



Reporting Carbon Stock Changes in Stump Systems Under The UNFCCC/ KP

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Reporting Stump systems – Outline

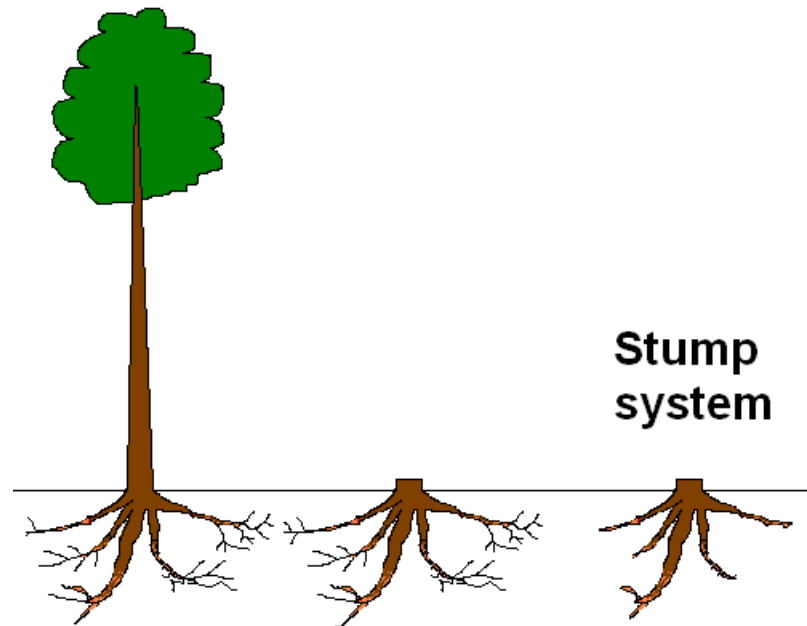
- Why reporting
- Definition
- How to model
- Special requirements
- Case studies
- Conclusions/ Summary

Why reporting Stump systems?

- Dead wood should be reported and IPCC (2003) defines dead wood as: "... Dead wood includes wood lying on the surface, dead roots, and stumps larger than equal to 10 cm in diameter or any other diameter used by the country".
- Important pool (Sweden: pool 500 Mton CO₂*; annual gross input to pool 30 Mton CO₂ per yr)
- Partly balancing changes in the living biomass pool

*Petersson, H., and Melin, Y. 2010. Estimating the biomass and carbon pool of stump systems at a national scale. For. Ecology and Management. 260: 466-471.

Definition



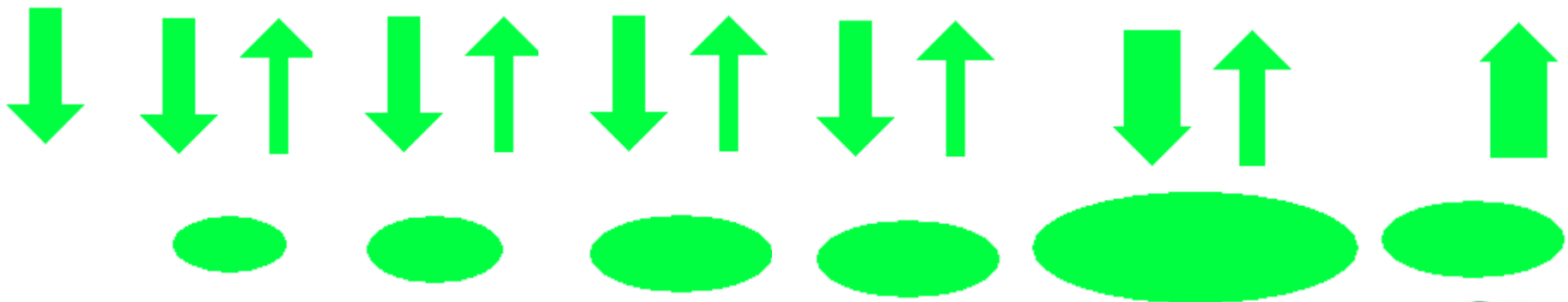
Stump system defined as*:

Stump and root fractions down to 2 mm “diameter”

*Petersson, H., and Ståhl, G., 2006. Functions for Below-ground Biomass of *Pinus sylvestris*, *Picea abies*, *Betula pendula* and *B. pubescens* in Sweden. Scand. J. For Res. 21(Suppl 7): 84-93.

