

Impacts of forest management on European forests' C balance



Gert-Jan Nabuurs,
MartJan Schelhaas, Bas
Lerink, Louis König

VERIFY, Reading meeting,
March 2019

Actuality: bark beetle in C Europe.

Kůrovec v českých lesích

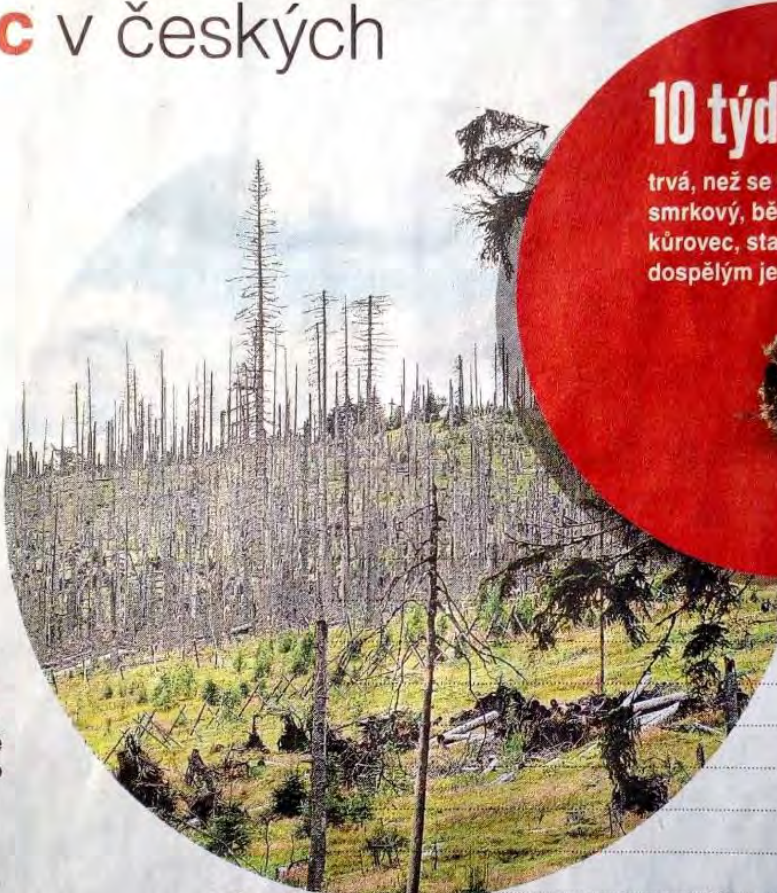

2,67 mil. hektarů tvořila výměra lesních pozemků v Česku v roce 2016, což je 33,9 procenta výměry státu.

50,5 % stromů na lesních pozemcích byly smrky.

12 až 14 mil. metrů krychlových kůrovcové hmoty se dle odhadů vytěžilo v minulém roce.

15 až 20 mil. metrů krychlových kůrovcové hmoty se dle odhadů má vytěžít v tomto roce.

10 týdnů trvá, než se lýkožrout smrkový, běžně zvaný kůrovec, stane z vajíčka dospělým jedincem.

Vývoj kůrovcových těžeb
(údaje k 31. 10. 2018, v tisících m³)

Year	Kůrovcové těžby (m ³)
2004	~1000
05	~1000
06	~1000
07	~1500
08	~2500
09	~3000
10	~2000
11	~1000
12	~500
13	~1000
14	~1000
15	~2500
16	~5000
17	~7000
18 (k 31. 10. 2018)	~14000
18 (prognóza 2018)	~20000

Prognóza celkového napadení za rok 2018
 Prognóza kůrovcových těžeb za celý rok 2018
 Předpokládaný nezpracovaný zůstatek k 31. 10. 2018
 Kůrovcové těžby

In 2018 in Cze:
20 Mm³ damage.
This year 30-40 Mm³ damage.

Same messages from Swi, Aut, Slr, Pol !

Forest owner decisions what to plant will determine C balance

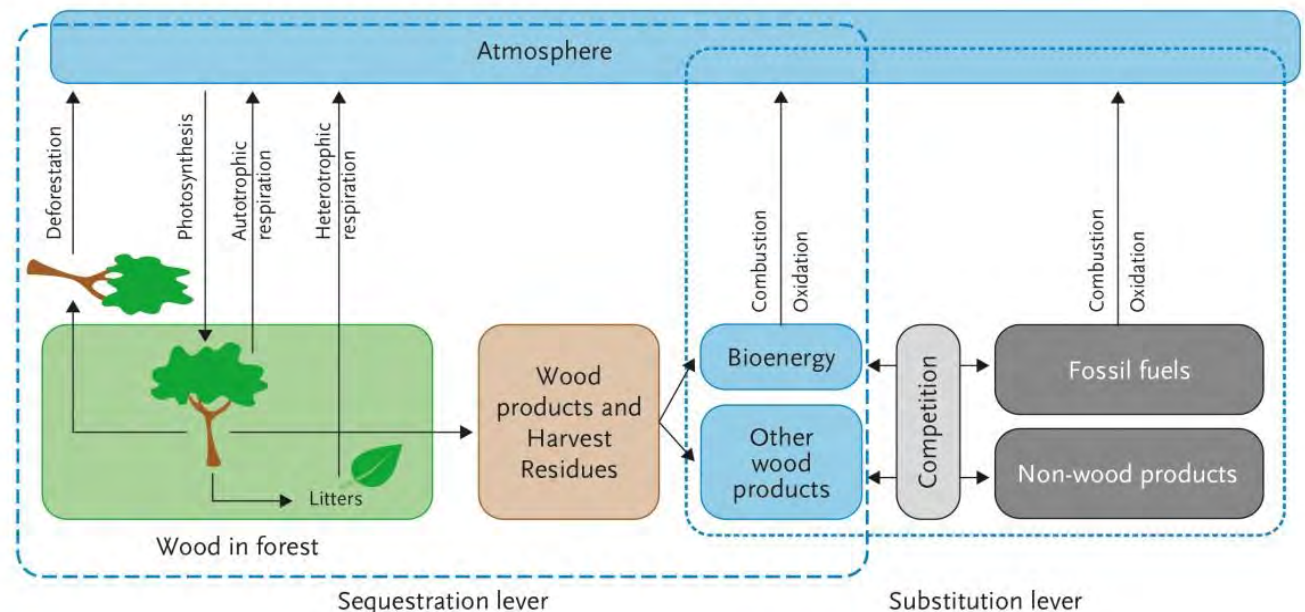
Practically all European forests are managed and accessible. *This would imply we can strengthen the mitigation role*

