Fire risk assessment of thinning with Bracke C16c

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Smallwood

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Technical University of Madrid

Objective

- To quantify and compare the woody fuel load after thinning performed by whole tree systems

Methodology

8 locations in 4 countries

Sample units

Shears, scale and bags

Weighting samples and collecting them for humidity analysis

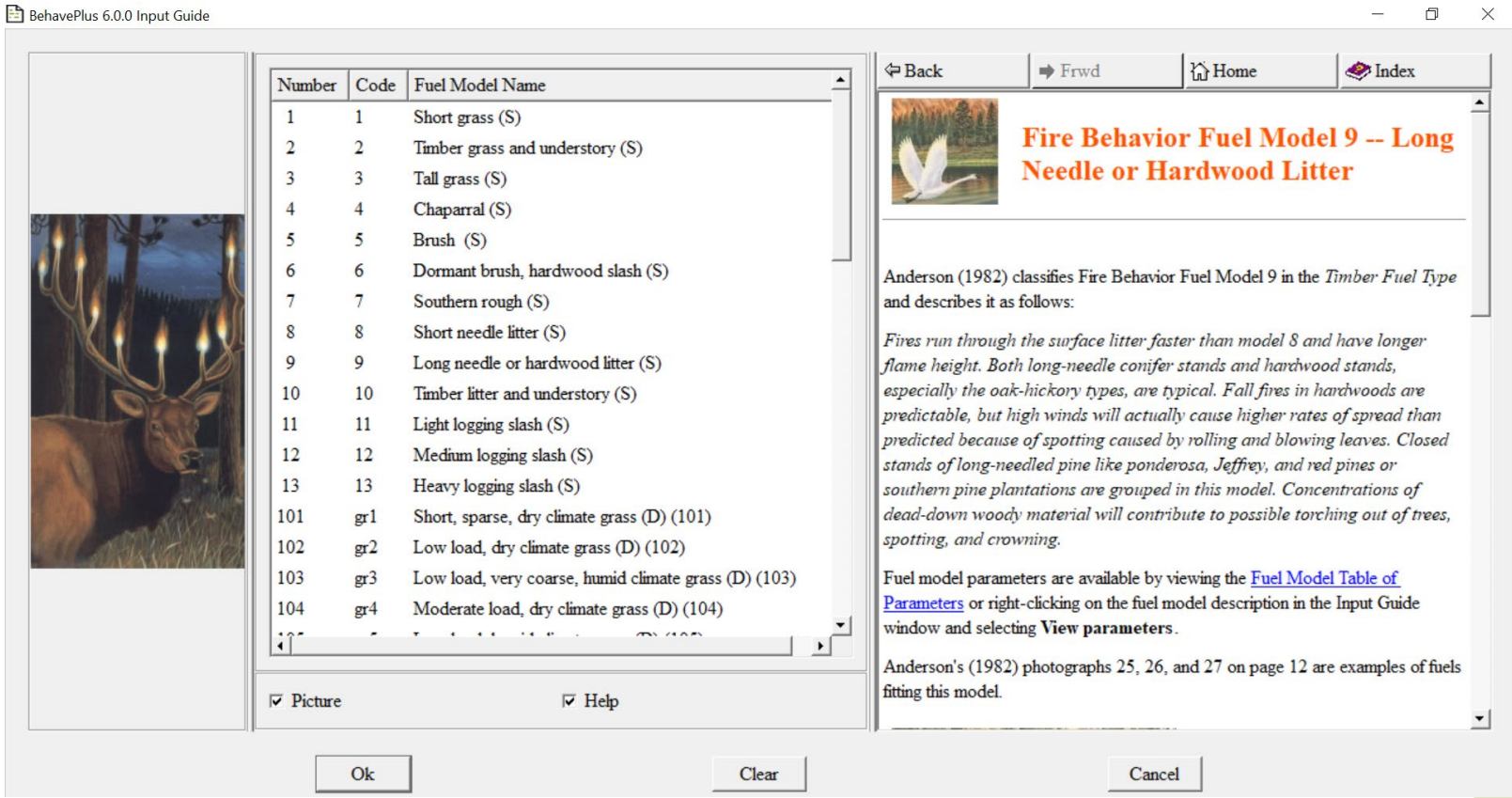
Go No Go Gauge

To separate fractions

Introduction

Fuel Model

[Guide to determine fuel model]

