

# How much forest is protected in Sweden?

*A simple question with many answers*



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# Who is Per Angelstam?

- Knowledge production and learning
- Rural inhabitant and forest owner in Sweden
- Regional collaboration towards sustainability



# Policy from from wood towards multiple benefits



# Policy from wood towards multiple benefits



1855

1903

1948

1993

2018

??

# Swedish biodiversity conservation policy (1993):

- "maintain viable populations of naturally occurring species"



# CBD Aichi target 11:

## 17% protected areas

- *“By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.”*

## FOREST INDUSTRY COUNTS LIKE THIS...:

Protected 4 % + Certification 4 % + tree retention 6% + unproductive 17% = 31%



## ... THE CONVENTION FOR BIODIVERSITY MUCH LESS:

Aichi target 11 (4+?%?) + Aichi target 7 + Aichi target 11

### Protected areas:

reduction of functionality;

- loss of naturalness
- small patches
- fragmentation
- longevity of certification?

### Sustainable use:

large regional variation

- small patches
- loss of naturalness
- fragmentation

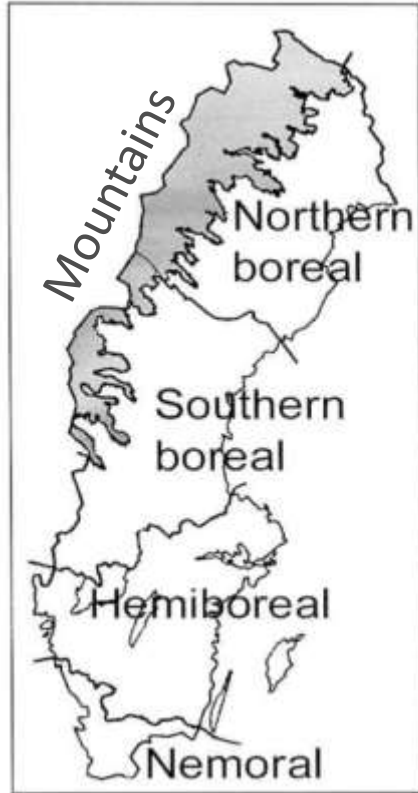
### Representation:

focus on unproductive sites  
protected (forest on mires)  
makes this contribution small,  
and variable among regions

