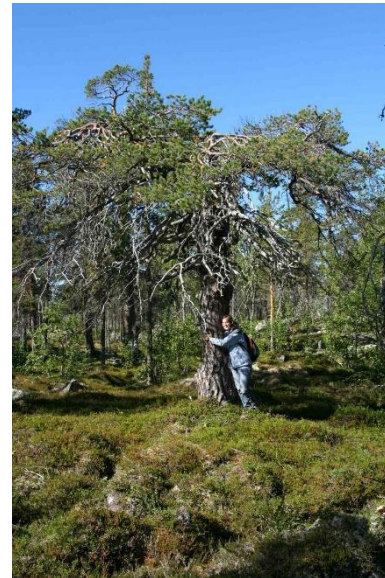


The devil in the details

What should be considered for a scientifically based definition of European primary and old growth boreal forests



Photo: Frederic Forsmark



Photos: Bege Jonsson



Characteristics of north European boreal forests

- Three dominant natural disturbances
 - Stand replacing forest fire (relatively rare)
 - Non stand replacing forest fire (very common, cohort dynamics)
 - Small scale disturbance (gap dynamics)
- Low native tree species diversity
 - Two conifers (Norway spruce, Scots pine)
 - A few deciduous tree species (Birch, Aspen, Goat willow and Rowan)
- High diversity of species associated with living and dead trees
 - Insects
 - Fungi (including lichens)
 - Bryophytes
 - Birds

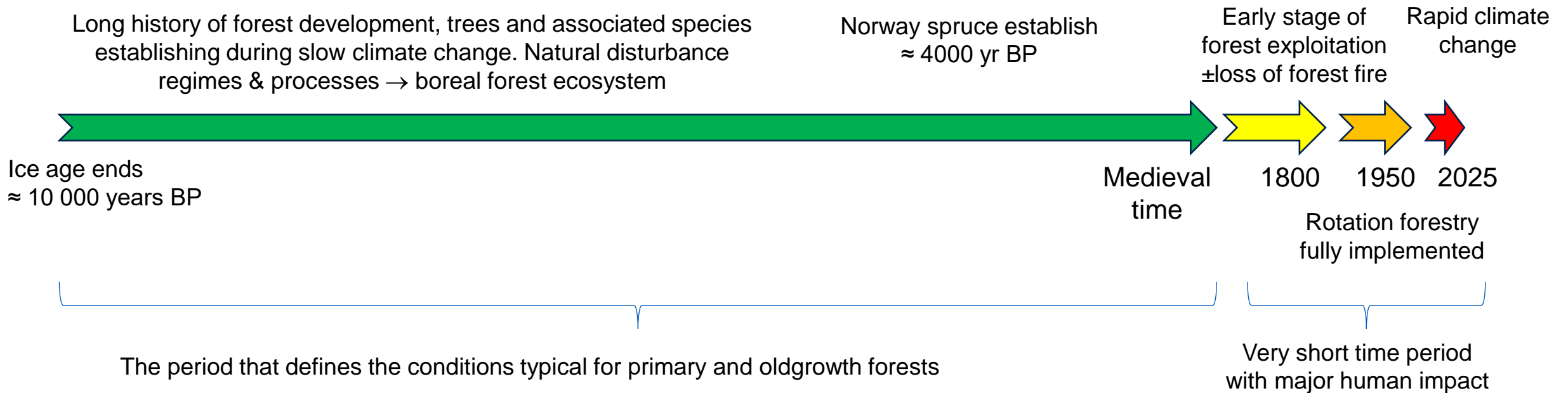


Haploporus odorus
on old goat willows



Three-toed woodpecker
feeding marks

Historic context of boreal forest and its use



The purpose of protecting PF/OGF

- Primary and old-growth forests are some of the EU's richest ecosystems
- They store significant carbon stocks
- Of paramount importance for biodiversity and the provision of multiple ecosystem services
- They provide a habitat for many of the EU's endangered and endemic species
- Prime examples of our natural heritage
- In the EU today, these forest areas are rare, often small, and fragmented.

