prepare for
- Reduction of planned harvests to mitigate impacts on timber market, happening now, some assortments can be lacking
- Continuous increase in the share of broadleaved with lower economic return

Recent bark beetle outbreaks in Europe – causes, outlook and management options

Thank you for your attention

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Beetle`s perspective

Normally, bark beetles kill only weakened/stressed trees and search for them over large distances in the forest

However, when trees in the forest are weakened by windstorm or drought, beetles show their „eruptive behaviour“ and can kill millions of trees in a short time

Outbreaks typically fade after a couple of years; exhaustion of resources is one of reasons for such a collapse

Warmer climate greatly accelerates beetle`s developments and multiplies numbers of beetles



Forest`s perspective

Trees have sophisticated defence systems against bark beetles, which, however, fail when trees are stressed

During last ca 200 years, spruce has been largely planted in unsuitable sites; better growth at a cost of poorer defence

Homogenous forest are extremely conducive for the development of large-scale outbreaks; there is nothing to stop the spread

