

# Potential technical corrections to the forest reference levels

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# LULUCF regulation (EU) 2018/841 updated

## Article 8.11 and 8.5

“11. In order to ensure **consistency** as referred to in **paragraph 5** of this Article, Member States shall, where necessary, submit to the Commission **technical corrections** not requiring amendments to the delegated acts adopted pursuant to paragraph 8 or 9 of this Article by the dates referred to in Article 14(1).”

“5. The forest reference level shall be based on the continuation of sustainable forest management practice, as documented in the period from 2000 to 2009 with regard to dynamic age-related forest characteristics in national forests, using the best available data.

Forest reference levels as determined in accordance with the first subparagraph shall take account of the future impact of dynamic age-related forest characteristics in order not to unduly constrain forest management intensity as a core element of sustainable forest management practice, with the aim of maintaining or strengthening long-term carbon sinks.

Member States shall demonstrate **consistency** between the methods and data used to determine the proposed forest reference level in the national forestry accounting plan and those used in the reporting for managed forest land.”

# Kyoto Protocol and technical corrections

2/CMP.7, Annex paragraph 14 and 15

14. When accounting for forest management, Annex I Parties shall demonstrate methodological **consistency** between the reference level and reporting for forest management during the second commitment period, including in the area accounted for, in the treatment of harvested wood products, and in the accounting of any emissions from natural disturbances. **Parties shall make technical corrections**, if necessary, **to ensure consistency**, including applying IPCC methods for ensuring time-series consistency (e.g. overlap with historical data) and shall report on how these corrections were made. [...].

15. After adoption of the reference level for forest management, if the reported data on forest management or forest land remaining forest land used to establish the reference level are subject to recalculations, **a technical correction shall be applied to include in the accounting the impact of the recalculations on the reported data that have been used by the Party to set the reference level.**

Guidelines for technical corrections were provided in the IPCC 2014 KP supplement



# Guidance on developing and reporting Forest Reference Levels in accordance with Regulation (EU) 2018/841

In section 2.5 of this report, guidance is presented on how to construct a Forest reference level (FRL) but it also gives some guidance on possible technical corrections of the FRL:

- Assumptions concerning climate
- Forest area in the FRL
- Starting year of the simulation
- Assumptions for the period 2010 – 2020
- Harvested Wood Products
- Possible problems with the projection
- [...]

