Precision Silviculture Partnership

Current practices & challenges for Thinning Operations

Presenter: Lania Holt

Meeting Date: Scion, 19 April, 10am-2.30pm

FOREST GROWERS RESEARCH

AIM

- **Thinning Workstream, Precision Silviculture Programme (PSP)**
  - **Current state of play – share, learn; future – workplan, vision, guide**
  - **Two activities (4.5 – forest system design & 4.6 – preselection for pruning & thinning)**
  - **Four milestones due by June 2023**
    - **Milestone 1 – Industry survey on thinning methods & practices in NZ**
    - **Milestone 2 – Industry workshop on thinning with focus on tree selection, forest design & priorities for PSP investment**
    - **Milestone 3 – Report combining workshop summary & survey results**
    - **Milestone 4 – Completion of revised workplan & roadmap for PSP 4.5 & 4.6**

AGENDA

10am	Tea / coffee	All
10.10am	Welcome – Introduction, thinning within the Precision Silviculture programme	Brian
10.20am	Workshop – agenda, aim	Lania
10.25am	Current situation & practices	
	Present thinning survey results, geospatial analysis of slope	
10.45am	Reality check exercise	
11.15am	Works well / pain points for a thinning contractor (manual, mechanical), Q&A	Practitioner (tbc) / All
11.35am	Works well / pain points for a thinning ops manager, Q&A	Practitioner (tbc) / All

AGENDA

12pm	Lunch	All
12.30pm	Opportunities	Yvette
	Forest system design, silvicultural pre-selection, state of art technologies, methods	Practitioner (tbc) / All
1pm	Transformation, continuous steps to progress	
	Brainstorming exercise	
1.30pm	Roadmap development	Lania
2.15pm	Wrap up	Brian
2.30pm	Workshop – end	

ABOUT THE WORKSHOP

- **Current – raise & discuss ideas (what works/doesn't work), Future - identify activities, milestones, priorities**

- **Presentations – clarifying questions, use 'raise' option**
- **Round table discussion – mute, share screens**
- **Parking notes will be shown onscreen**
- **Recording workshop**