1x1 km, tree spp map
(Hengeveld et al.2012;
Brus et al. 2012)



Present role of the European forest

- Sink 450 Mt CO₂, or 10% of EU emissions (growth > harvest)
- Wood products sink of 44 Mt CO₂ + substituting aluminium and plastics.
- Biomass for bioenergy provides 7% of total EU energy need



EU forest management is directly impacted by bio-economy strategies & other policies

Nabuurs et al. Carbon Balance and Management (2018) 13:18
<https://doi.org/10.1186/s13021-018-0107-3>

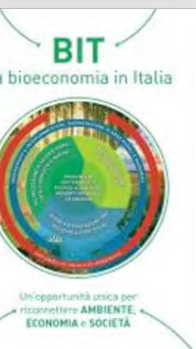
Carbon Balance and Management

RESEARCH Open Access

Understanding the implications of the EU-LULUCF regulation for the wood supply from EU forests to the EU

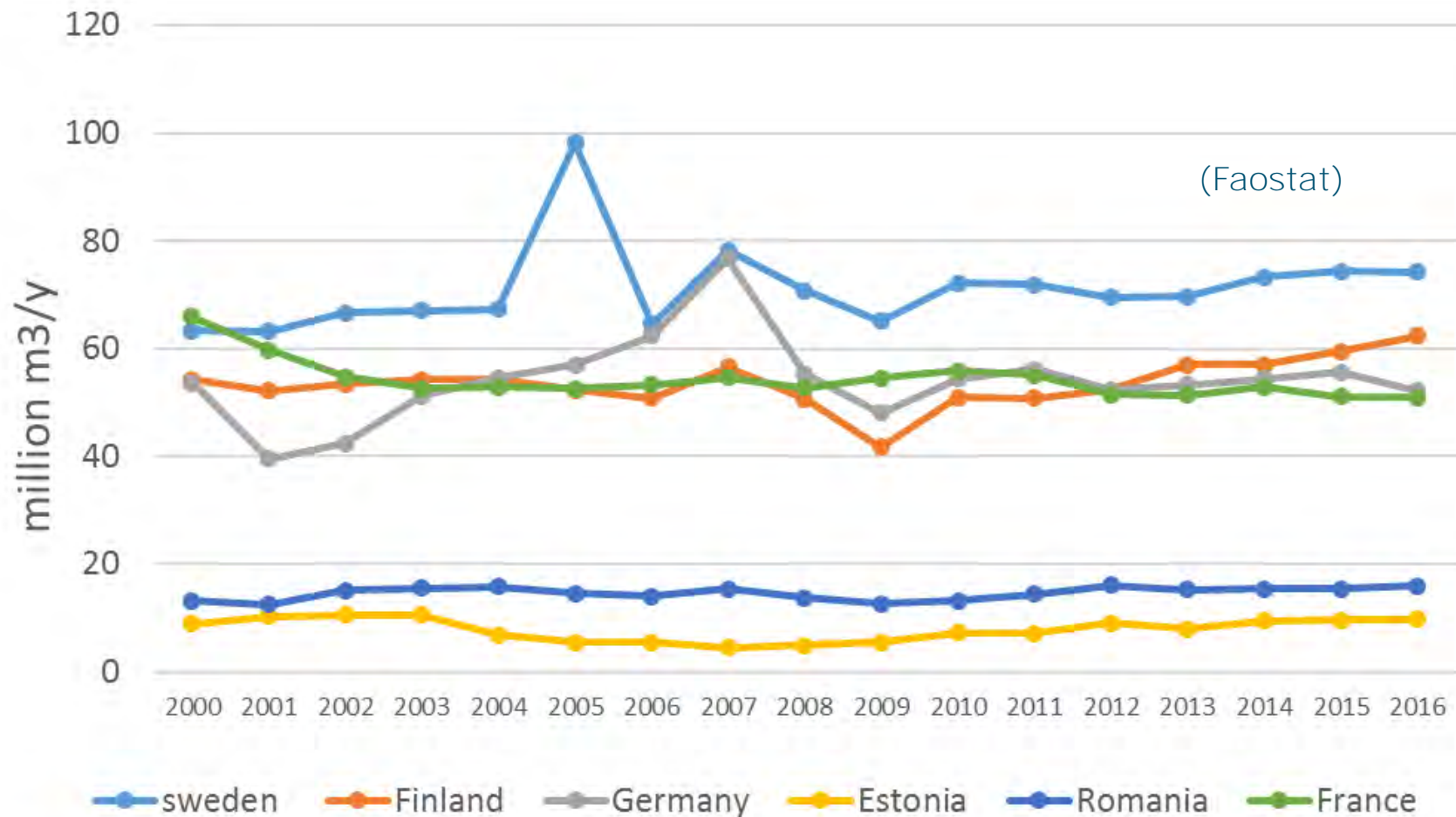
Gert-Jan Nabuurs^{1,2*}, Eric J. M. M. Arets¹ and Mart-Jan Schelhaas¹

Abstract
Background: In June 2018, the European Parliament and Council of the European Union adopted a legislative regulation for incorporating greenhouse gas emissions and removals from Land Use, Land Use Change and Forestry (EU-LULUCF) under its 2030 Climate and Energy Framework. The LULUCF regulation aim to incentivise EU Member States to increase greenhouse gas emissions and increase removals in the LULUCF sector. The regulation, however, does not



Has harvesting gone up?