## Aichi target 11

## Protected and set aside

## Remaining to reach target 11



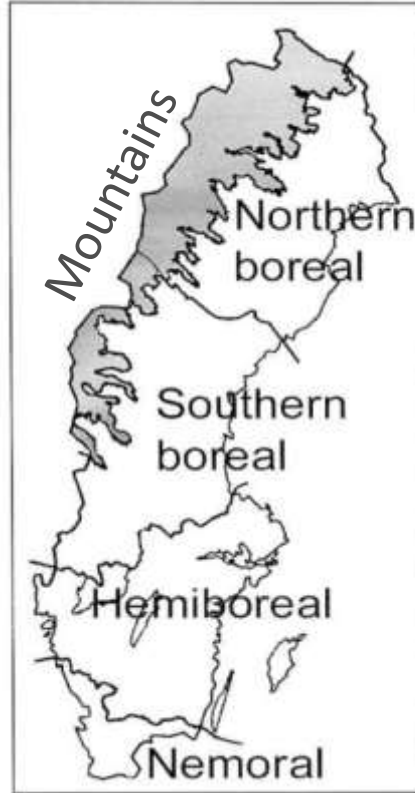
17 %

17 %

17 %

17 %

17 %



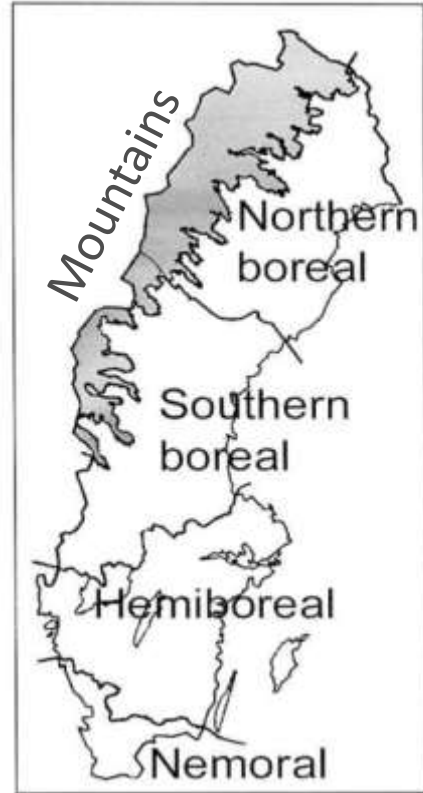
43 %

7 %

8 %

8 %

9 %



0 %

10 %

9 %

9 %

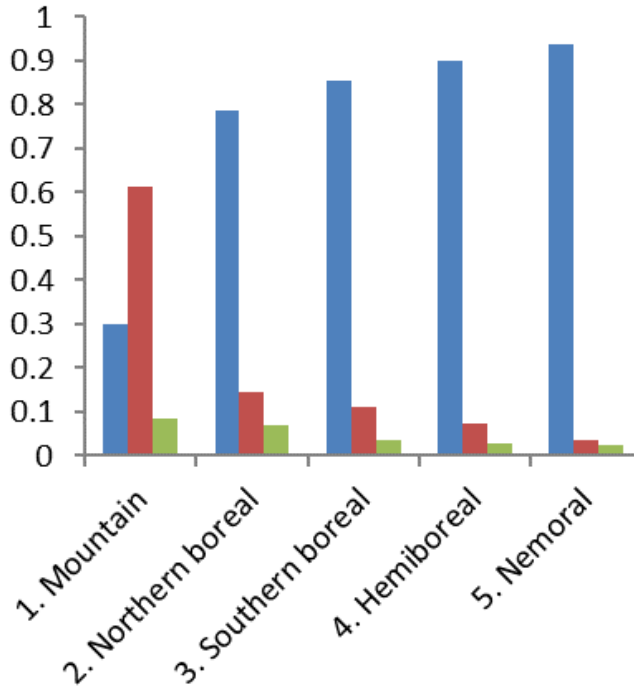
8 %



