

Are sawmills getting what they want?

- A simulation approach to estimating the value of precise harvester measurements and minimized bucking splits

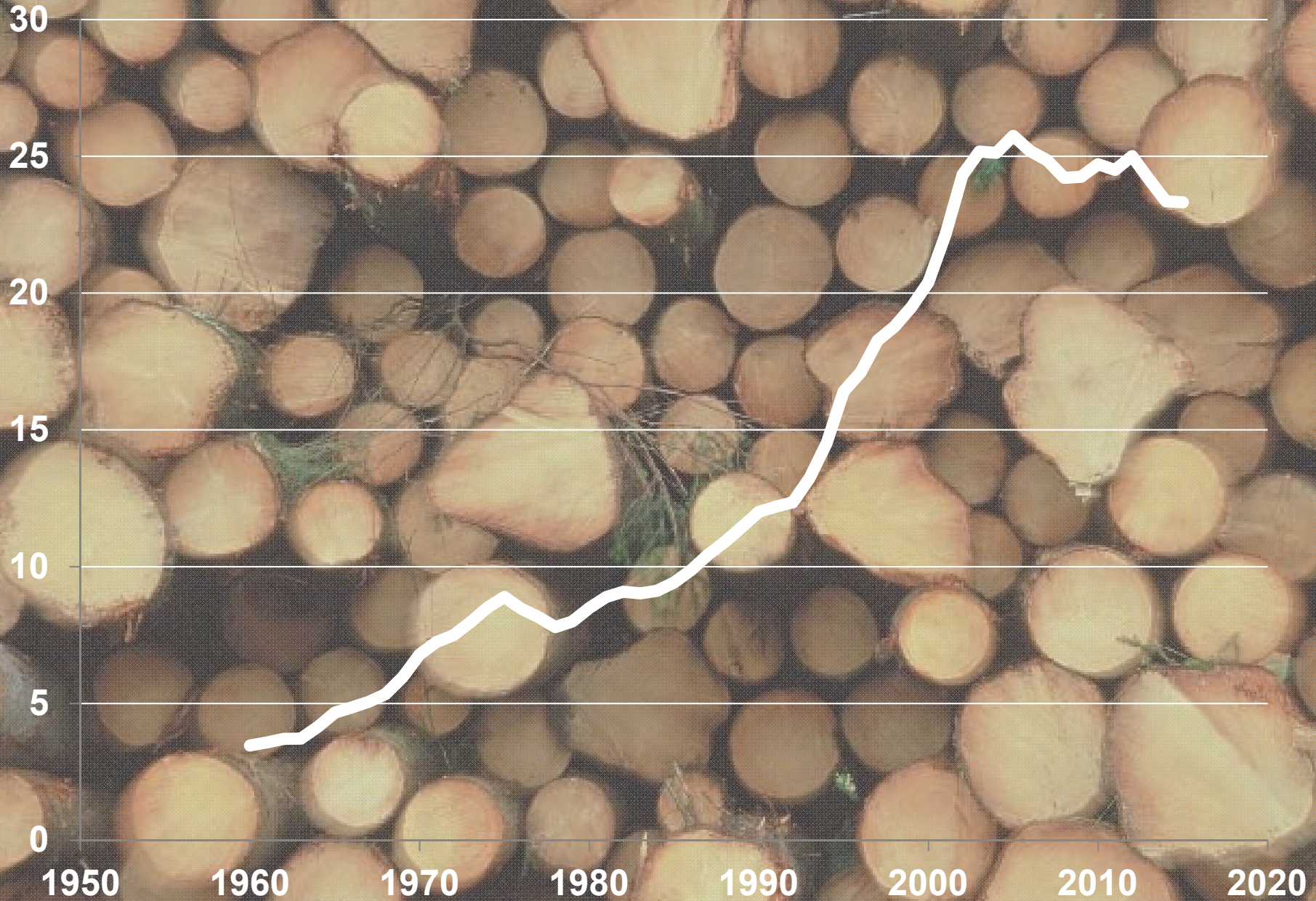
Maria Nordström, Petrus Jönsson, Björn Hannrup and Anders Mörk