Harvesting levels are quite uncertain



..but there are also other signals

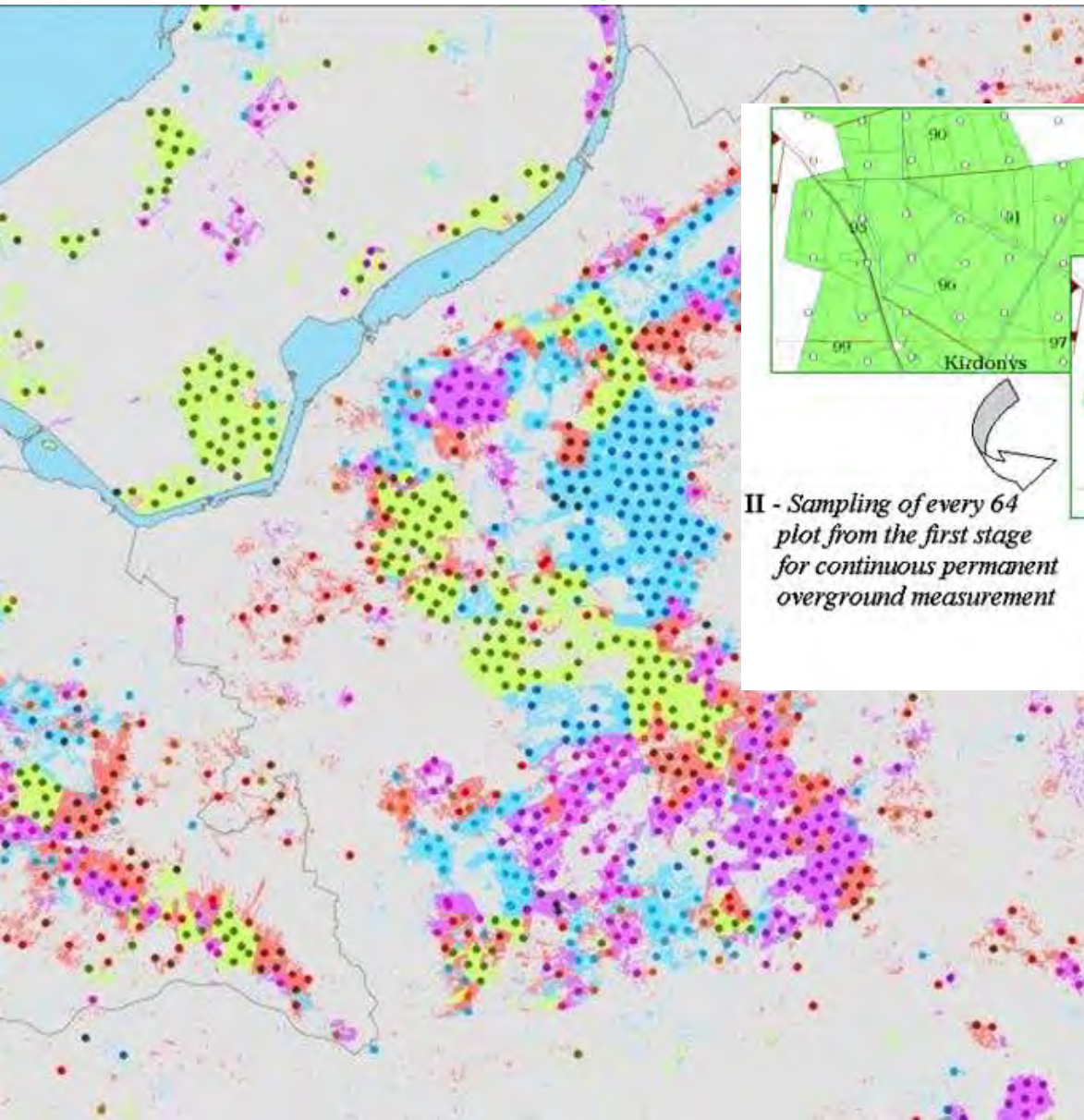
The screenshot shows a LinkedIn interface with a navigation bar at the top containing icons for Home, My Network, Jobs, Messaging, Notifications, and Me. The main content area is titled 'Updates' and features a post from 'Indufor Ltd.' (1,845 followers) dated '1d'. The post text reads: 'Matias Pekkanen gives us an update on the Swedish forest industry performance in 2018.' Below the text is a photograph of a lush green forest with tall trees. The headline of the post is 'Harvests Approach Maximum Sustainable Levels as Roundwood Prices Surge in Sweden', and the source is 'induforgroup.com'. The post has '11 Likes' and options to 'Like', 'Comment', and 'Share'. A large blue arrow points to the headline. To the right of the main post is a 'Promoted' section with three advertisements: 'Online M' (Advance yo MBA in 1 Y), 'Are You a' (Supercharg Managerie Apply Now), and 'Modern E' (CFOs choo global and). Below that is a 'Similar pages' section listing 'Forest2M' (Paper & F 11-50 emp) and 'Simosol' (Informatic 11-50 emp).

11 march 2019

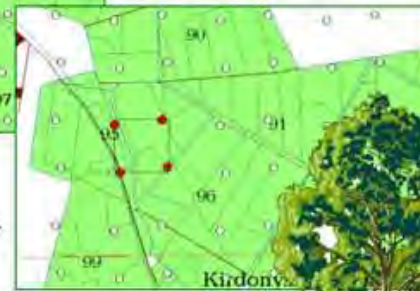
How to tackle this in VERIFY

- Based on ground based forest inventory data:
 - Assess actual forest management
 - Bottom-up assess European forest and forest sector carbon balance
 - Comparable data as countries use to report to UNFCCC
 - but independent modelling & harmonised