# Four key topics

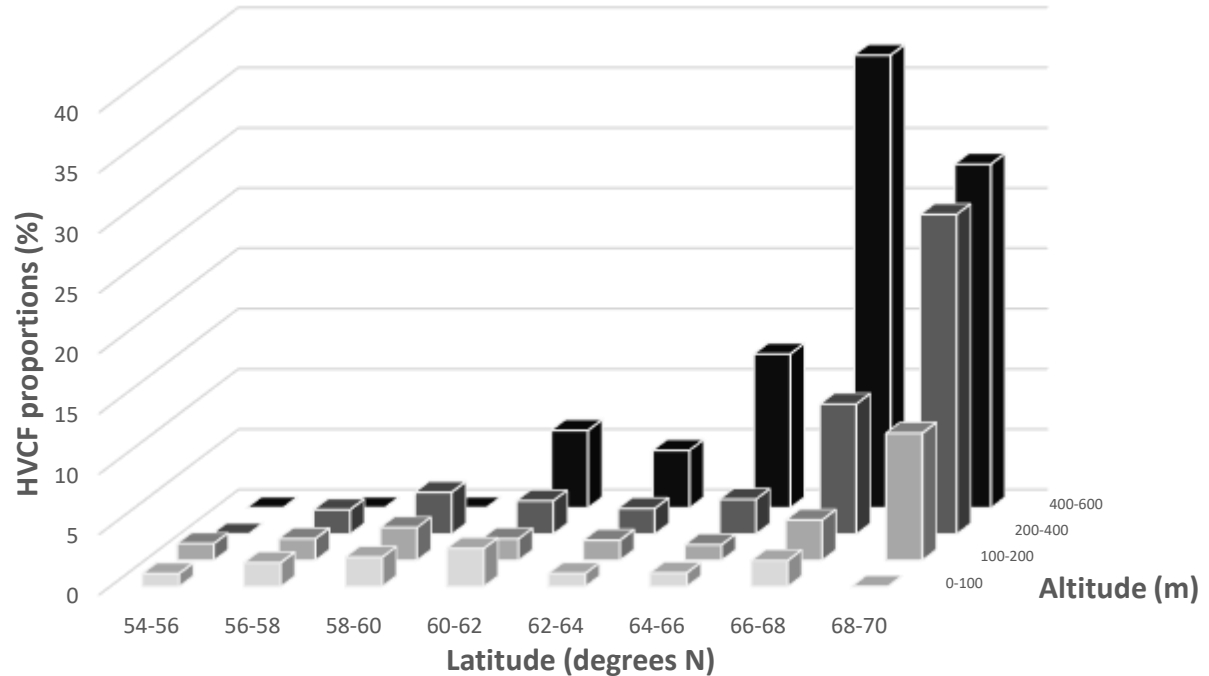
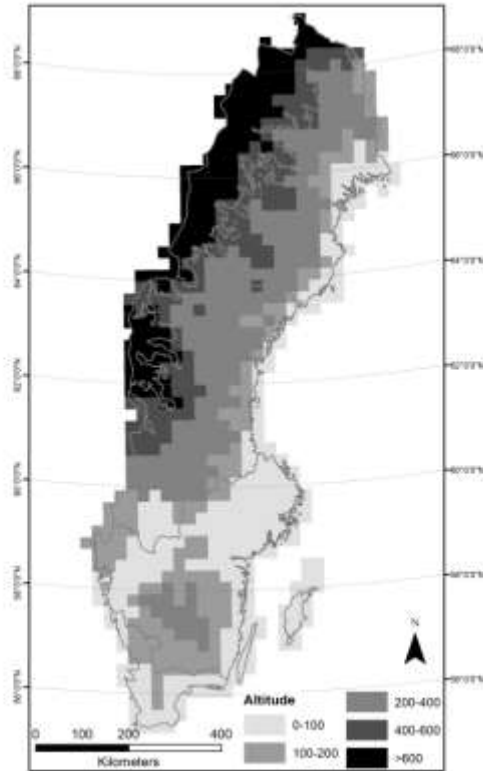
- **Habitat quality** (natural > protected > certified)
- **Habitat size** (protected 10 ha and certified 1ha)
- **Connectivity** (protected >> certified)
- **Representation** biased (forest regions and types)