One way to model stump systems

- Stump system biomass at harvest
- Crude decomposition model
- Long time series



Case studies – three options (Sweden)

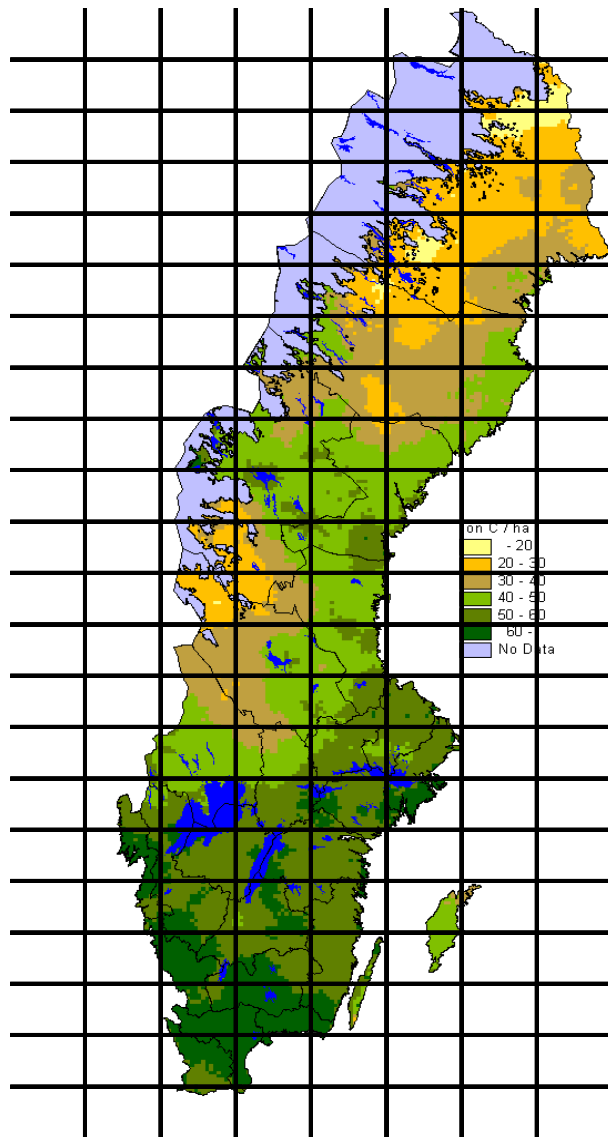
- **Growth – Net change in living biomass = Harvest**
- **Harvest statistics consumption studies (Forestry agency)**
- **Empirical single tree models adapted to the NFI**

Special Requirements

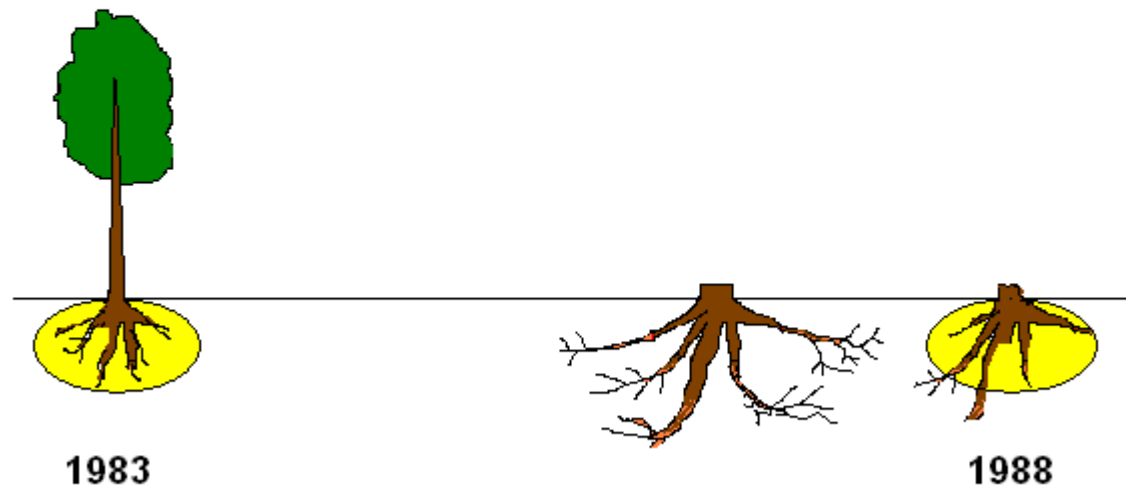
- harmonize with living biomass
- harmonize with HWP
- prepared for stump extraction for forest fuels
- handle self mortality
- handle land use and land use conversions
- accuracy