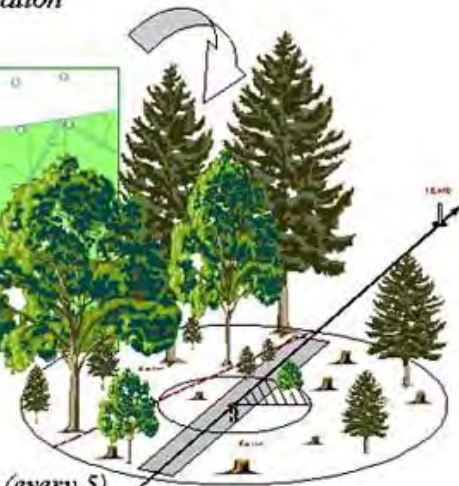
Main data: all EU countries have a sample based inventory



I - Sampling of plots using satellite map for area estimation

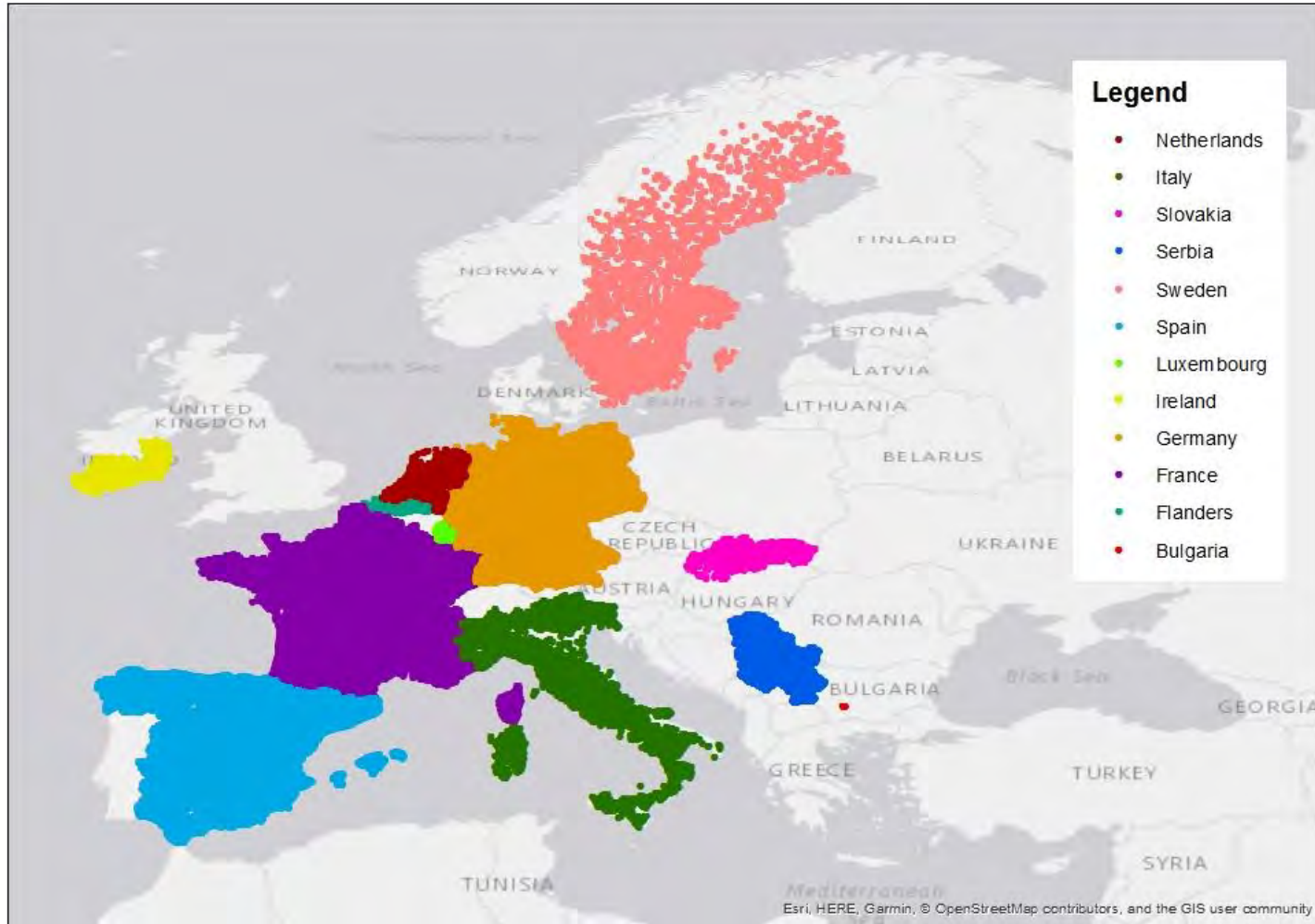


II - Sampling of every 64 plot from the first stage for continuous permanent overground measurement



