



Natural regeneration in Boreal forestry

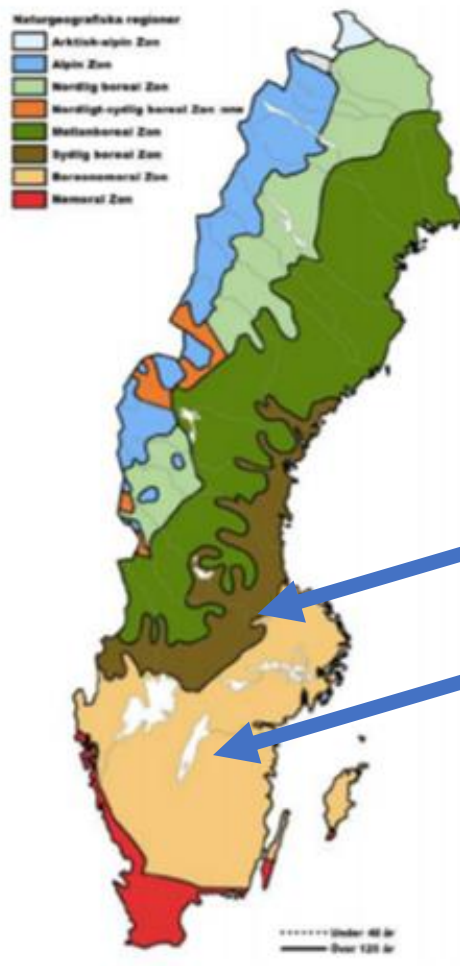
Current utilization and possibilities

Martin Jentzen Forest engineer

Ekoskog

28 January 2025

Planting is the most common way to establish regeneration in the Swedish forestry at present



Most of Sweden, but not all, is in the boreal zone

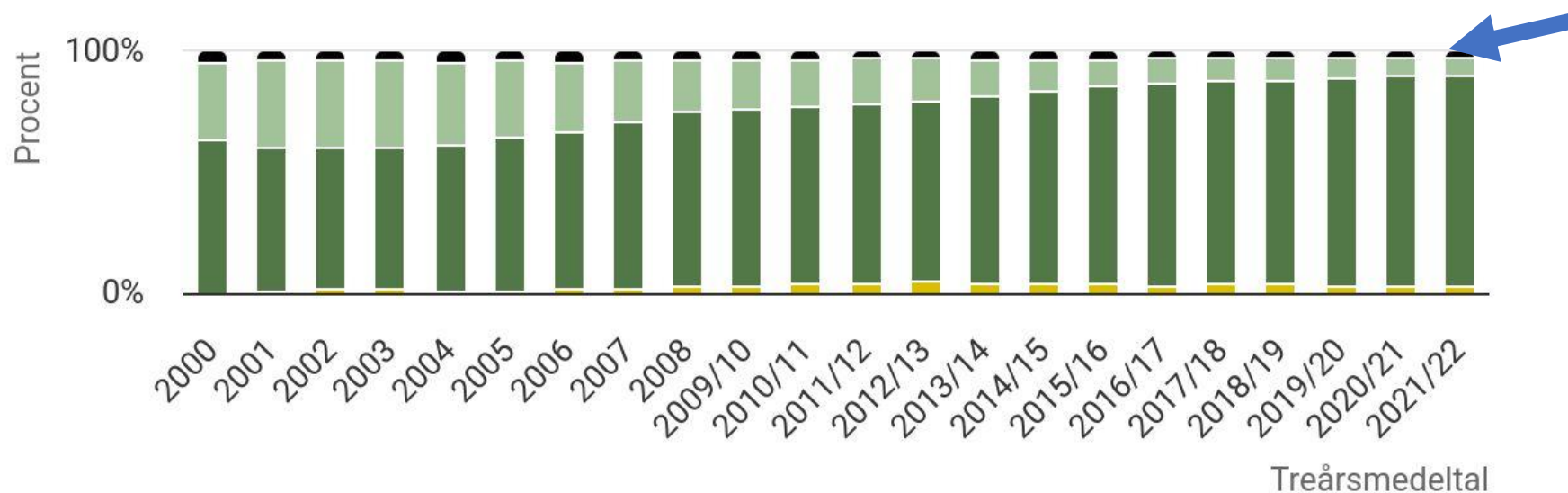
Boreal vegetation zone, from here and north

Boreonemoral vegetation zone

Over time natural regeneration has become less common in Swedish forestry



Figur 4. Använd förnygringsmetod som andel av avverkad areal.



Natural regeneration in relation to other methods.