Precision Forestry Symposium 2017, Stellenbosch, 28-02-17



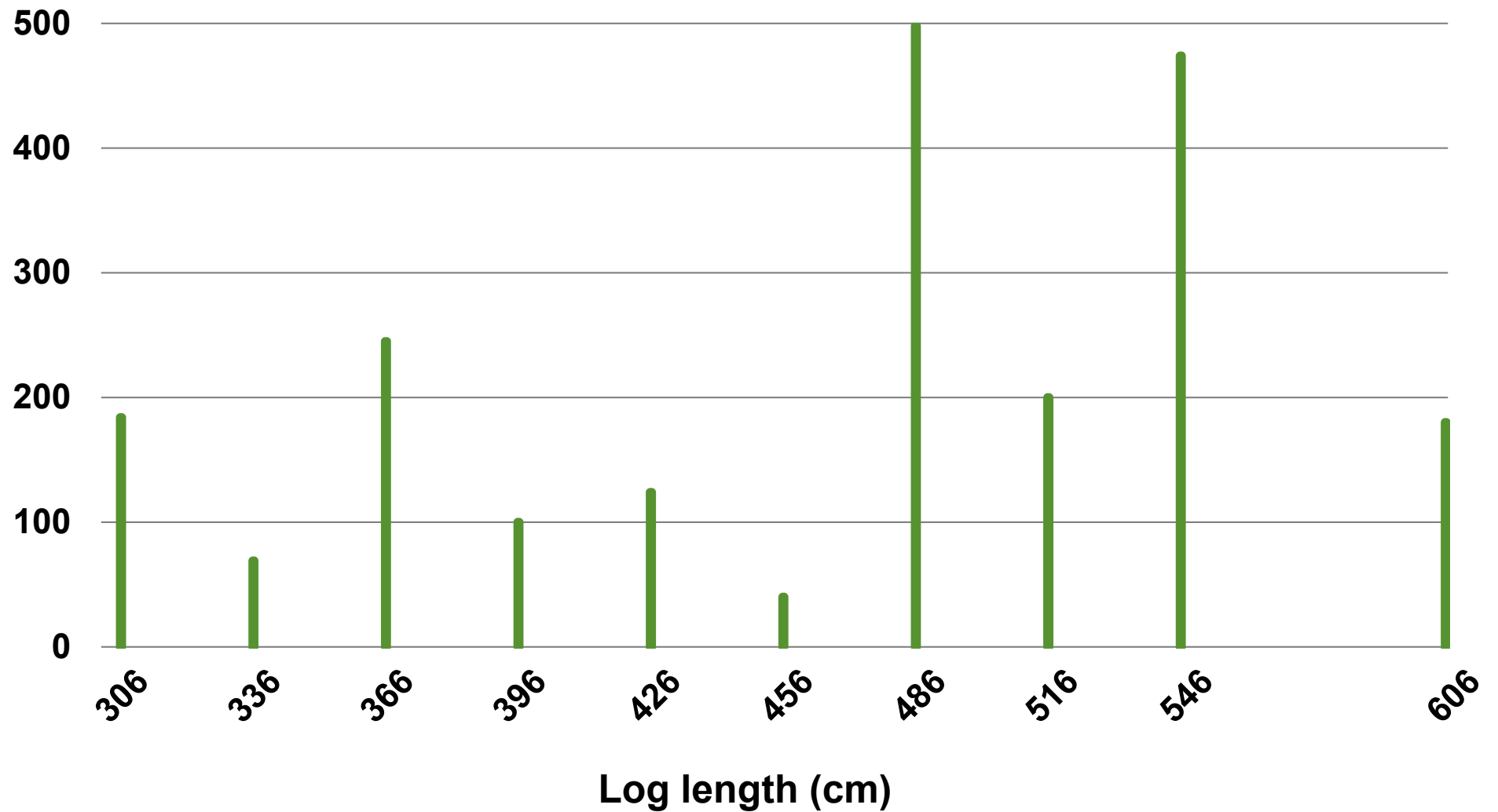
SKOGFORSK

Productivity in Swedish forest operations (m³sub per day's work)