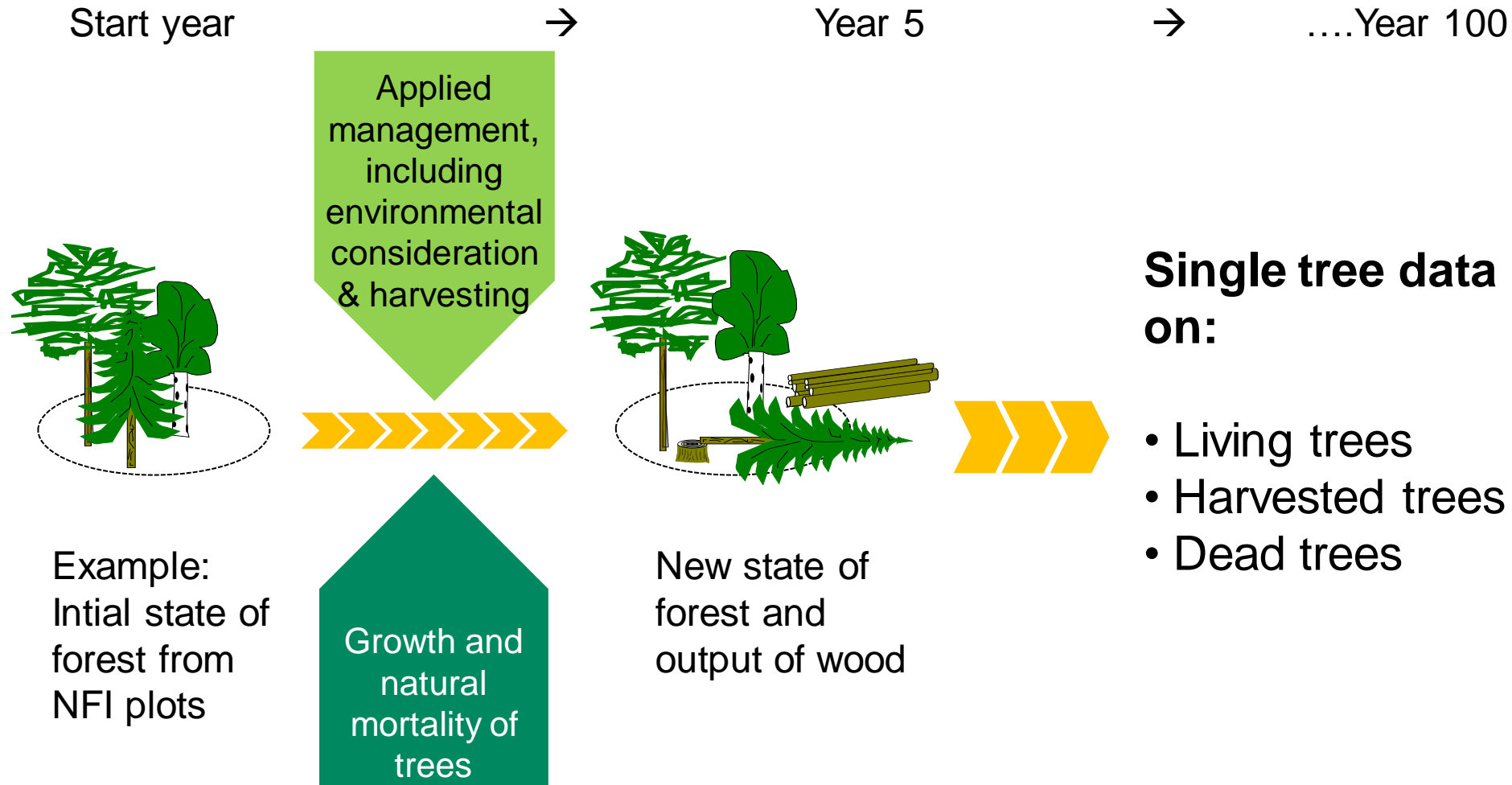


# The Swedish FRL in short

Carbon pool	GHG-inventory	FRL
Living biomass	Repeated inventory of permanent plots (NFI)	Heureka RegVis
Dead wood	Repeated inventory of permanent plots (NFI)	Heureka RegVis
Stumps	Decomposition model (Melin et. al. 2009)	Q-model
Litter	Repeated inventory of permanent plots (SFSI)	
Mineral soil	Repeated inventory of permanent plots (SFSI)	
Organic soil	Areas from SFSI and EF	
Fertilisation	Fertilised areas	Reported average 2000-2009
Fire	Burned areas	