- Andel, procent, Hela landet, Ingen åtgärd (Without rejuvenation measure)
- Andel, procent, Hela landet, Naturlig förnygring (Natural regeneration)
- Andel, procent, Hela landet, Plantering (Planting)
- Andel, procent, Hela landet, Sådd (Sowing)

Natural regeneration is a actually bit more common in reality



On planted sites it is common with naturally regenerated plants.

Approx 30% of the planted areas are "saved by natural regeneration" to meet the legal minimum standard.

Biodiversity and climate are more and more important in parallel to the importance of timber production.

Natural generation is therefore more and more favourable.

Local genetics local adoption by evolution. Species diversity, can of course be planted but...

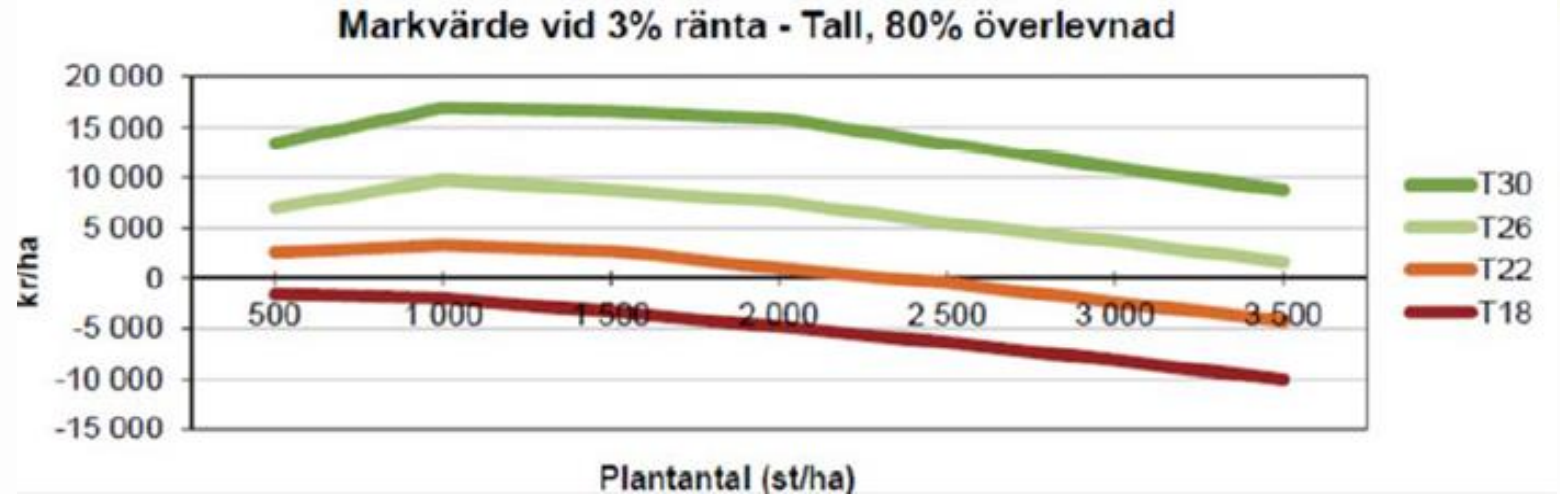
Planting is costly



The establishment of a stand is costly.

It should be view as an investment.
Not a logging cost.

With an interest rate applied over time this investment sums up to a large part of the future income from harvest.



Hyggesfritt skogsbruk, Back Tomas Ersson, Sveriges lantbruksuniversitet
Skogsmästarskolan, Skinnskatteberg, 2020
<https://www.slu.se/institutioner/skogsmastarskolan/forskning/net4forest/>

Regeneration is a key factor for a successful forestry and resource management

But it is also important to avoid harvesting the existing stand too early to create or save existing natural generation

How many plants are needed? What is successful regrowth?

On a clear felling the need is big, to use the productive capacity of the soil.



Photo Pixel Pettersson



The need of plants from a volume production perspective

Less when there are older trees left after a selective harvest.

On open land we need a higher number to compensate for the removal of biomass. In both cases we in practice of course need additional ones as reserves to fill in for natural mortality.

In restorations projects there can be reasons for early harvest to promote natural generation. For example, in lodge pole pine, *Pinus contorta* stands.



Natural regrowth is a process



The shorter time span we set up to achieve it, the more complicated and larger risk for failure.

More complex stand structures are needed.

Probably the most effective way to reduce future risk exposure in the forestry.



Photo Pixel Pettersson

Harvest suitable for at least two objectives

Effective, profitable, harvest of timber and create suitable conditions for regeneration.

Pine, spruce and birch are common and will always be. Species as rowan, willow, aspen and alder are today less common compared to what could be expected as a more natural composition.