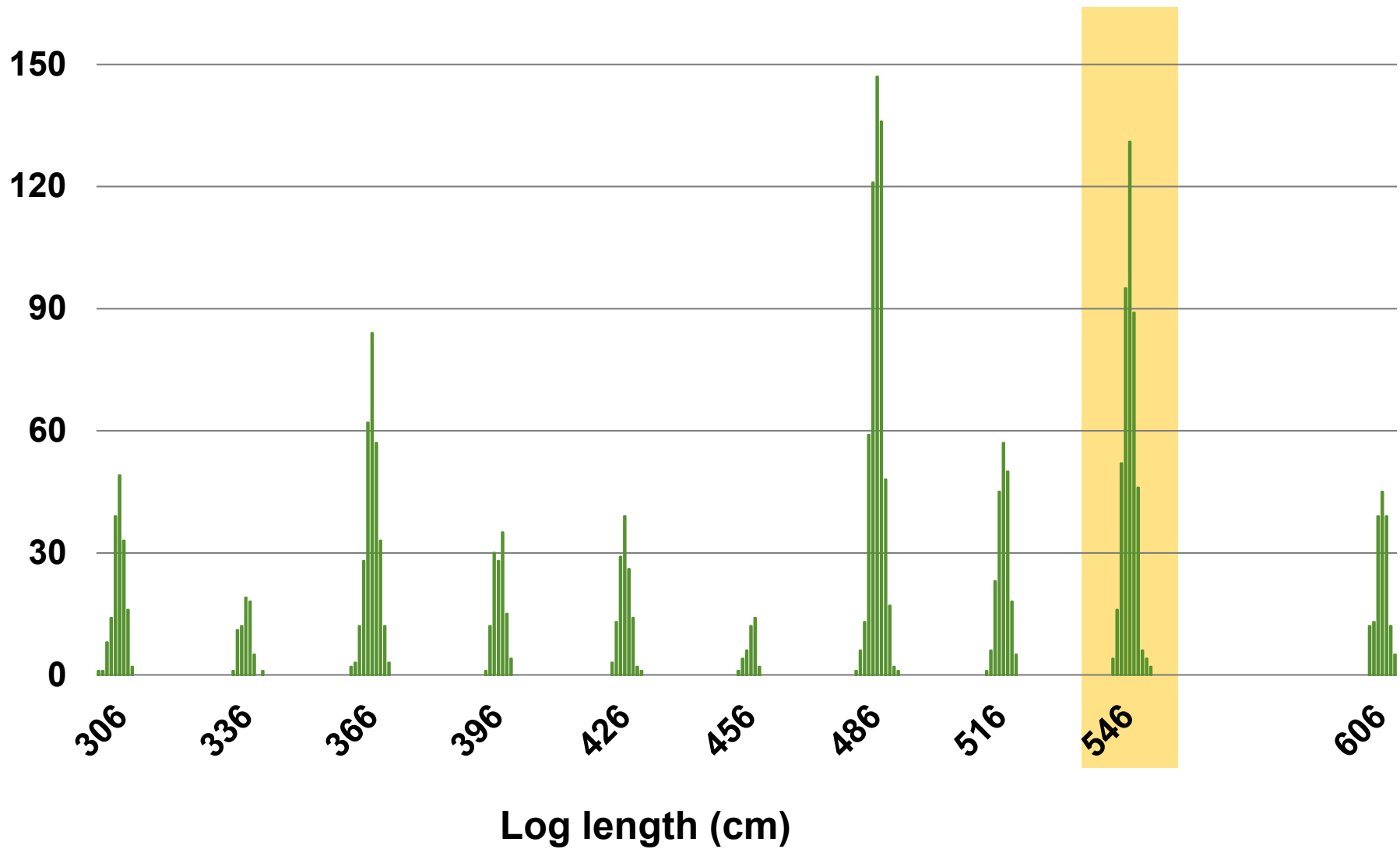
What the sawmill wants...