# Sweden is "tall"

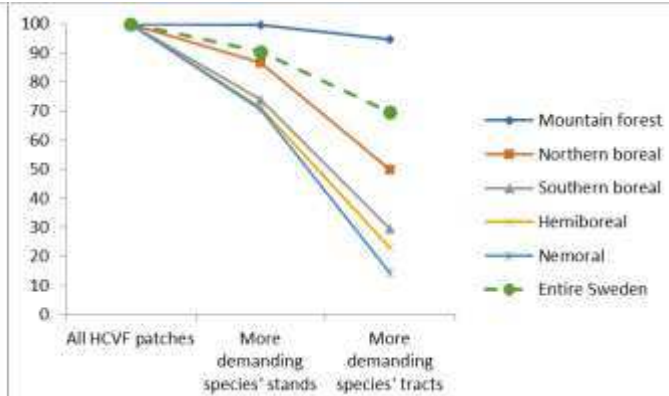
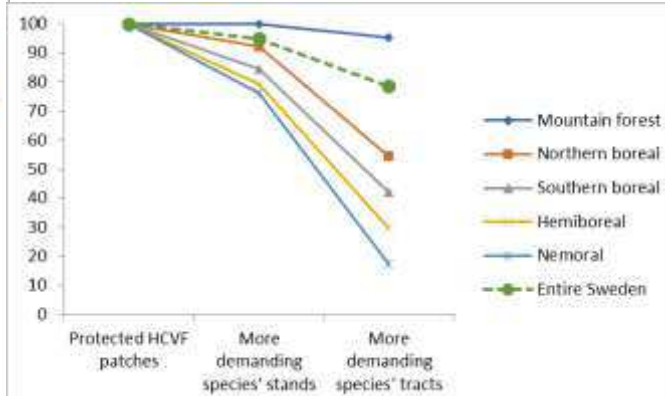
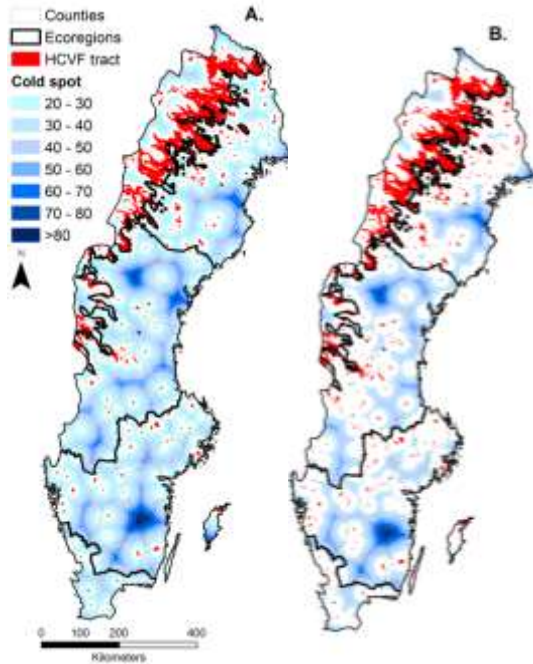


- Proportion productive forest land
- Proportion unproductive forest land
- Proportion other wooded land

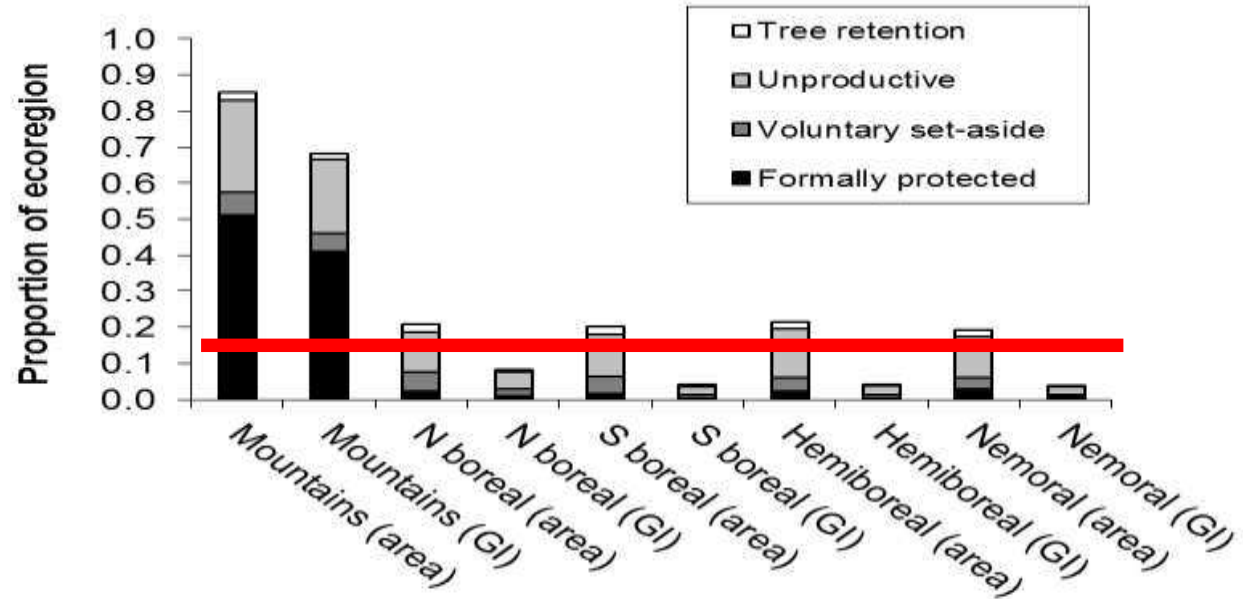
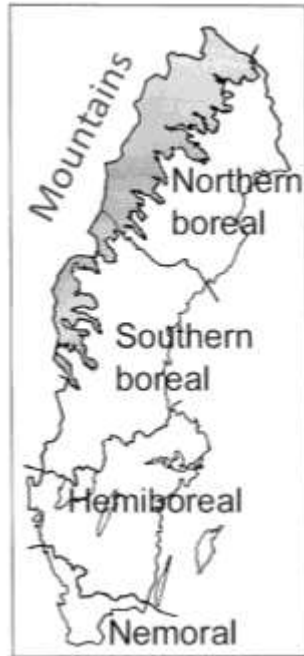
# Analyses of HCVF areas in Sweden (>600,000 polygons)