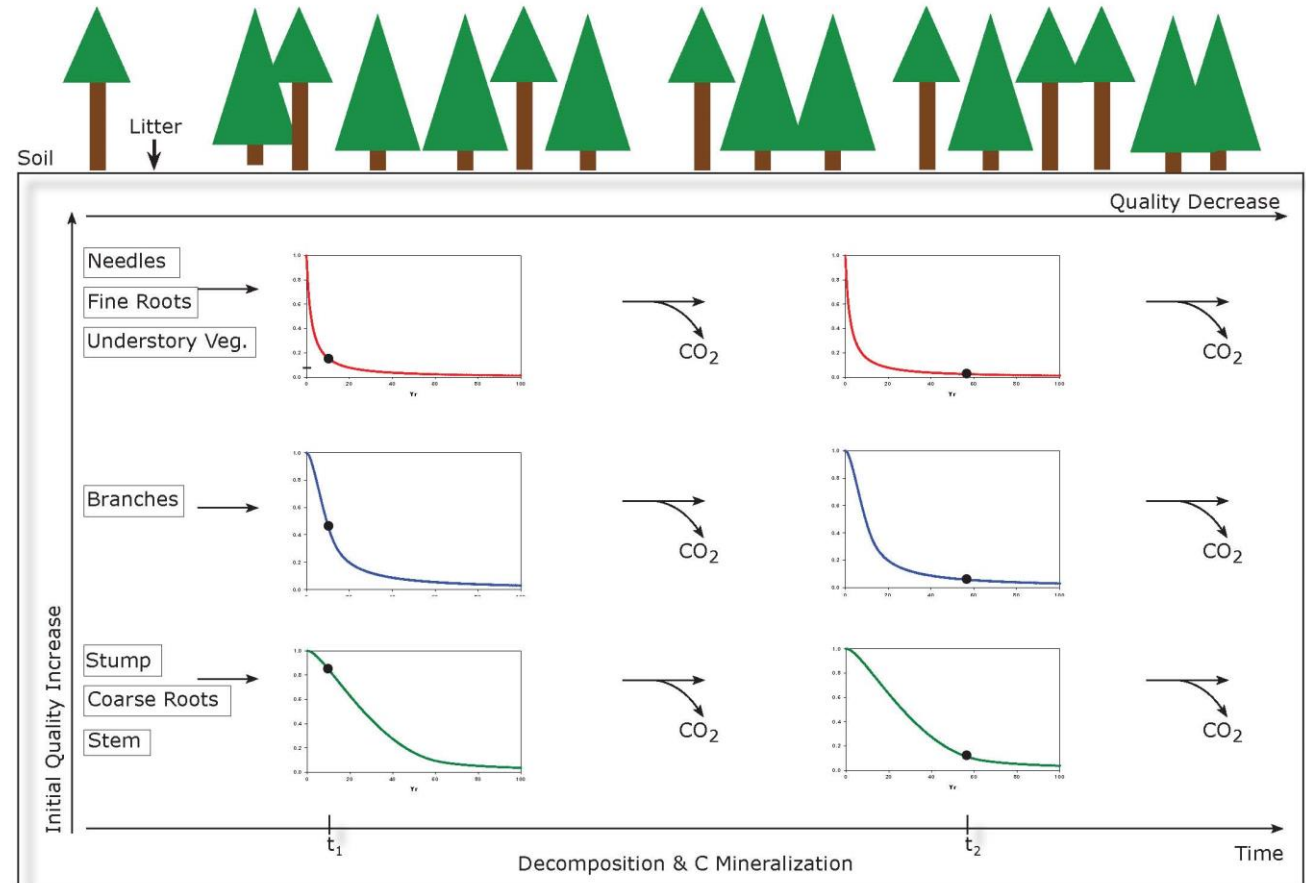


# Heureka Regvis - Modelling based on single tree data



# Q-model (mineral soil, litter, stumps)

- Decomposition in the Q-model is continuous and follows the quality of the different fractions.
- Input of carbon from Heureka consists of litter from different fractions (needles, branches, fine roots, stumps, stems, ground vegetation, coarse roots).
- Both annual litter production based on standing stock and harvest residues.





## Technical corrections in practice – some examples

- Our view is that: *A technical correction shall be done to ensure that differences (i.e. accounting quantities) between reported emissions/removals and FRL reflect (i) changes in emissions/removals that are due to measures taken to influence on emissions/removals or (ii) natural variations **during the commitment period (2021-2025)**.*
- Some examples:
  - Division of SOM into Stumps and SOC
  - Adjustment of level of SOM
  - Updated projection:
    - Forest area in the FRL*
    - Starting year of the simulation*
    - Assumptions for the period 2010– 2020*