III - Sampling of trees (every 5) for a detailed measurement

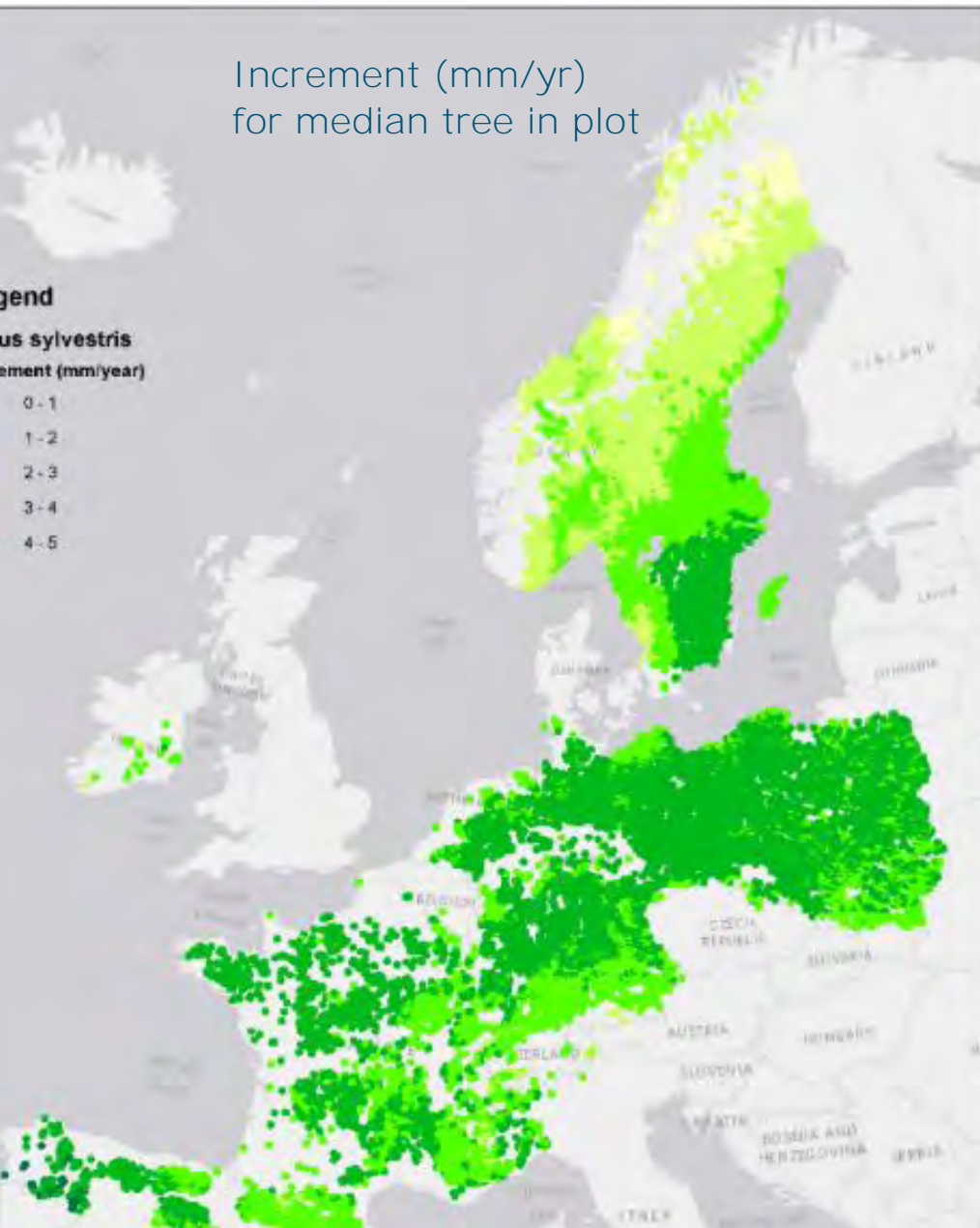
VERIFY NFI plot coverage



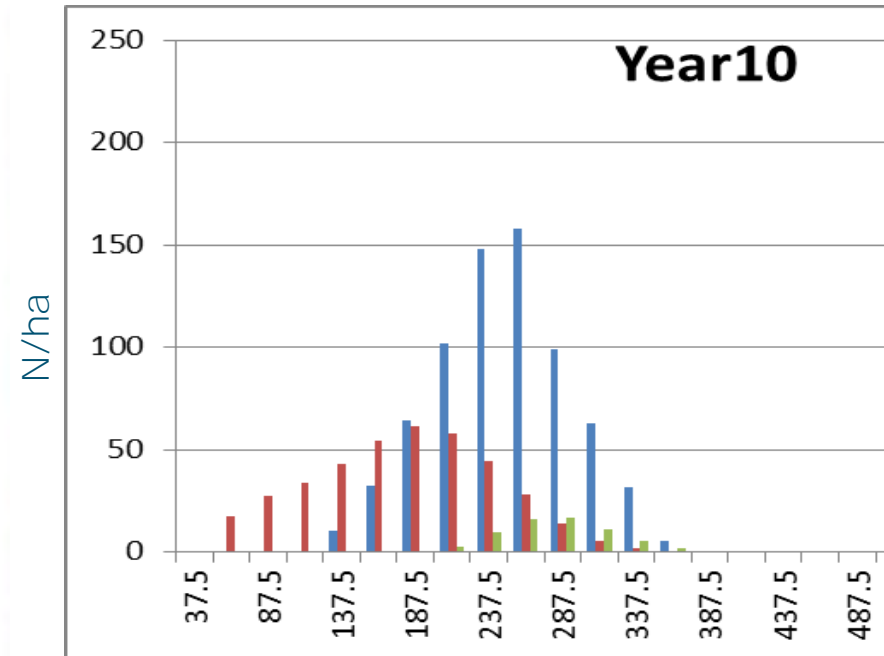
➤ 200,000 plots.