Commission Guidelines for Defining, Mapping, Monitoring and Strictly Protecting EU Primary and Old-Growth Forests

EU commission indicators for PF/OGF

- Main indicators
 - Native species
 - Deadwood
 - Old or large trees
- Complementary indicators
 - Stand origin
 - Structural complexity
 - Habitat trees
 - Indicator species
- Main indicators
 - Not only about non-native, but natural mix of native species
 - Dead wood not only about quantity
 - How old/large varies across the boreal region
- Complementary indicators
 - Stand origin → often stand age
 - Structural complexity → how to set a threshold?
 - Habitat trees → Tree related microhabitats, TreMs
 - Indicator species → which?

Challenge I – Stand origin/age \neq Tree age



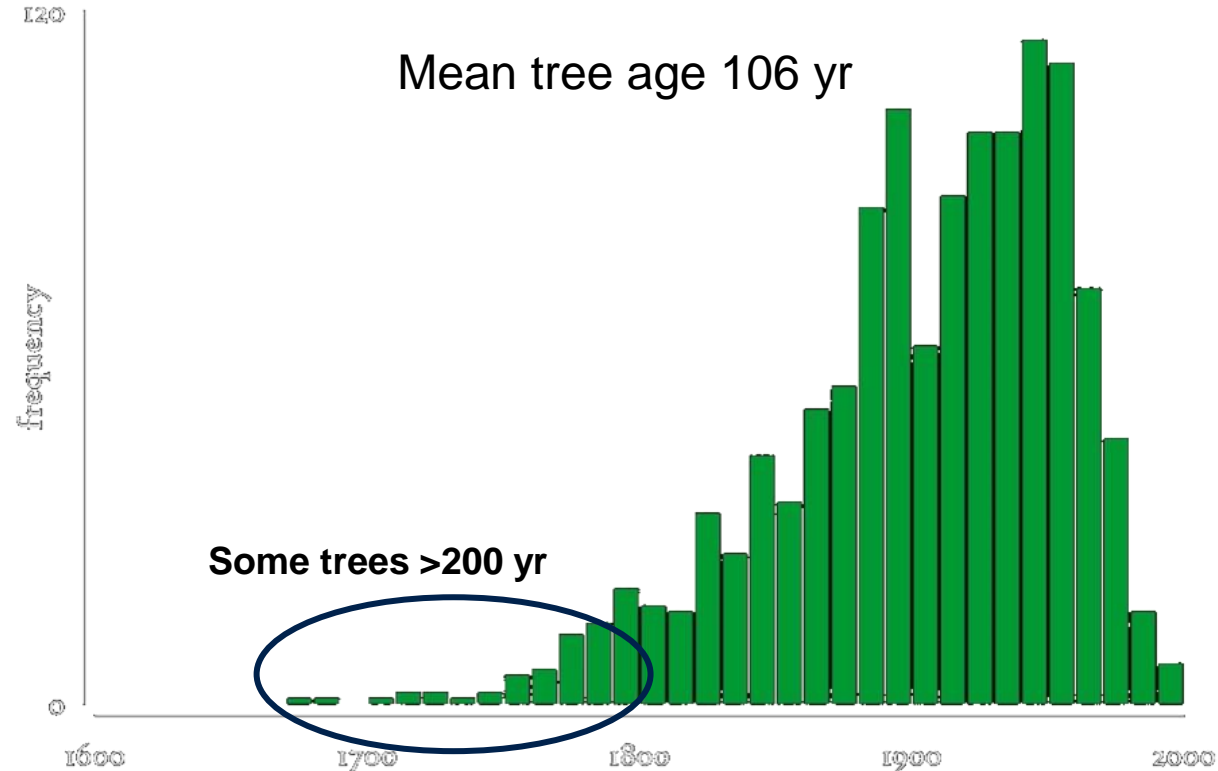
- Although not an explicit criteria it is the second most used indicator in EU
- Primary and oldgrowth forests are old with many generation of trees
- Criteria emphasizing tree age go wrong
 - Basal area weighted mean age (really wrong)
 - Presence of $>Y$ number of trees $> X$ years (also wrong but better)
- Truly estimating tree ages for forest stands is demanding in practice



Does the age limits make sense?

NO!