No of logs

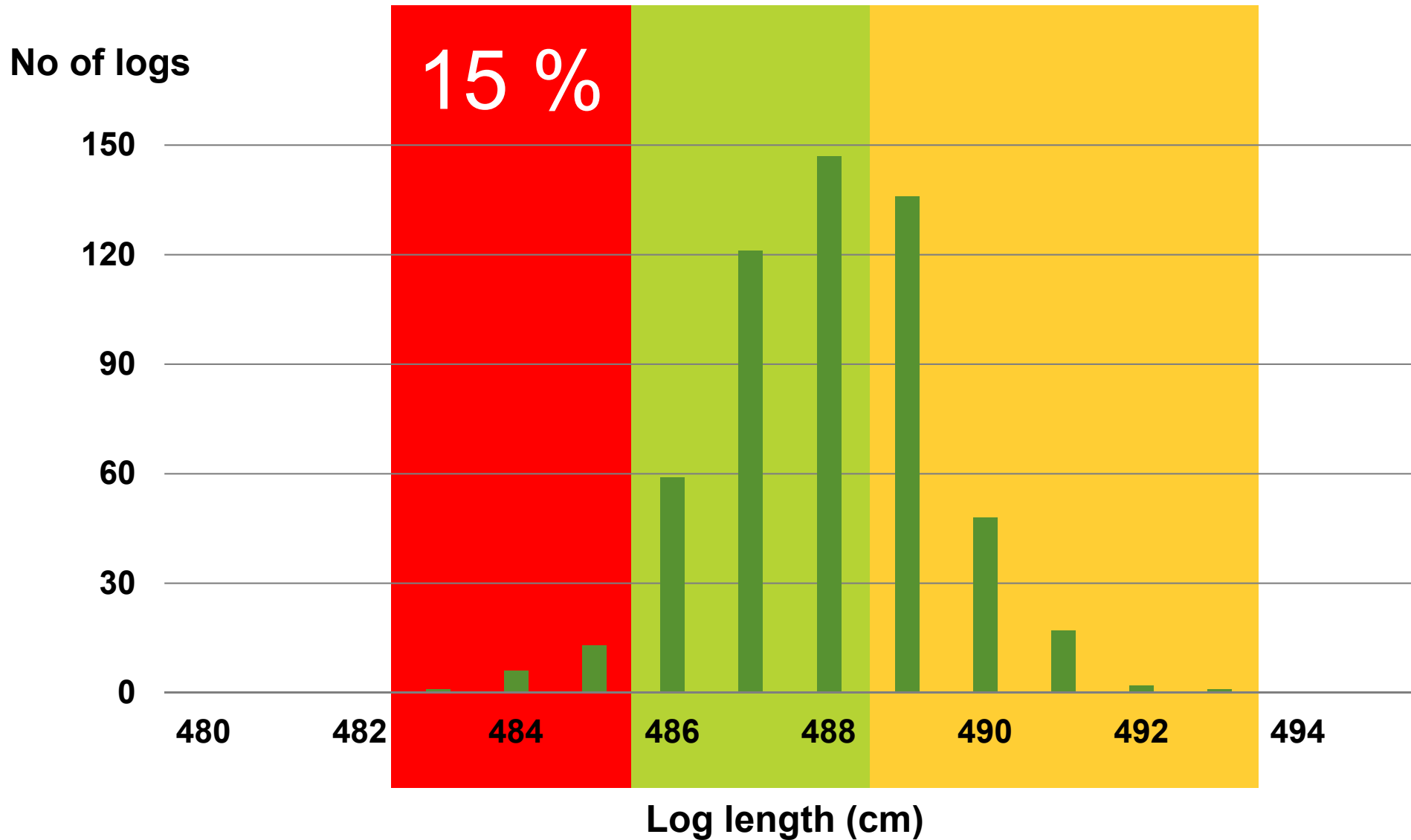


... and what it gets

No of logs



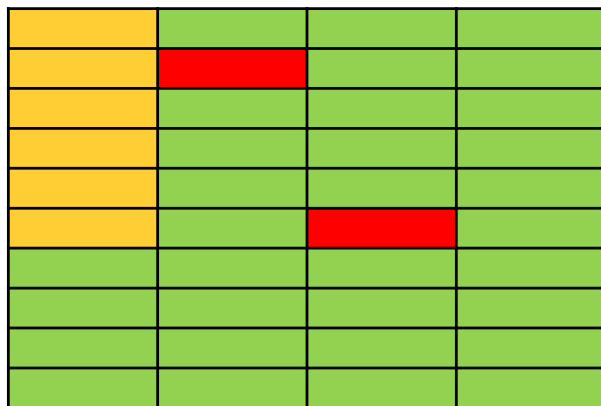
... and what it gets



Sawmills order logs of specific diameter and length

		Diameter (cm)			
		16-17,9	18-20,9	21-28,9	29+
Log length (cm)	306	Yellow	Green	Green	Green
	336	Yellow	Red	Green	Green
	366	Yellow	Green	Green	Green
	396	Yellow	Green	Green	Green
	426	Yellow	Green	Green	Green
	456	Yellow	Green	Red	Green
	486	Green	Green	Green	Green
	516	Green	Green	Green	Green
	546	Green	Green	Green	Green
	606	Green	Green	Green	Green

Sawmills order logs of specific diameter and length