➤ + Pol, Swi, Por, Nor

Every NFI point is run in EFISCEN-Space

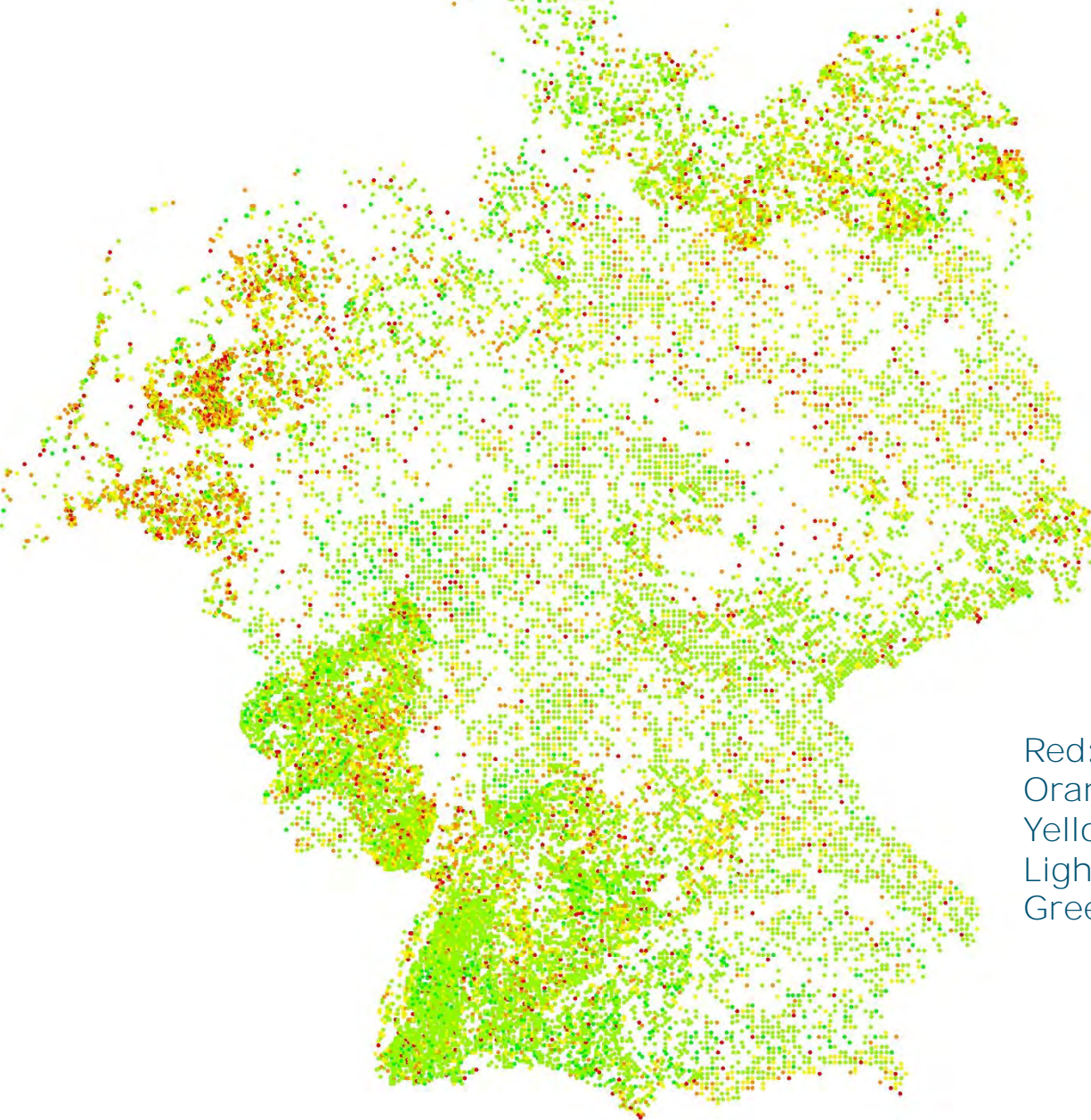


Empirical diameter class model.
Climate sensitive, density dependent
growth function (Schelhaas et al.
2018)



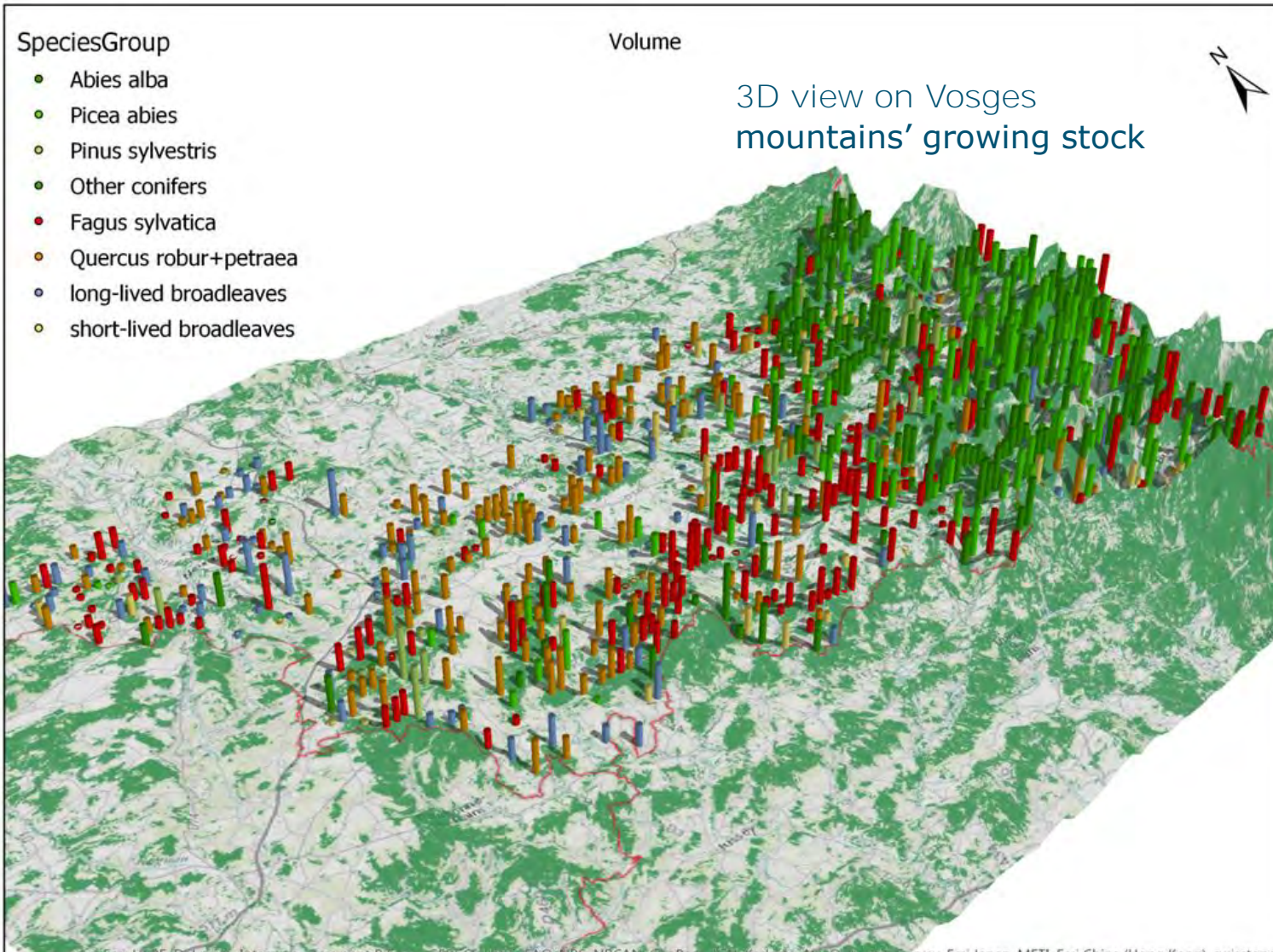
One plot

Stemwood volume increment simulated



Red: < 5 m³/ha.y,
Orange: 7.5,
Yellow: 10,
Light green 20,
Green > 20

Now able to make detailed resource projections on wood availability



Actual management is highly varying.