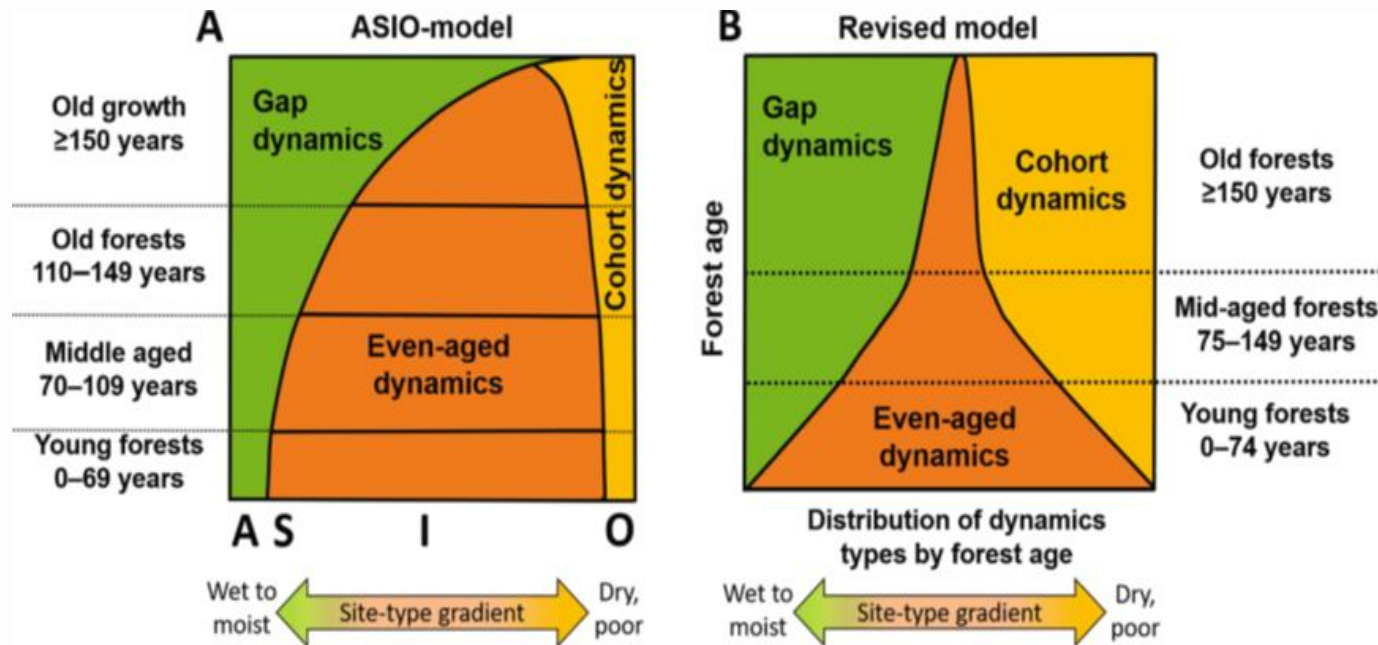
To achieve more complex structures, and there by a more diverse natural regeneration the clear-felling method is not suitable.



An inverted landscape



What is common in pristine landscapes is uncommon, and vice versa.



Areas for regeneration of typical pioneer species are not lacking.

This often-discussed topic is maybe a question for generations of forester after us...

Representative boreal forest habitats in northern Europe, and a revised model for ecosystem management and biodiversity conservation Håkan Berglund , Timo Kuuluvainen

Always natural disturbances influencing the forest landscape parallel with forestry



The importance of the natural wildfires must be taken into consideration.

We must though keep in mind that the clear-felled areas are not ecological equal to a naturally burned area. Chemistry and substrate diversity differs substantially.

Do we need to introduce controlled fires as a combined activity for forestry purpose and as a nature conservation activity?

Management of young trees and stands



Typical pioneers are often established naturally but, are now mainly reduced in the pre commercial thinnings (except pine, *Pinus silvestris*).



The society and the forestry sector's customers are asking for a different forestry now

The origin, the production is a part of the product.

Changes in practice cause a need of increased knowledge.

A lot can be learned from natural forest as reference.

But there will always be differences in a managed forest we extract timber from.

We need to collect experience from practice.

It is not a reason to wait for change practise, it is a call to combine a new practice with a structured building knowledge.



Photo Klas Anker

Summary



- **Natural generation depend on structures, both in stand and landscape.**
- **Diverse structures give diverse pathways for future development.**
 - Reduce management intensity to increase adaptability.
- **Don't forget the natural disturbances regimes. They are there, always.**
 - Less disturbances in Scandinavia is needed coming decades as we have a history of intensive forestry causing intense disturbances.
- **Preserve the structures and substrates generated by natural disturbances.**
- **Don't cut trees for lowest product level. Aim up, for better money and use! We need regeneration but also more old big trees in the forest landscape, as long lived and diverse tree populations ensure a larger genetic diversity.**