Measurement inaccuracy	Unwanted logs	< Timber
Average	3 %	4 %

Sawmills order logs of specific diameter and length

Yellow	Green	Green	Green
Yellow	Red	Green	Green
Yellow	Green	Green	Green
Yellow	Green	Green	Green
Yellow	Green	Green	Green
Yellow	Green	Red	Green
Green	Green	Green	Green
Green	Green	Green	Green
Green	Green	Green	Green
Green	Green	Green	Green

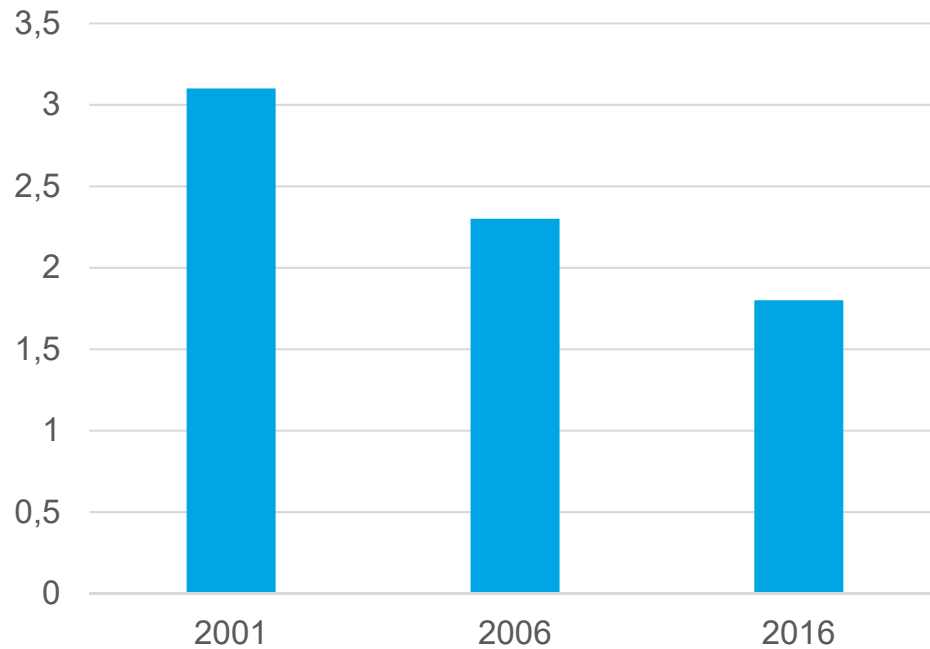
Measurement inaccuracy	Unwanted logs	< Timber
Average	3 %	4 %
Average, need for calibration	4 %	5 %

More accurate measurements of length and diameter in harvesters

Length

Diameter

Stddev (cm)