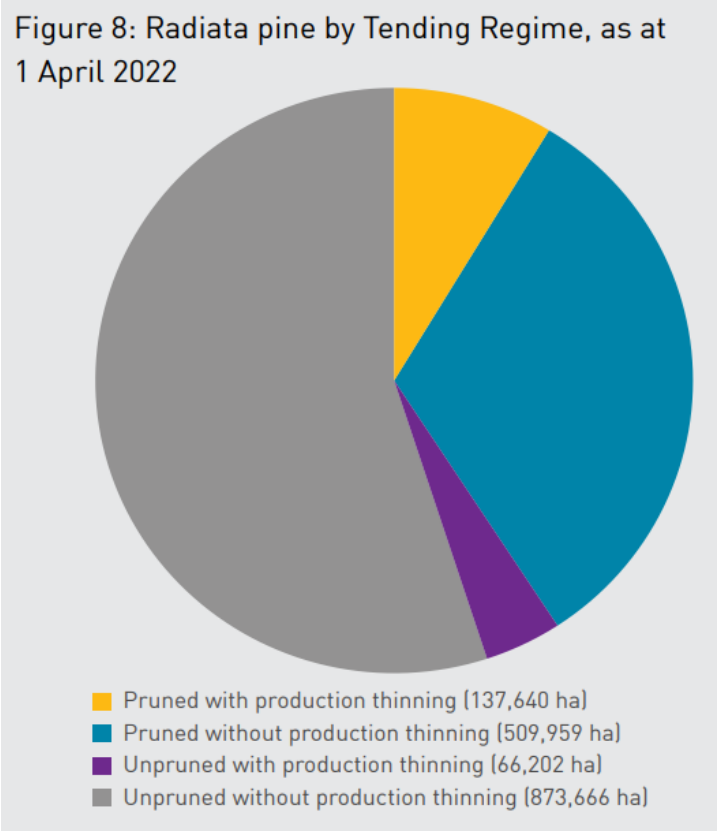
Introduce workshop people

CURRENT SITUATION & PRACTICES

Production thinning

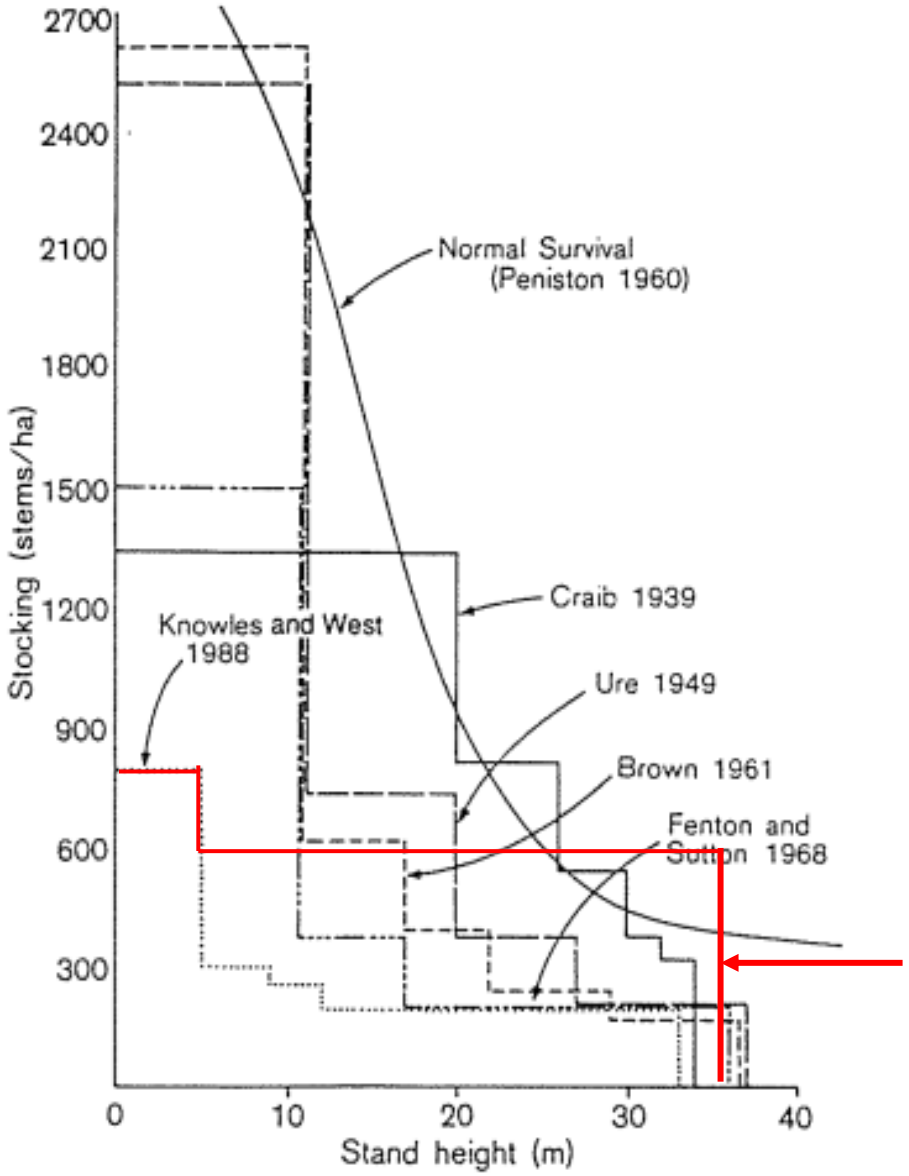
- **~13% of pine planted forests**
  - **165,820 ha North Island**
  - **38,022 ha South Island**
- **Area of production thinned forest declined over the past decade**
- **Trend towards minimal tended forests**

NEFD 2022



CURRENT SITUATION & PRACTICES

- NZ theory
  - ~7,300 ha thinned p.a.
  - Potential ~60,000 ha thinned p.a.
  - Opportunity cost …
    - Growth
    - Pest & fire (& employment)
- NZ reality
  - Plant & leave regime
  - Slope / terrain limitations
  - Cost v benefit