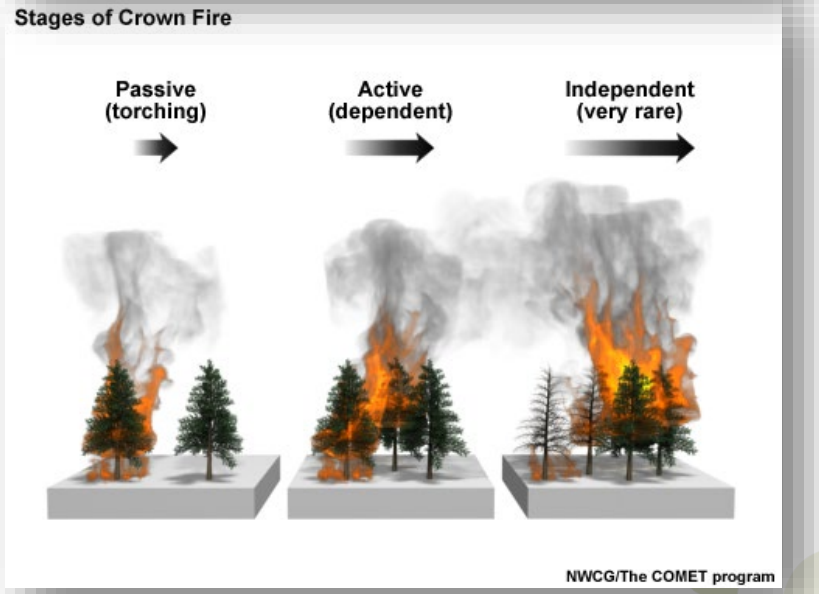


Introduction to fire behaviour

Types of wildfires

Surface

Crown

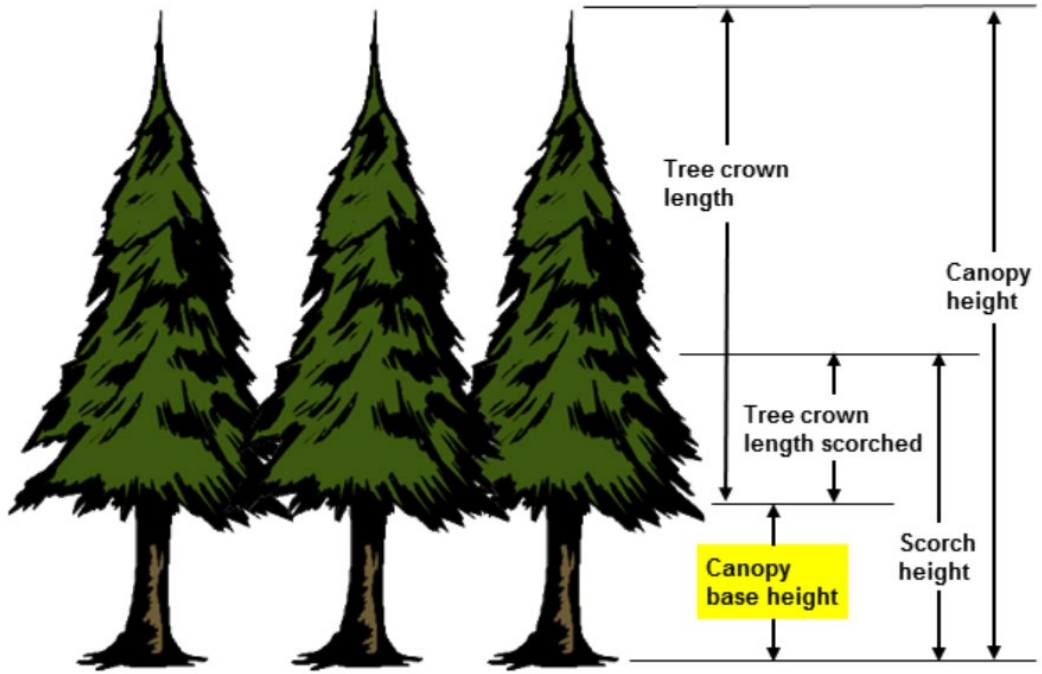


Severity: trees mortality, soil distubance,
buildings & roads afection

Introduction

Main variables determining type of wildfire:

1. Wind speed
2. Humidity of leaves/needles (Meteorological factor)
3. Crown base height and crown bulk density
4. Available surface fuel load, mainly fine woody fuel load



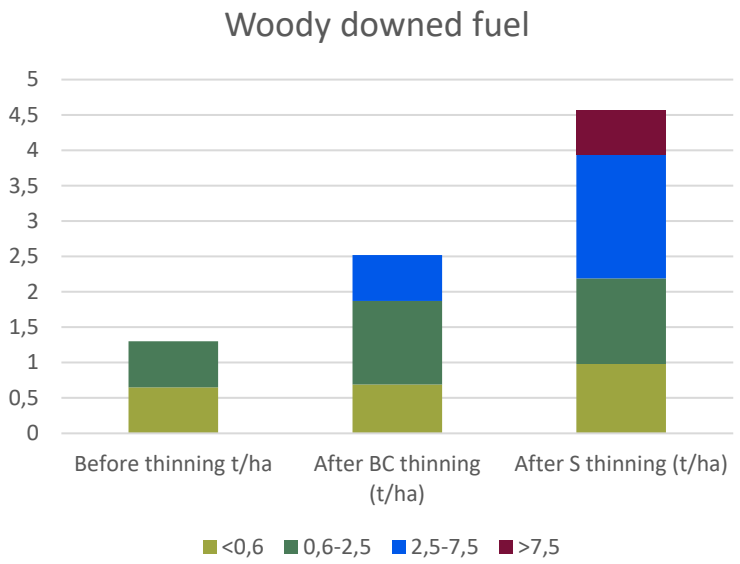
Introduction

Main effects of silvicultural treatments, Agee and Skinner, 2005

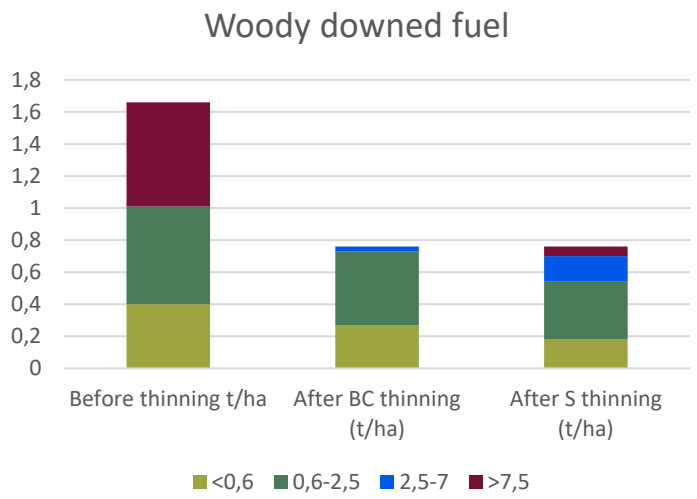
Principle	Effect	
Reduce surface fuels	Reduce potencial flame lenght	These effects interact with weather conditions: wind at stand level and fuel shading at ground level, and are dynamic over the time
Increase height to live crown	Requires longer flame length to begin torching	
Decrease crown density	Makes tree-to-tree crown fire less probable	
Keep big trees of resistant species	Less mortality for same fire intensity	