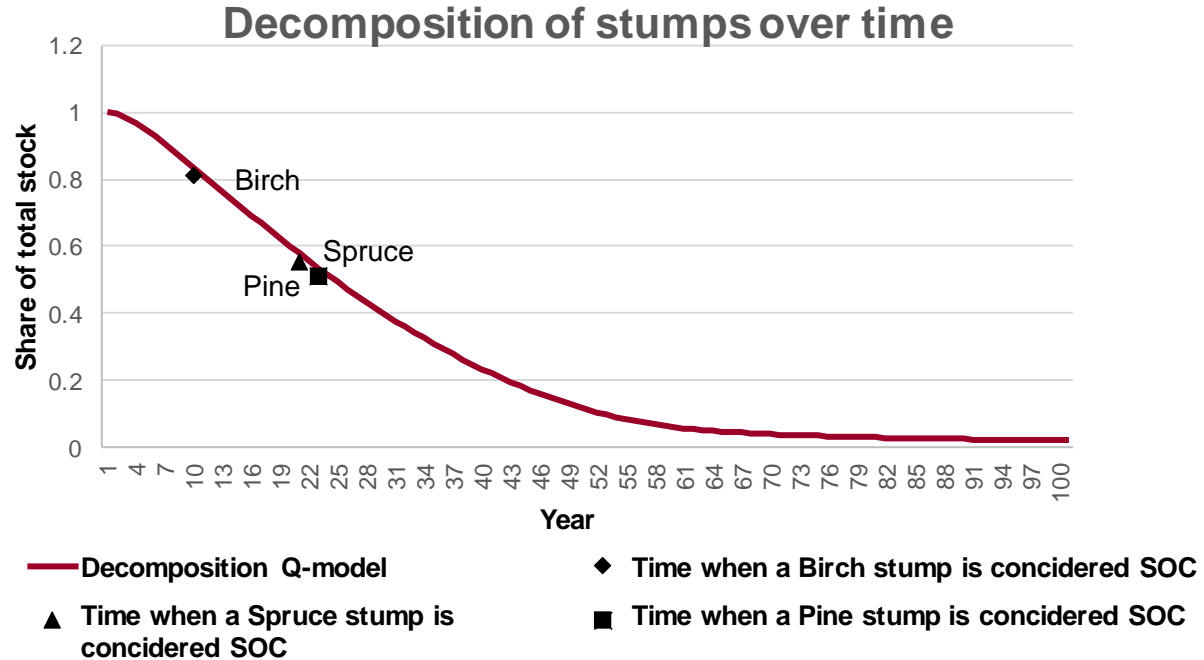
# Division of SOM into Stumps and SOC

- Started to check the consistency between carbon pools in the GHG-inventory and FRL
- Dead wood is accounted without a cap and therefore this pool must be comparable between GHG-inventory and FRL
- In the current FRL, stumps, litter and SOC were simulated aggregated in the Q-model.
- As stumps belong to dead wood, a project was done to improve the model to simulate stumps separately.
- The task was mainly to find out ***when a stump is not a stump any longer!***
- Different studies were assessed where the **change of density** determined when the stump is not a stump any longer.

Carbon pool	GHG-inventory	FRL
<b>Stumps</b>	Decomposition model (Melin et. al. 2009)	Q-model
<b>Litter</b>	Repeated inventory of permanent plots (SFSI)	
<b>Mineral soil</b>	Repeated inventory of permanent plots (SFSI)	

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	Remaining amount (%)	Time (year)
<b>Spruce</b>	55	21
<b>Pine</b>	50	23
<b>Birch</b>	20	10

kt CO <sub>2</sub>	Current FRL	Revised FRL
<b>Litter</b>	-	In SOC
<b>SOC</b>	-	-5 190
<b>Stumps</b>	-	-3 081
<b>Total</b>	-8 644	-8 271

# Adjustment of level of SOM

- The method for reporting SOC in mineral soils and litter has been updated.
- Recalculations have been done regularly due to updated datasets from the SFSI.
- The SOM (stumps + SOC) was validated for the FRL based on Submission 2019.
- Due to the recalculations a post-calibration is needed.
- A post-calibration was done using the quote between the simulated values and the reported values for Submission 2024.