# Is the green infrastructure functional?

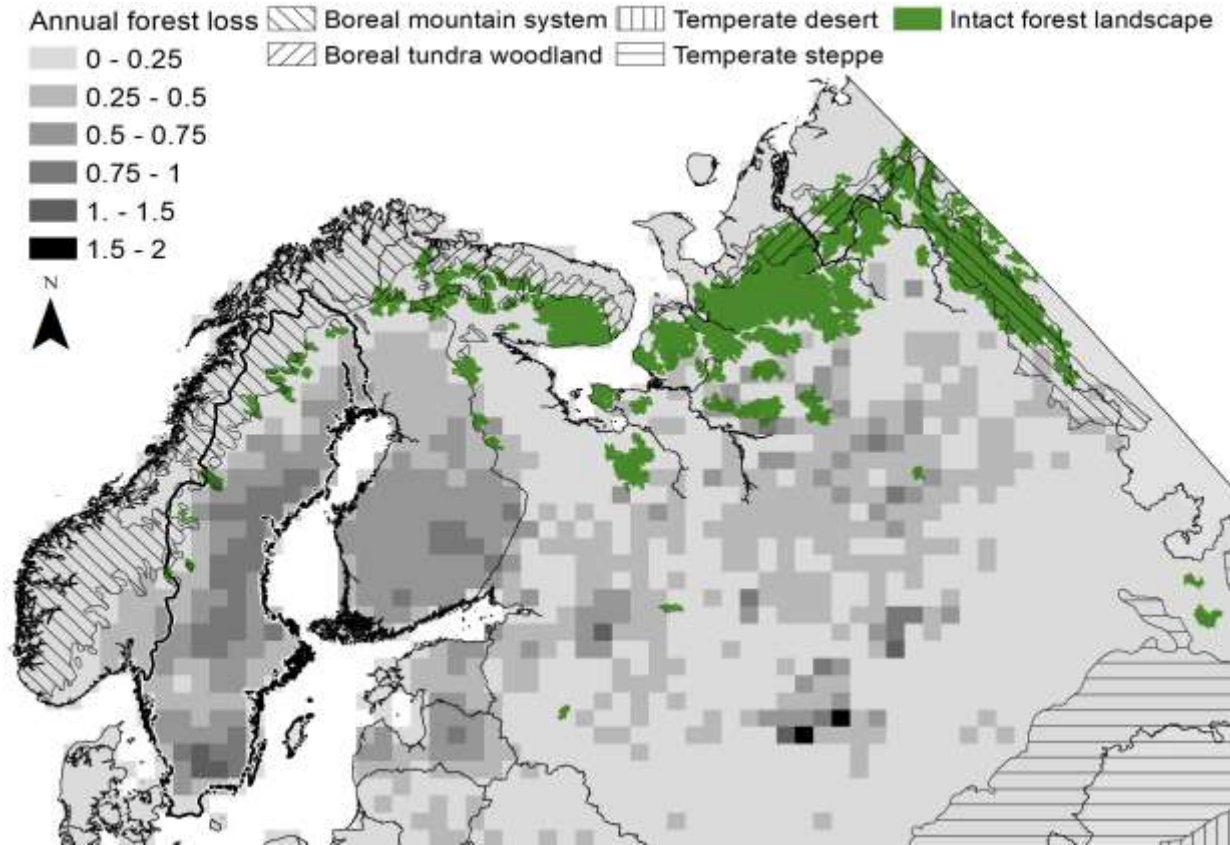


# Far below conservation targets

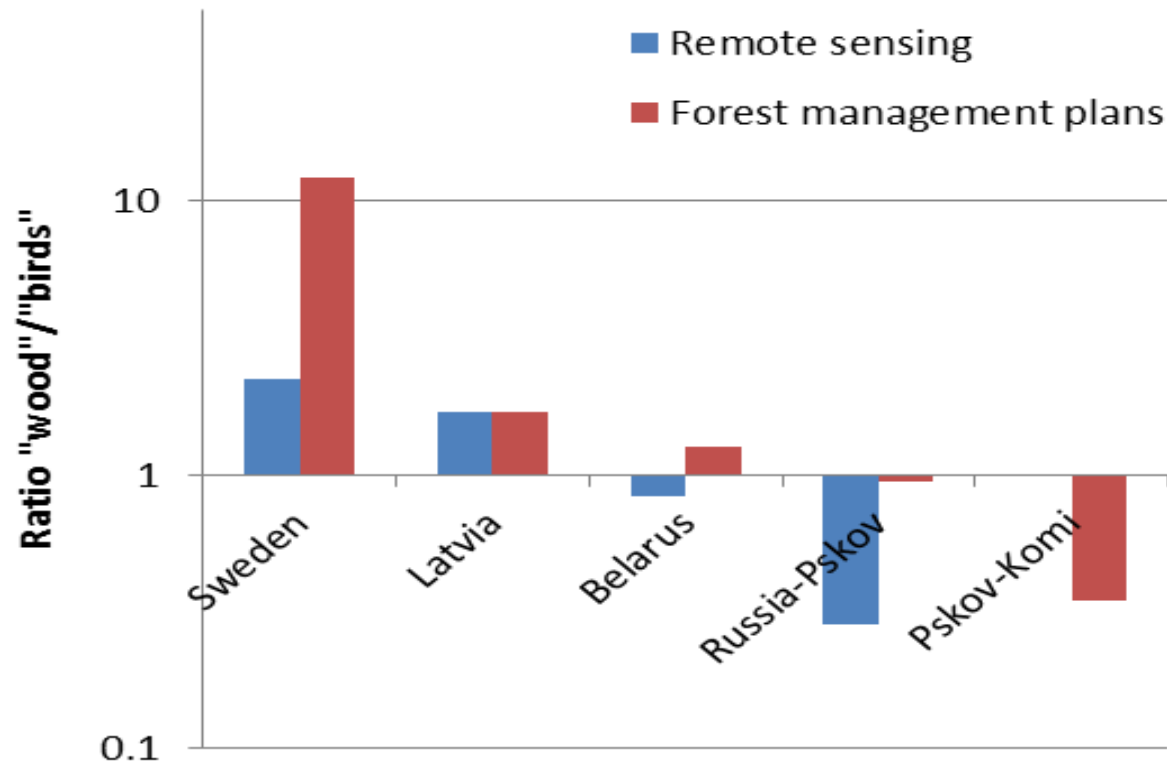


Angelstam, P., Elbakidze, M., Lawrence, A., Manton, M., Melecis, V., Pereira, A. 2018. Barriers and bridges for landscape stewardship and knowledge production to sustain functional green infrastructures. In: Pereira, A., Peterson, U., Pastur, G., Iverson, L. (eds.). Ecosystem Services from Forest Landscapes: Broadscale Considerations. Springer. pp. 127-67.