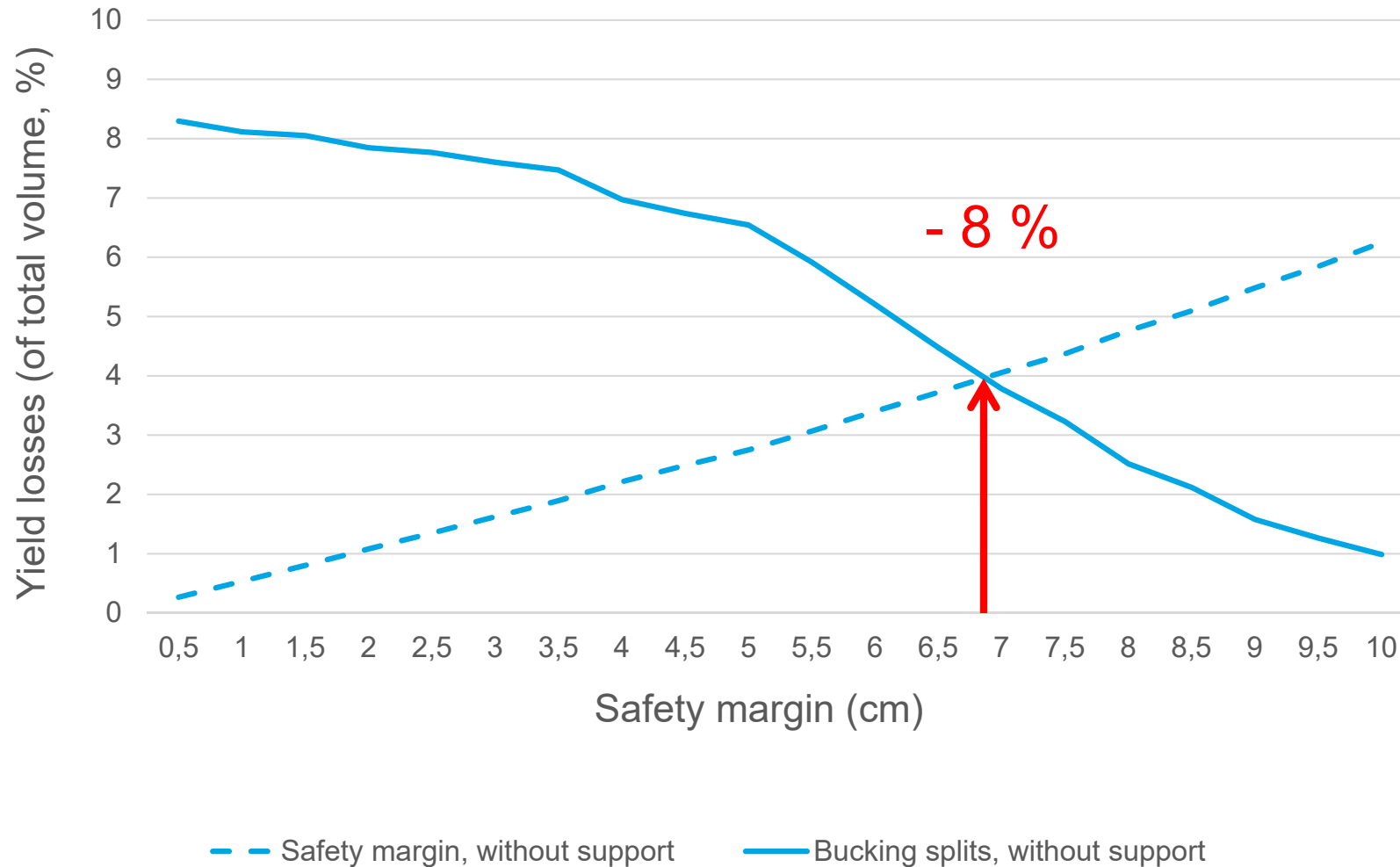
Stddev (mm)