- from repeated NFIs we know the management is very different between owners and regions
- 16 million private owners, thousands public. Driven by wood market



PLOS ONE

RESEARCH ARTICLE

Actual European forest management by region, tree species and owner based on 714,000 re-measured trees in national forest inventories

Mart-Jan Schelhaas¹, Jonas Fridman², Geerten M. Hengeveld^{3,4}, Helena M. Henttonen⁵, Aleksi Lehtonen⁵, Uwe Kies⁶, Nike Krajnc⁷, Bas Lerink⁸, Áine Ní Dhubháin⁹, Heino Polley¹⁰, Thomas A. M. Pugh^{11,12}, John J. Redmond¹³, Brigitte Rohner¹⁴, Cristian Temperli¹⁴, Jordi Vayreda¹⁵, Gert-Jan Nabuurs^{1,8*}

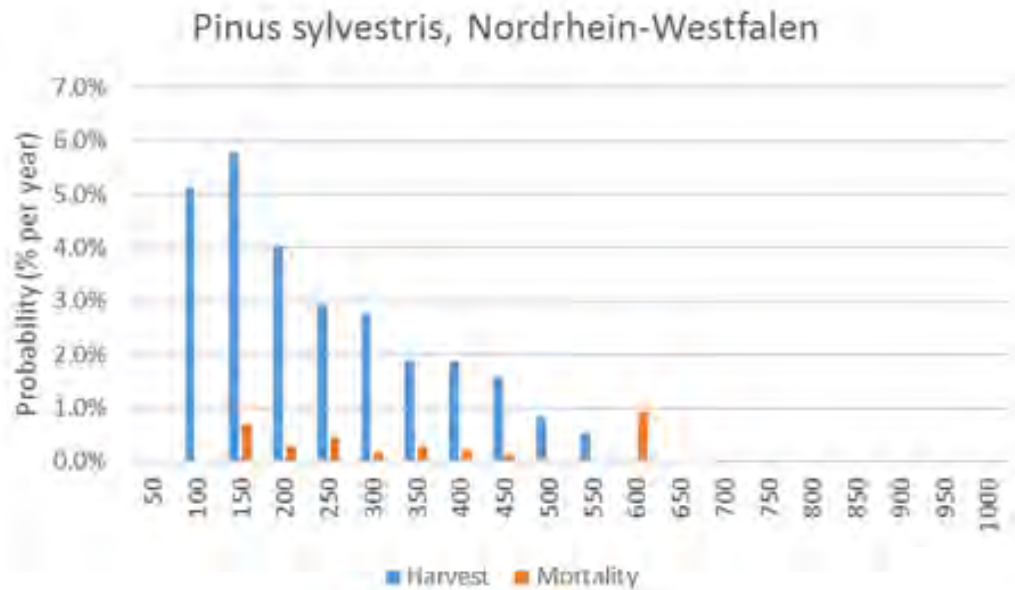
1 Wageningen Environmental Research (WENR, previously Alterra), Wageningen University and Research, Wageningen, The Netherlands, 2 Swedish University of Agricultural Sciences (SLU), Umeå, Sweden, 3 Biometris, Wageningen University and Research, Wageningen, The Netherlands, 4 Forest and Nature Conservation Policy Group Wageningen University and Research, Wageningen, The Netherlands, 5 Natural Resources Institute Finland (Luke), Helsinki, Finland, 6 InnovaWood, Brussels, Belgium, 7 Slovenian Forestry Institute, Ljubljana, Slovenia, 8 Forest Ecology and Forest Management Group, Wageningen University and Research, Wageningen, The Netherlands, 9 Forestry Section, School of Agriculture and Food Science, University College Dublin, Belfield, Dublin, Ireland, 10 Thünen Institute of Forest Ecosystems, Eberswalde, Germany, 11 School of Geography, Earth & Environmental Sciences, University of Birmingham, Birmingham, United Kingdom, 12 Birmingham Institute of Forest Research, University of Birmingham, Birmingham, United Kingdom, 13 Department of Agriculture, Food and the Marine, Wexford, Ireland, 14 Resource Analysis, Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

OPEN ACCESS

Citation: Schelhaas M-J, Fridman J, Hengeveld G M, Henttonen H M, Lehtonen A, Kies U, et al. (2018) Actual European forest management by region, tree species and owner based on 714,000 re-measured trees in national forest inventories. *PLOS ONE* 13(12): e0206111. doi:10.1371/journal.pone.0206111