RESULTS

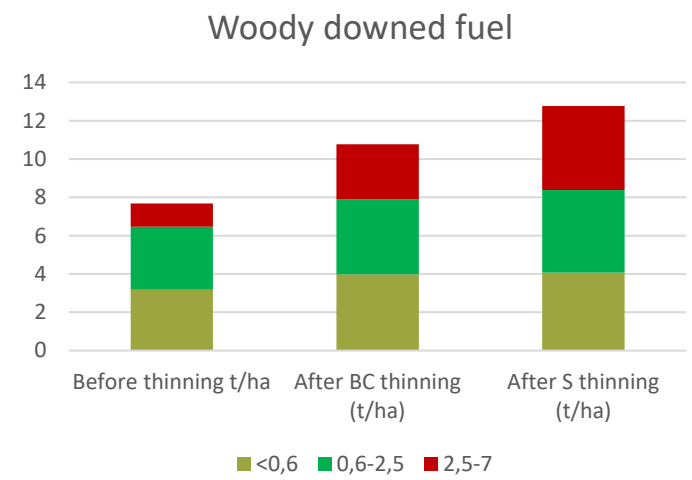
Woody fuel load



Sweden



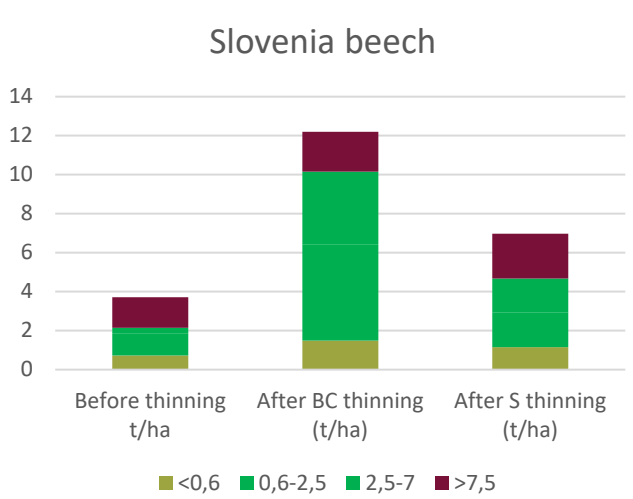
Finland

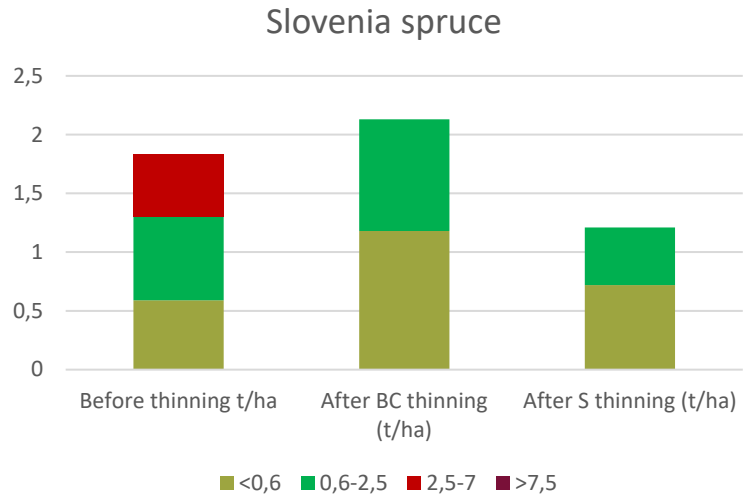


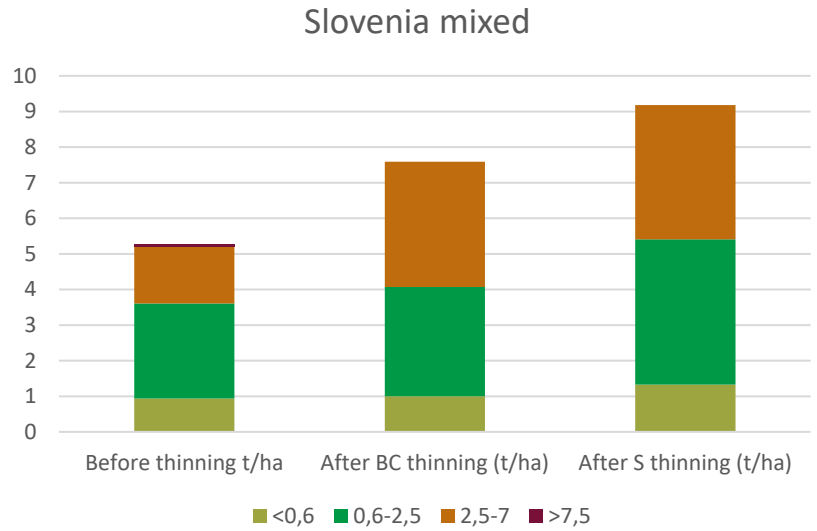
Spain

RESULTS

SLOVENIA







BEECH (*)