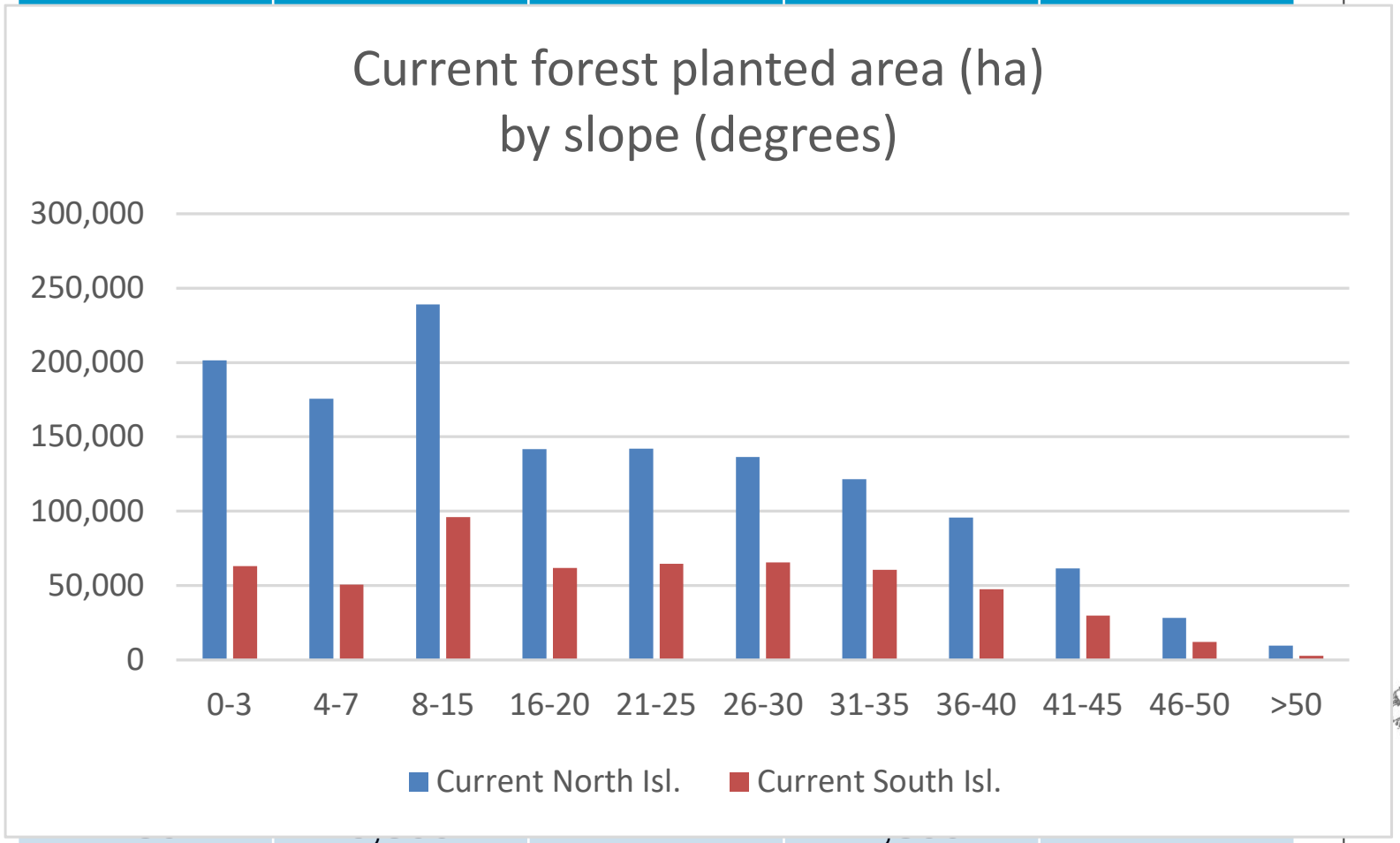


Watt et al 2016,
Moore et al 2018,
Dash et al. 2019 ?