Tree age – primary forest northern Sweden (Granlandet nature reserve)



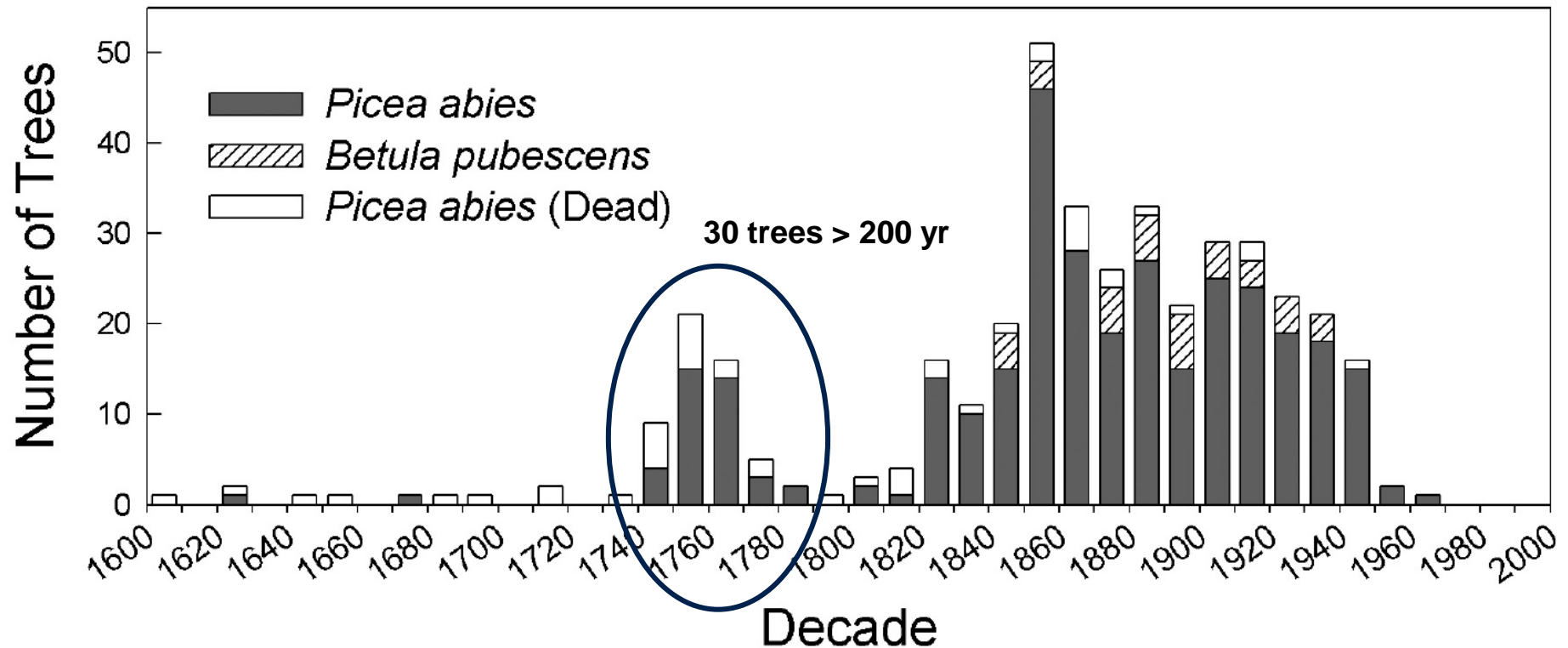
Suggested criteria for Sweden

	Primary forest	Oldgrowth forest
REDIII		
Basal area weighted mean age	NA	180 years
Number of trees older than x years	>20 trees/ha >250 pine >200 spruce	Many trees >200 years
Area	>10 ha	>0.5 ha
National forest inventory		
Basal area weighted mean age	NA	140 years
Number of trees older than	NA	NA
Area	NA	NA

Maybe...

Does the age limits make sense?