# Intensification and bioeconomy

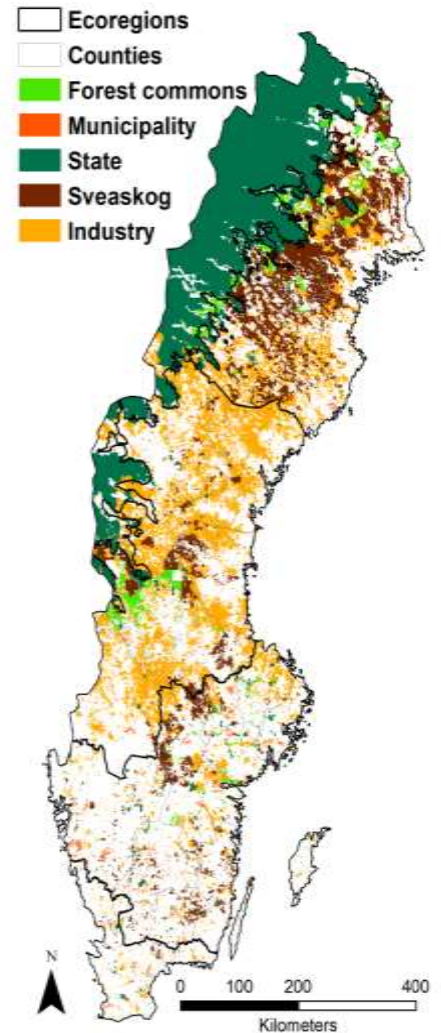


# Forestry and biodiversity conservation are competing objectives



# Spatial planning?

- Many owner categories
- Many owners
- Large regional variation

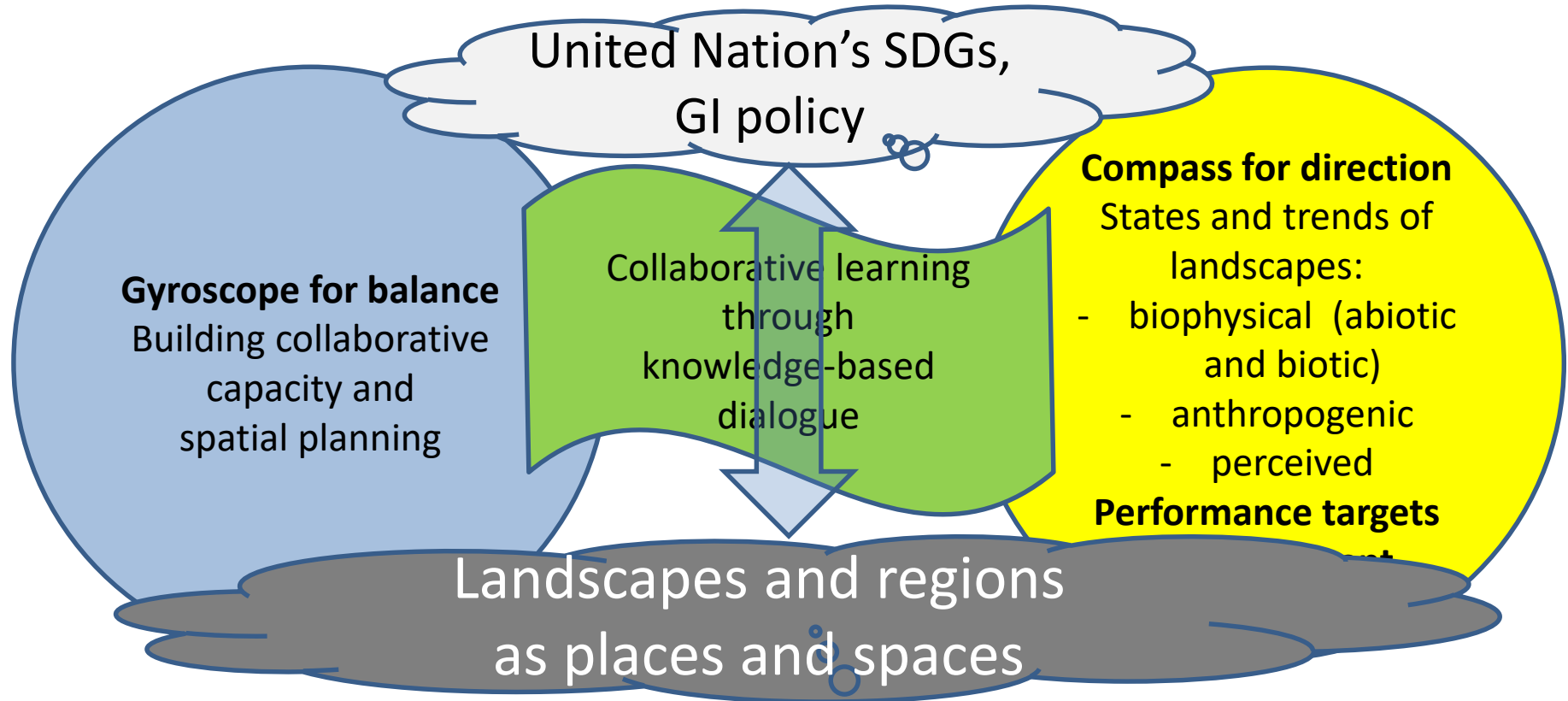




# ***Implementation of policies aiming at sustainable landscapes require:***

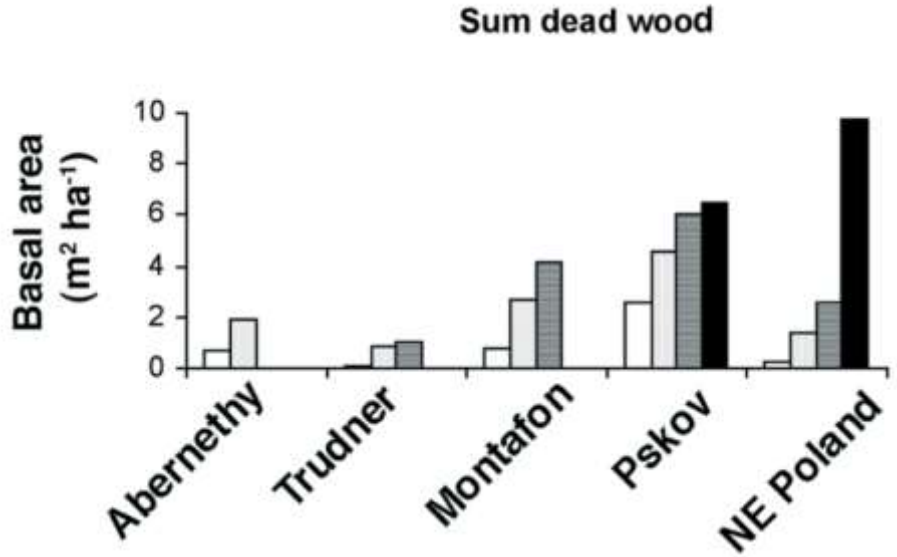
- Knowledge about both social and ecological systems (**interdisciplinarity**)
- Knowledge derived from multiple stakeholders (**stakeholder engagement**)
- Reflexive, transparent, iterative and integrative knowledge production and learning (**transdisciplinarity**)
- = “**Landscape Approach**”