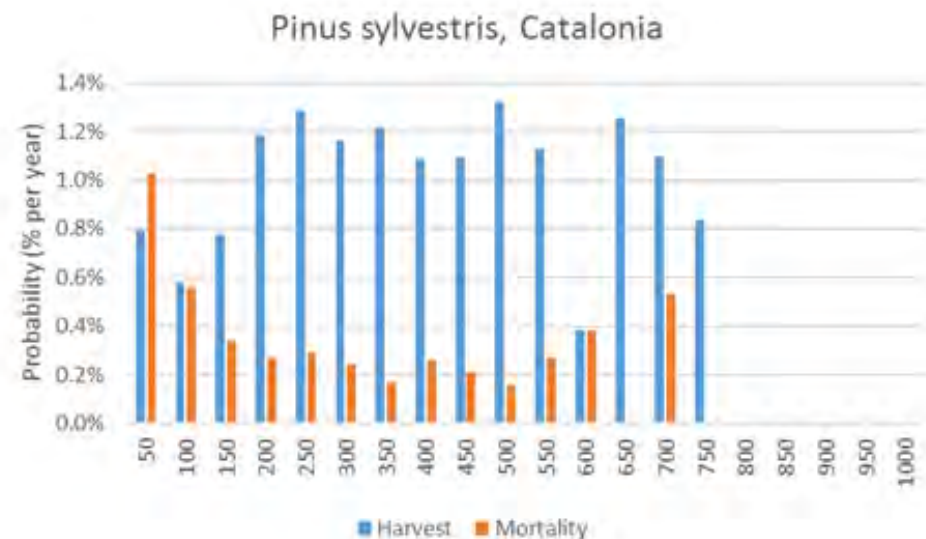
Check for updates

Understanding owner behaviour from repeated NFIs. Felling chance per diam cl.

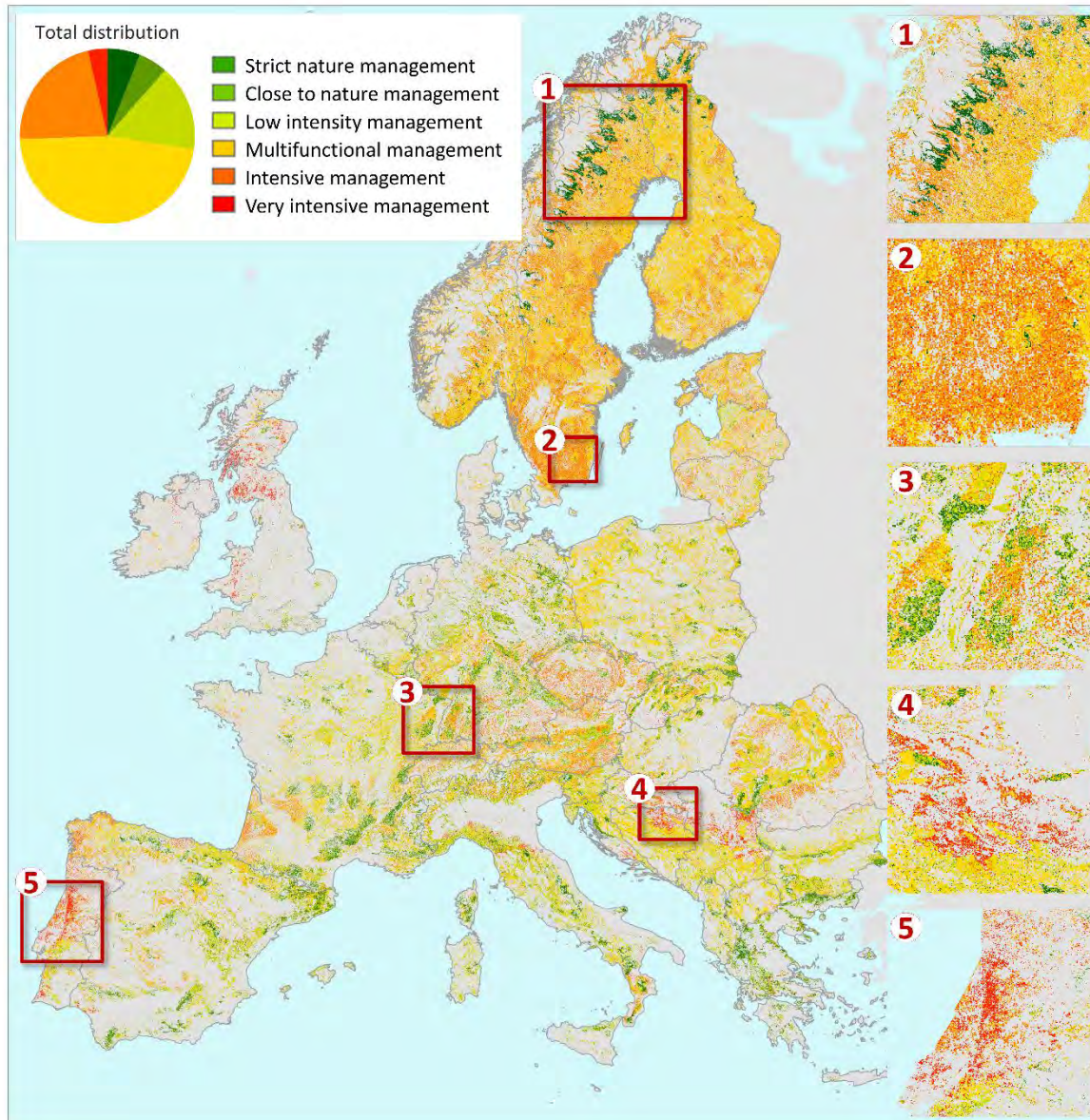


Very low intensity and equal over all age classes in Catalonia

Schelhaas et al. 2018. PLOS One.



Management intensity map (draft)



Hendriks, Verweij, Perez-soba, Pulzl, Nabuurs, in review

Next

In European forests, management does have a very large influence. This role can be strengthened, locally specific measures

This year:

- Complete EFISCEN-space with soil module
- Provide bottom-up medium resolution carbon balance of European forests
- incorporate management trends and routines
- Serve as validation to ORCHIDEE

In meantime: Dutch Climate Accord

- Dutch Government is negotiating a Climate Accord. 300 million € in 2018 & 2019 for climate measures in all sectors.
- Out of this, 2 M€/y is allocated to forestry pilots in climate smart forestry. (WENR-WUR leads this for 38 partners)
- A wide variety of measures is being implemented now. Also to fill a climate measures toolbox.

<https://www.vbne.nl/thema/klimaatakkoord>



27 Febr: + 19 degrees

Thank you !

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