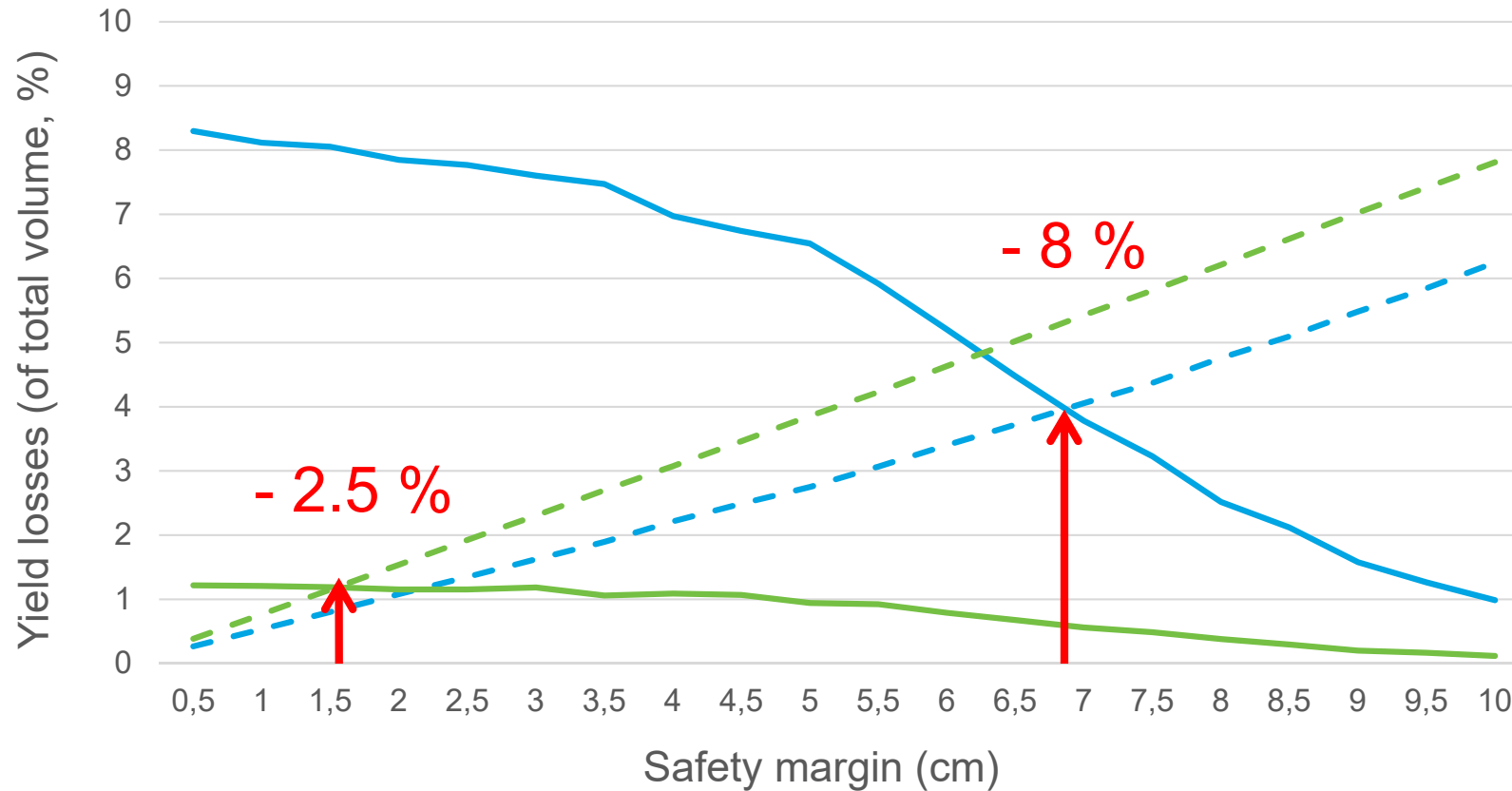
Simulation of yield losses due to bucking splits

- Two cases – cut hanging freely vs with support
- Assumed average measurement accuracy
- Average stem size 0.6 m³sub
- Scenarios with varying safety margins (length)
- Yield losses caused by bucking splits and extra safety margin
- Diameter measurements not considered

Bucking splits cause yield losses



Bucking splits cause yield losses



- - Safety margin, without support
- - Bucking splits, without support
- - Safety margin, with support
- - Bucking splits, with support

In summary

- Accurate length and diameter measurements in harvesters are needed to meet industry demands
- Bucking splits cause substantial yield losses if measures are not taken to avoid them
- Focus on accurate harvester measurements and minimized bucking splits is a key to increase sawmill profitability