Case study – Background Swedish NFI



Case study – Background Swedish NFI



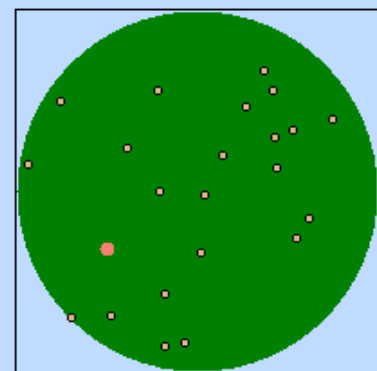
Year	ForestArea	SettlementArea	IsRowChanged	IsMeasured	LandUse ID
1995	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322600
1996	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322601
1997	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322602
1998	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322603
1999	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322604
2000	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322605
2001	31416	0	<input type="checkbox"/>	<input type="checkbox"/>	24322627
2002	20166	11250	<input type="checkbox"/>	<input type="checkbox"/>	24322628,2464...
2003	20166	11250	<input type="checkbox"/>	<input checked="" type="checkbox"/>	44821,44822
2004	20166	11250	<input type="checkbox"/>	<input type="checkbox"/>	24233282,2463...
2005	20166	11250	<input type="checkbox"/>	<input type="checkbox"/>	24233283,2463...
2006	20166	11250	<input type="checkbox"/>	<input type="checkbox"/>	24233284,2463...
2007	20166	11250	<input type="checkbox"/>	<input type="checkbox"/>	24233185,2463...
2008	20166	11250	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5206025,5209158

ass Biomass graph

Year	LandUseID	LandUseClass	AboveGround	BelowGround	Volume
2000	24322605	F	16243	5410	30033
2001	24322627	F	16243	5410	30033
2002	24322628	F	10851	3616	19683
2002	24647917	S	0	0	0
2003	44821	F	10851	3616	19683
2003	44822	S	0	0	0
2004	24233282	F	11140	3712	20087

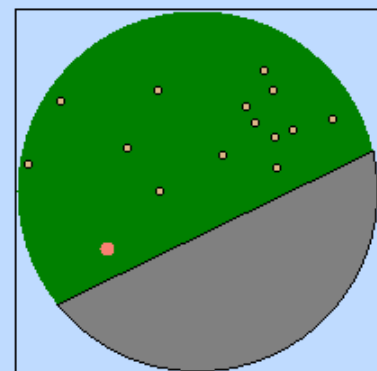
☐ Reviewed and OK

1994



2003

☒ Second Display



6

☐ ☐ ☐ ☐

Plot Details - Kol Data 1983-2508-206

RT Data Conversions Conversions graph RT TreeData

1983

	Tree No	Dry-weight branch	Dry-Weight Root	Dry-Weight Stem	Species Code	Volume	Diameter
▶	6	174	253	582	11	1394	169
	9	174	253	582	11	877	169
	12	133	180	409	11	972	149
	15	93	116	260	11	738	127

Case studies – Results

Predicted biomass and CO₂-equivalents of stump systems in Sweden, based on data from approximately 30 000 sample plots

Year	Biomass (dry weight)		GHG-equivalents	
	[M ton] Stock	[M ton·yr ⁻¹] Change in Stock	[M ton CO ₂] Stock	[M ton CO ₂ ·yr ⁻¹] Change in Stock
1990	224	4.11	410	7.53
1991	227	3.45	416	6.33
1992	229	2.36	421	4.32
1993	233	3.21	426	5.89
1994	237	4.70	435	8.62
1995	241	3.51	442	6.44
1996	244	2.94	447	5.39
1997	248	4.08	454	7.47
1998	251	2.74	459	5.03
1999	255	4.51	468	8.26
2000	259	3.52	474	6.45
2001	261	2.53	479	4.63
2002	265	3.46	485	6.34
2003	270	5.15	495	9.44

Conclusions/ Summary

- Weakness – crude decomposition model
- Most countries could use the concept
- Sweden has not yet decided model

	Individual Model	Growth-Net Liv.Biomass Model
Harmonize living biomass?	?	+
Harmonize HWP?	?	?
Stump extraction?	+	?
Self mortality?	+	-
Land use conversion?	+	-
Accuracy?	+	?