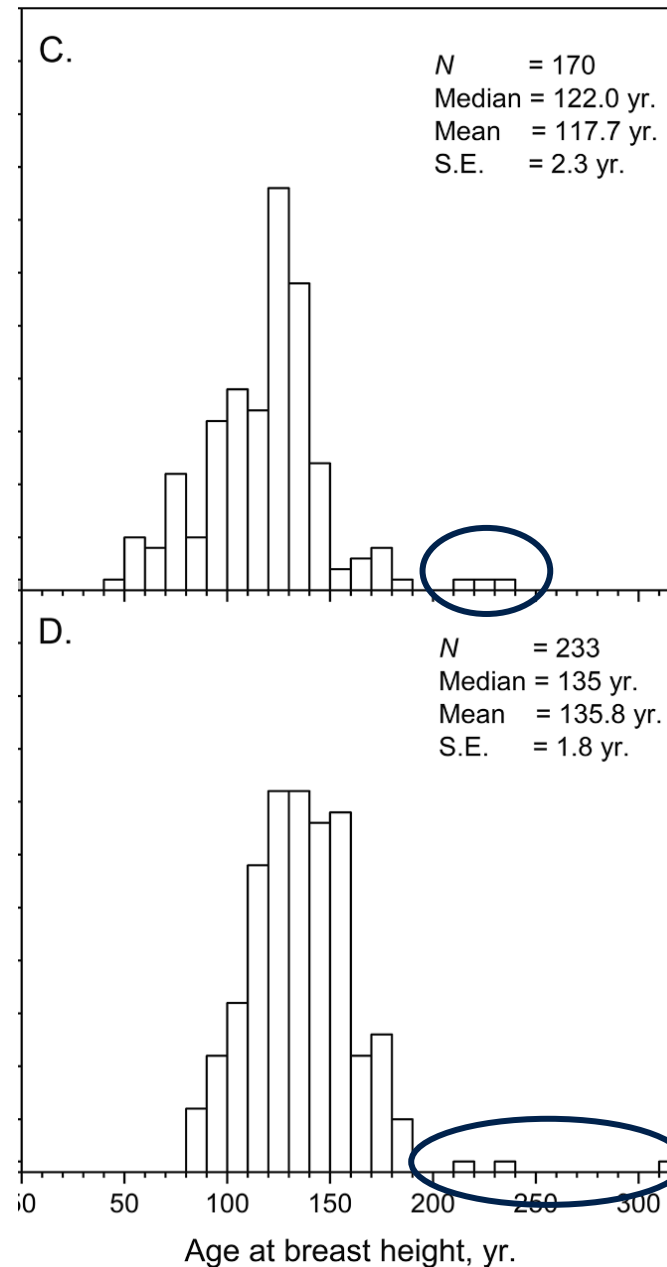
Tree age primary mountain forest northern Sweden (Gardjället nature reserve)



Does the age limits make sense? Tree ages old-growth forest central Sweden (Skuleskogen national park)



Photo: Per-Anders Esseen



NO!

Challenge II – “*the area is large enough to maintain its natural ecological processes*”



- Internal gap dynamics
- Non-stand replacing forest fires
- Stand replacing fires or storms

If this is to be translated into a minimum area for PF/OGF a large fraction may not meet the criteria

But the EU guidelines explicitly state “they are rare, often small and fragmented”

Challenge III – Historical harvesting



- “*without significant human intervention*”
- During 1800s, the timber frontier had major impact by removing large trees, particularly in pine forests
- Impact seen through the loss of a generation of large trees where some would still be alive and some as standing dead snags (Kelo trees)
- Yet, old selectively logged pine forests is what is left of a once dominant forest type
 - Contain fire history records
 - Dead wood still occur, including Kelo trees
 - Rich community of mycorrhizal fungi
 - High restoration potential (restoration fire, tree veteranization)

How to deal with the devils?



- Definitions and criteria must consider the purpose of protecting PF/OGF
- Recognize that PF/OGF open to interpretation regardless criteria – gradients in naturalness
- Do not set criteria thresholds to meet a specific area target – focus on the purpose!
- Do not use tree ages as a decisive criteria – will be wrong and difficult to implement
- Avoid criteria where small changes in thresholds have a large impact on the outcome
- Ideally focus on “*without significant human intervention*” – counting stumps

A photograph of a forest with a large fallen log in the foreground and tall trees in the background. The log is dark and weathered, lying horizontally across the lower left. The forest floor is covered in low-lying vegetation and dry leaves. Tall, thin trees with green foliage stand in the background under a blue sky with some clouds.

EU and global conservation agenda
No net loss
Bending the curve of BD loss
Net gain principles
Giving back to nature
Put Europe's biodiversity on a path
to recovery by 2030

A good start is to ensure
that high conservation
value forests are not lost

Thanks!