Statistically different

SPRUCE

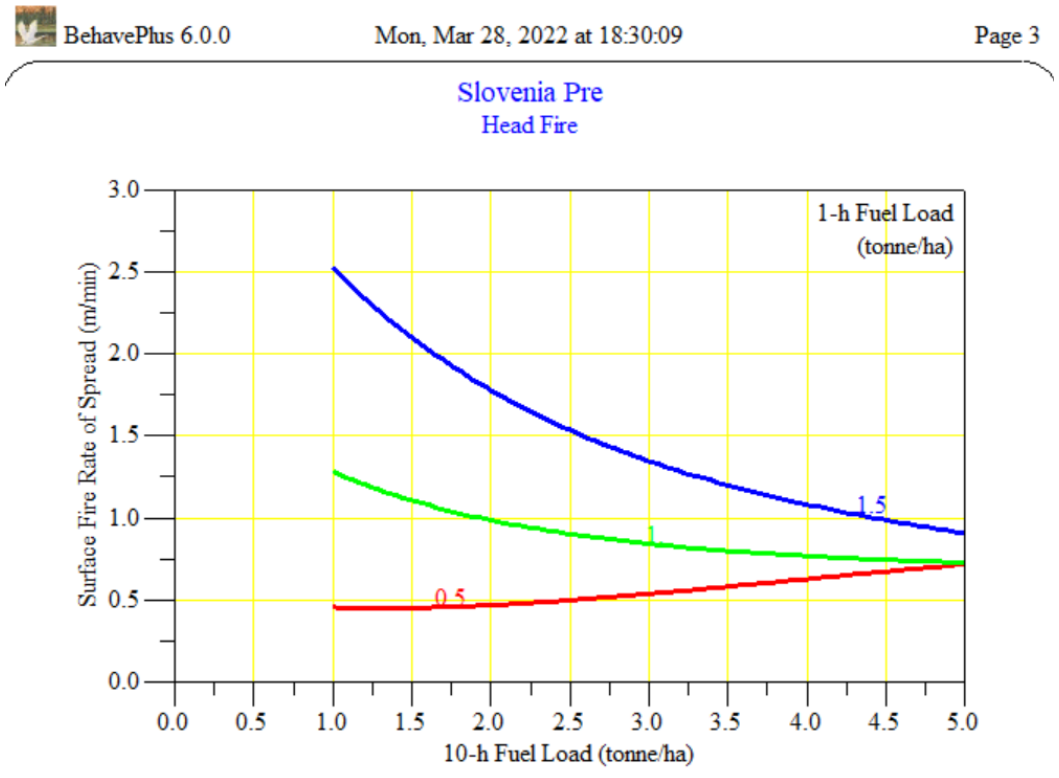
MIXED

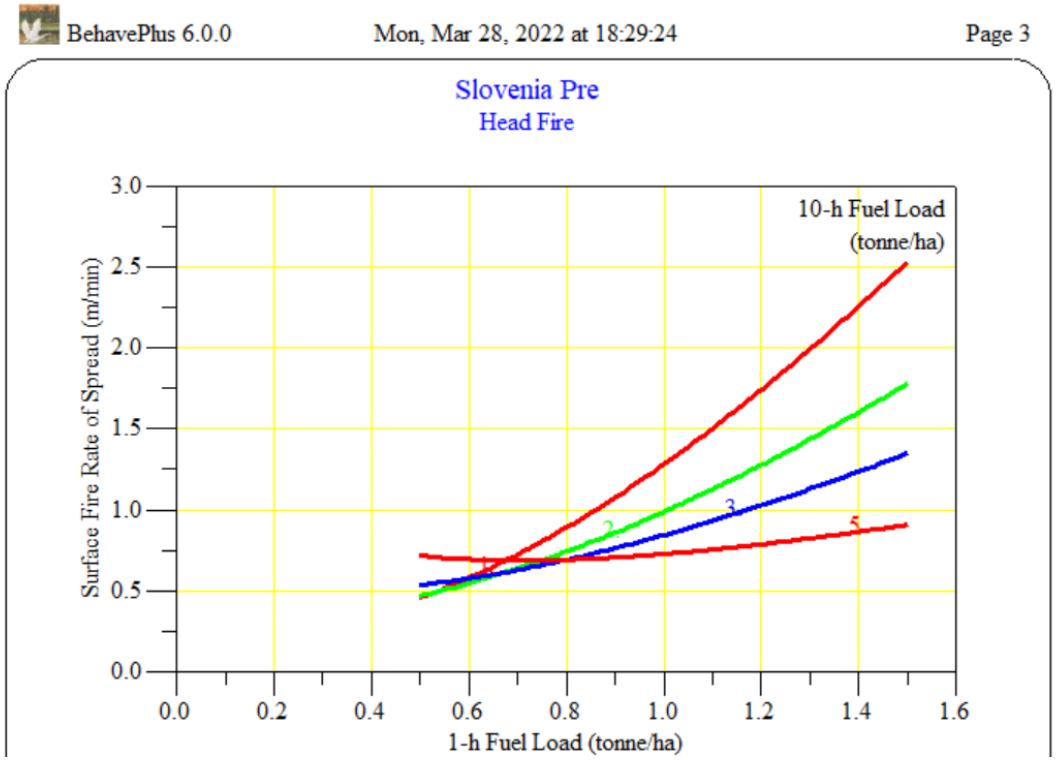
Results

SLOVENIAN BEECH STAND

RESULTS

RATE OF SPREAD Simulation results from BEHAVEPLUS 6.0

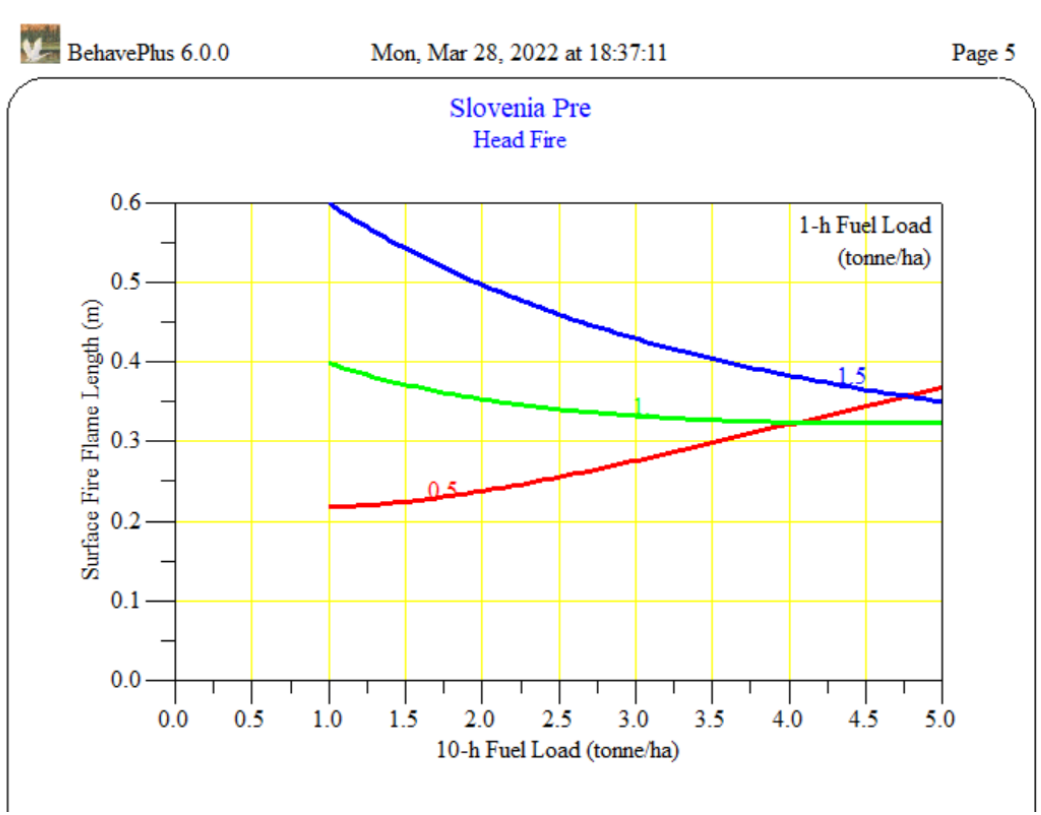


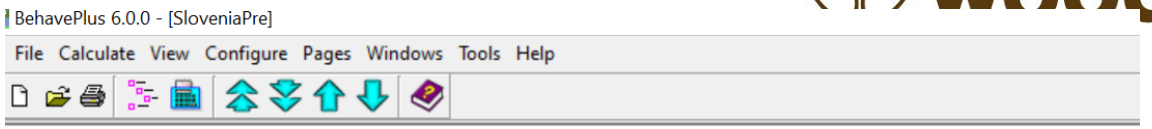


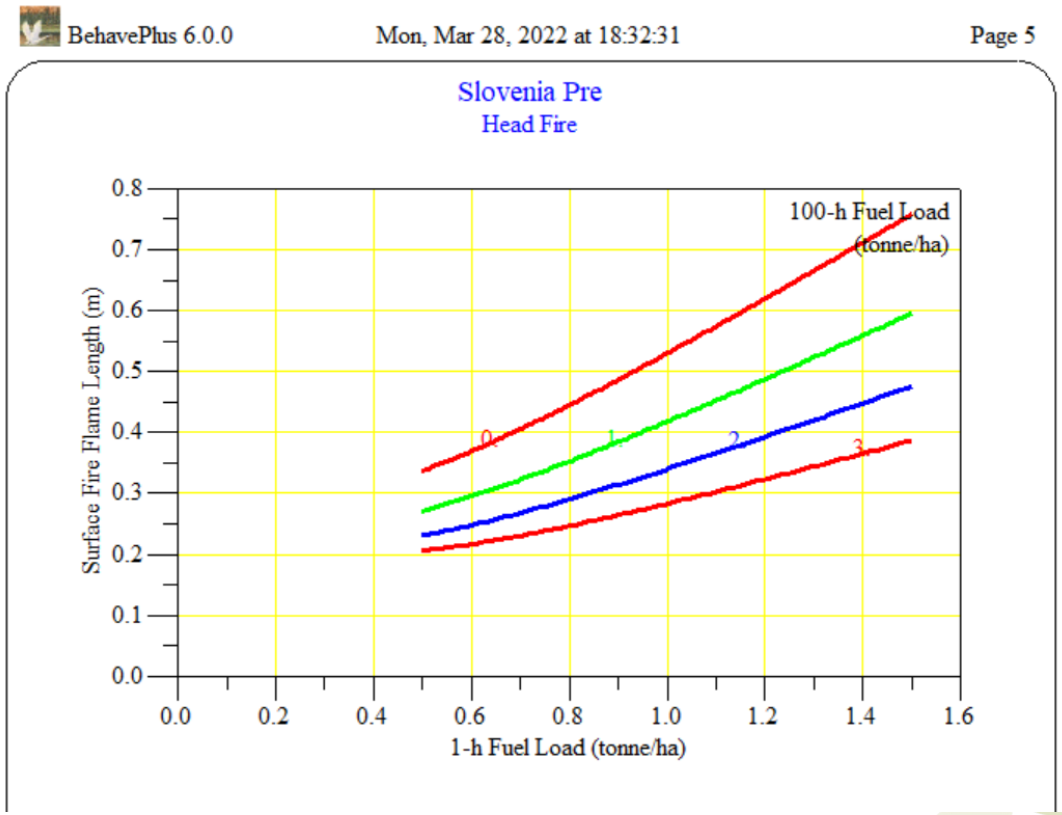
EXPERIMENTAL DESIGN	FIELD DATA		
	1h (ø<0,6 cm)	10 h (0,6cm <ø<2,6 cm)	100h (2,6cm <ø<7,5 cm)
	Dried tonne/ha		
Pre thinning	0.7	1.1	0.3
Post thinning (BC)	1.5	4.9	3.7

RESULTS

FLAME LENGHT







RESULTS

Mechanized whole-tree system does not increase surface downed woody fuel loads

No difference has been found between the two whole tree system options: BC and S

The only trial in which there has been an increase in the woody fuel load has been in thinning on very high density beech stands, and the increase of the 1 h, 10 h and 100 h fractions have produced opposite effects on flame lenght and rate of spread.

CONCLUSION

Mechanized whole tree system adds to the benefits of thinning the saving of any surface fuel load treatment such as prescribed burning or mastication.

Thanks!

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