# Navigation of SD as societal process and sustainability as consequence

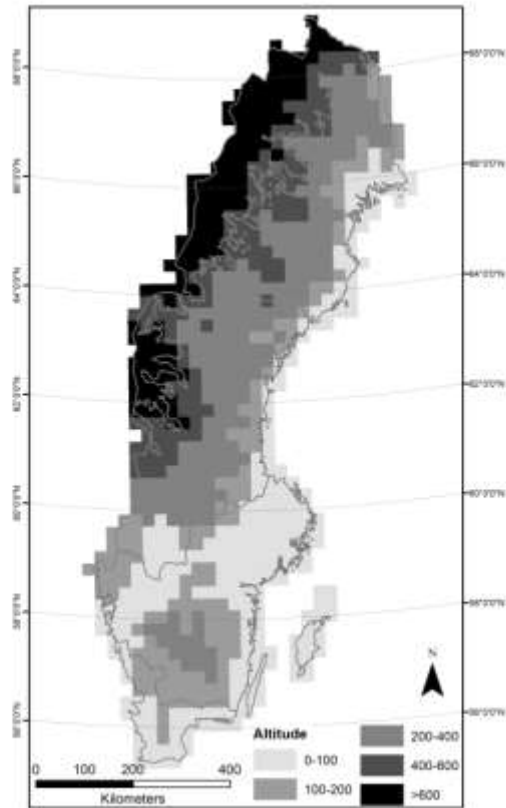




# Quality – dead wood as example



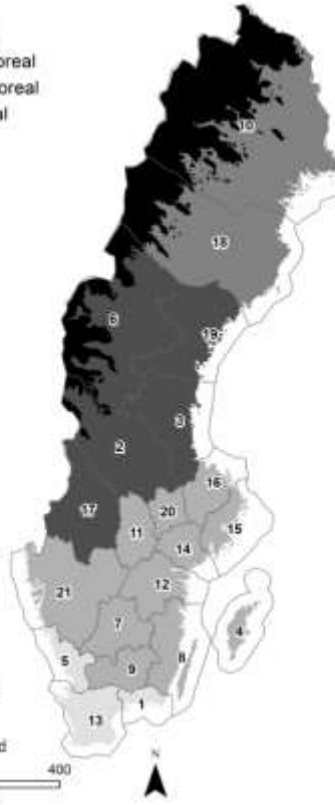
# Sweden as a case study



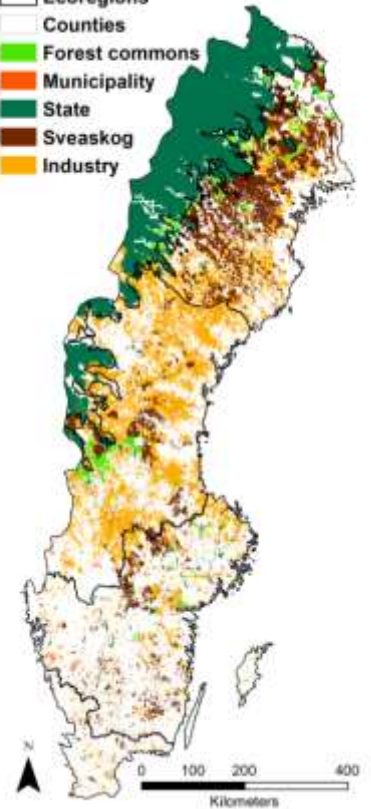
## Ecoregions

- Sub-alpine
- Northern Boreal
- Southern Boreal
- Hemi-Boreal
- Nemoral
- Counties

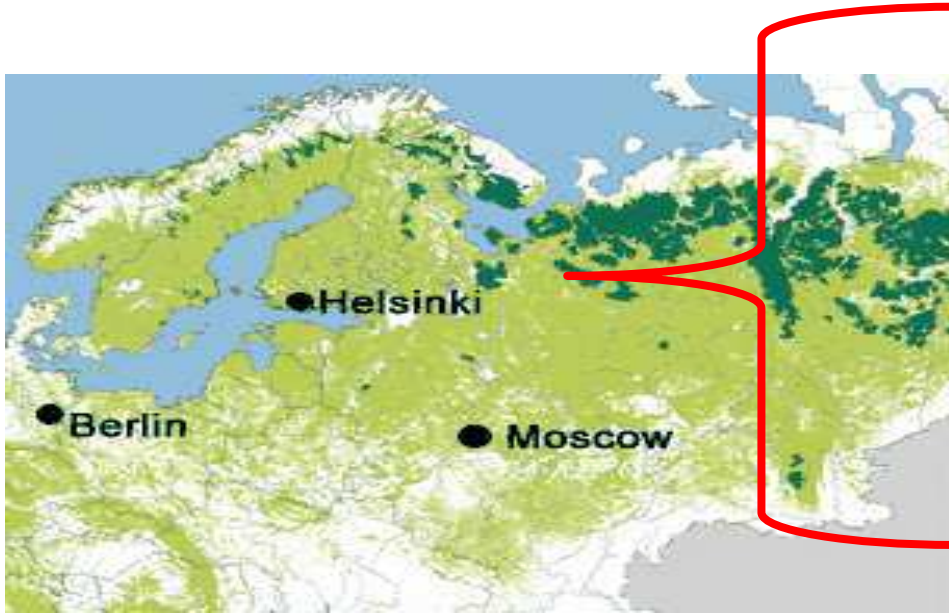
- 1 Blekinge
- 2 Dalarna
- 3 Gävleborg
- 4 Gotland
- 5 Halland
- 6 Jämtland
- 7 Jönköping
- 8 Kalmar
- 9 Kronoberg
- 10 Norrbotten
- 11 Örebro
- 12 Östergötland
- 13 Skåne
- 14 Södermanland
- 15 Stockholm
- 16 Uppsala
- 17 Värmland
- 18 Västerbotten
- 19 Västernorrland
- 20 Västmanland
- 21 Västra Götaland