	Current FRL	Revised FRL	2000-2009 Subm 2019	2000-2009 Subm 2024	Post-Calibrated FRL
<b>Litter</b>	In SOM	In SOC	11 731	3 613	In SOC
<b>SOC</b>	In SOM	-5 190	-14 670	-19 148	-17 816
<b>Stumps</b>	In SOM	-3 081	-6 785	-8 230	- 4 362
<b>SOM</b>	<b>-8 644</b>	<b>-8 271</b>	<del>-9 724</del>	<del>-23 765</del>	<b>-22 178</b>



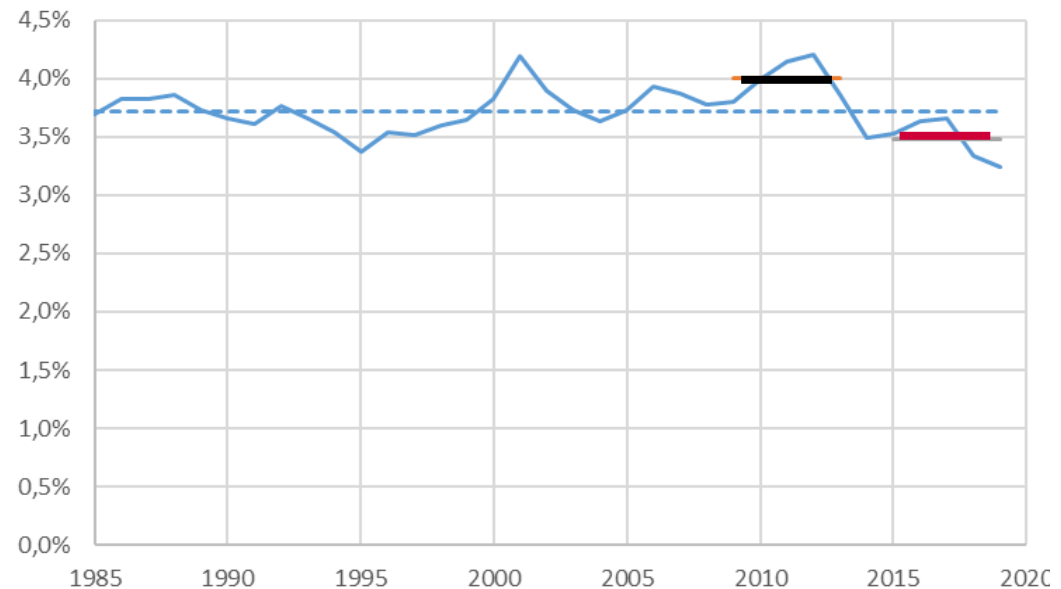
# Updated simulation

- The current FRL is based on the state of the forest 2008-2012:
  - Standing stock
  - Area
  - Age distribution
  - Growth (relative growth)
- Recalculations needs to be done based on the state of the forest the period just before the commitment period (2016-2020) to reflect these changes.

→ Refining the model

**Forest management intensity from 2000-2009 is maintained.**

**Example:** Relative growth (growth rate in relation to standing stock)



Using the relative growth based on the inventory 2016-2020 instead of the long-term average used in the FRL **and the same relative harvest as in the original FRL** may change (decrease) net removals in living biomass in the FRL for the period 2015-2025 of more than 10 million tonnes CO<sub>2</sub>

## Summary

- According to the legal text, the advice in the guidance report and experience with TC of FMRL under the 2<sup>nd</sup> CP of the Kyoto protocol we see the need for TC of FRL in different aspects.
- Some examples of TC to consider of which some have already been tested:
  - Division of SOM into Stumps and SOC
  - Adjustment of level of SOM
  - Small trees (<10 cm dbh). Currently based on historical trend.
  - Refining model (based on state of forest just before start of CP)
  - Area of FL rem FL due to actual LUC
  - Change in recovery of paper (HWP)
  - Recalculations of emissions 2000-2009 (updated EF organic soils)





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