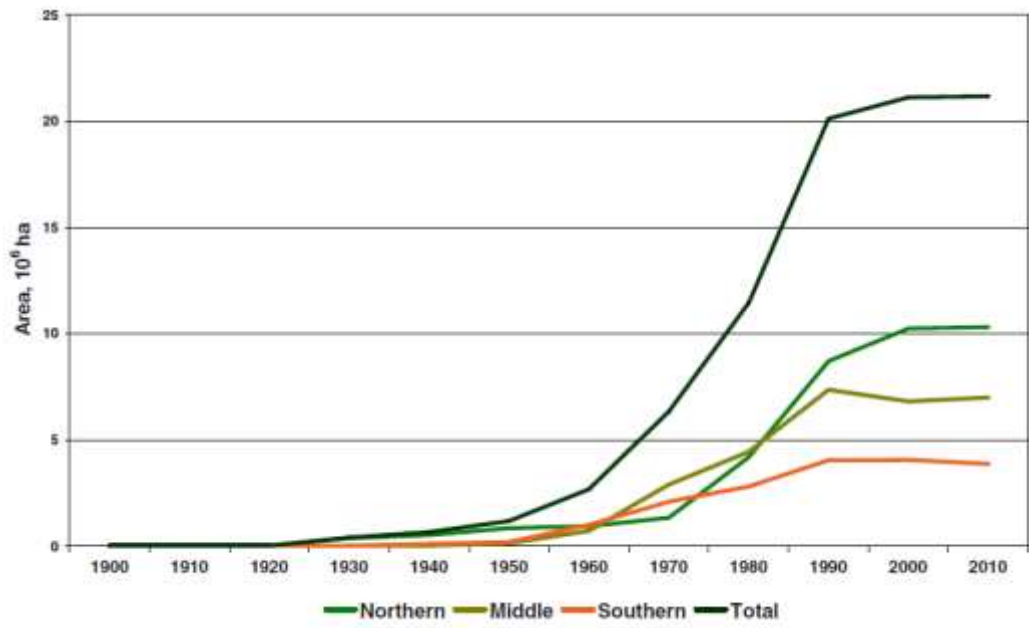
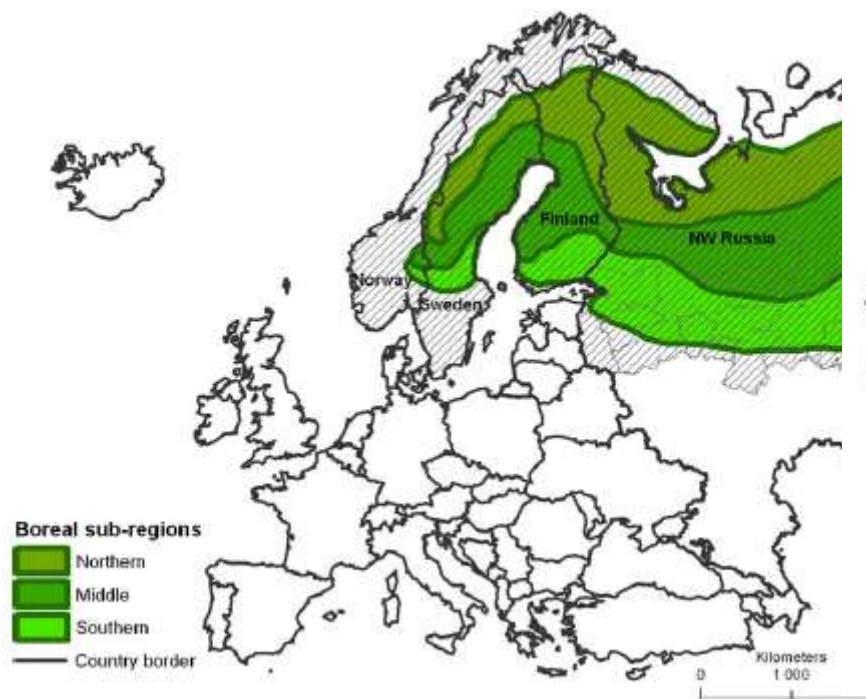


- Ecoregions
- Counties
- Forest commons
- Municipality
- State
- Sveaskog
- Industry



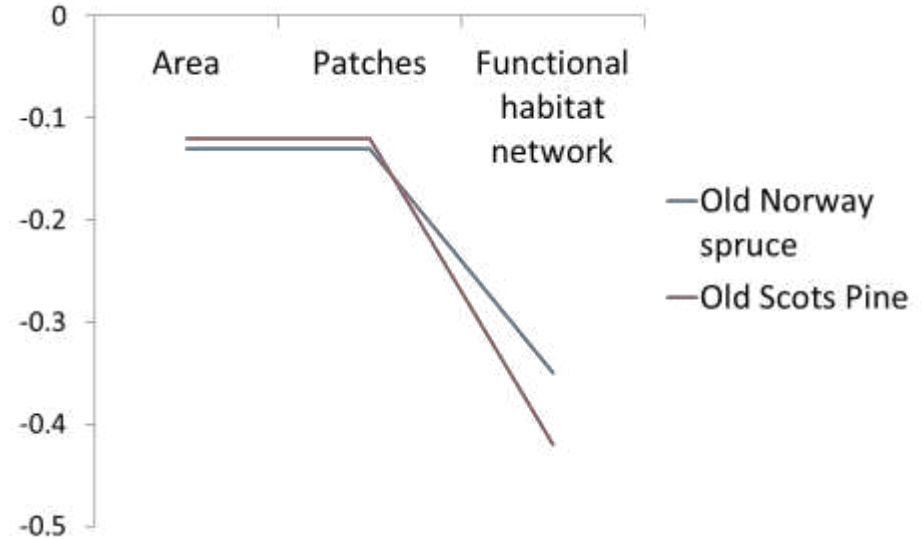
# Regional and local logging frontiers





# But it does not get better...

- XX





- Kuuluvainen, T. , Hofgaard, A. , Aakala, T. & Jonsson, B. G. (2017). [North Fennoscandian mountain forests](#) : History, composition, disturbance dynamics and the unpredictable future. *Forest Ecology and Management*, vol. 385, ss. 140-149