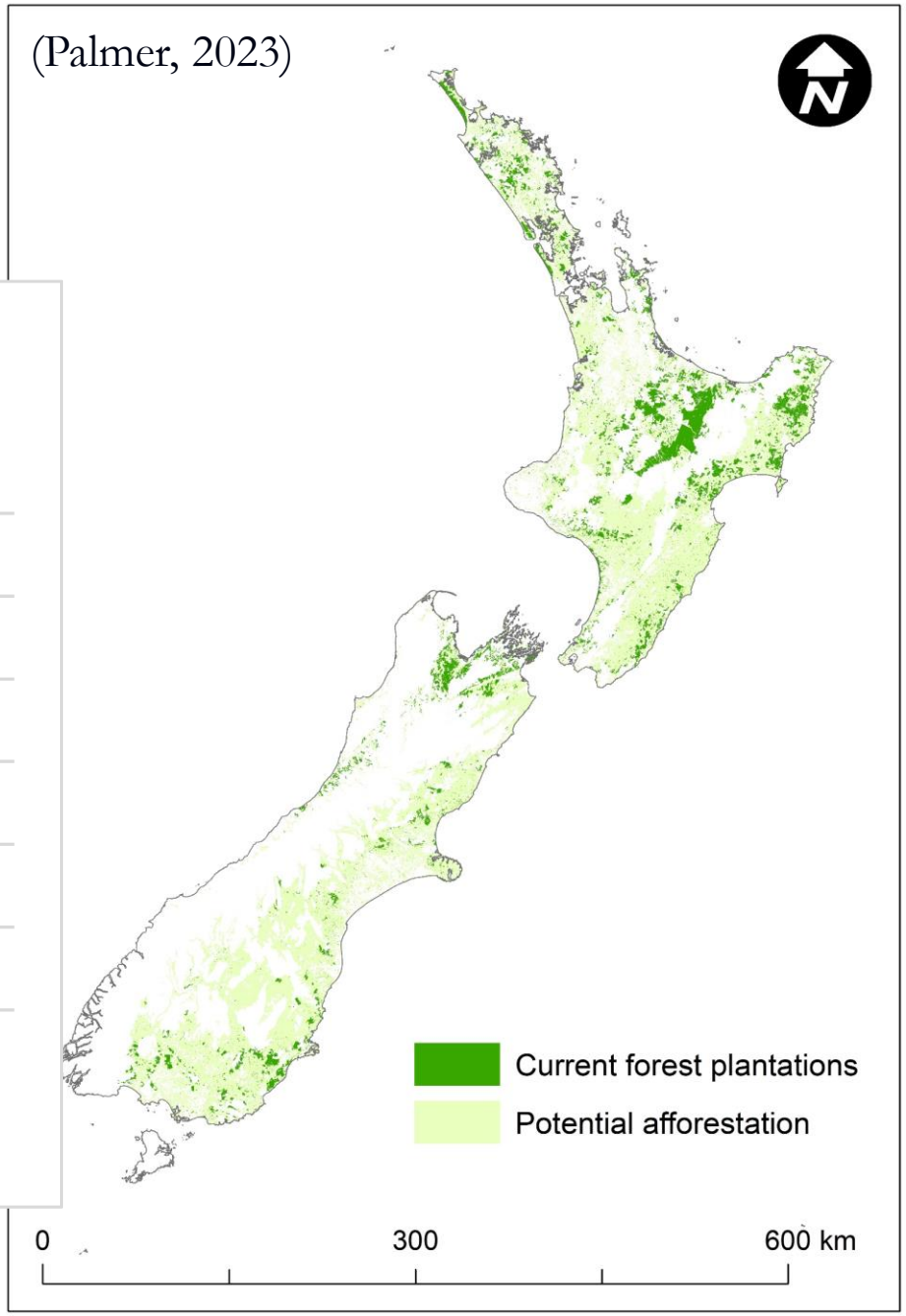
(James 1990)

CURRENT SITUATION

- **Area (ha) by slope (degrees)**



Total	**1,351,700**	**2,076,100**	**553,300**	**3,023,800**



SURVEY

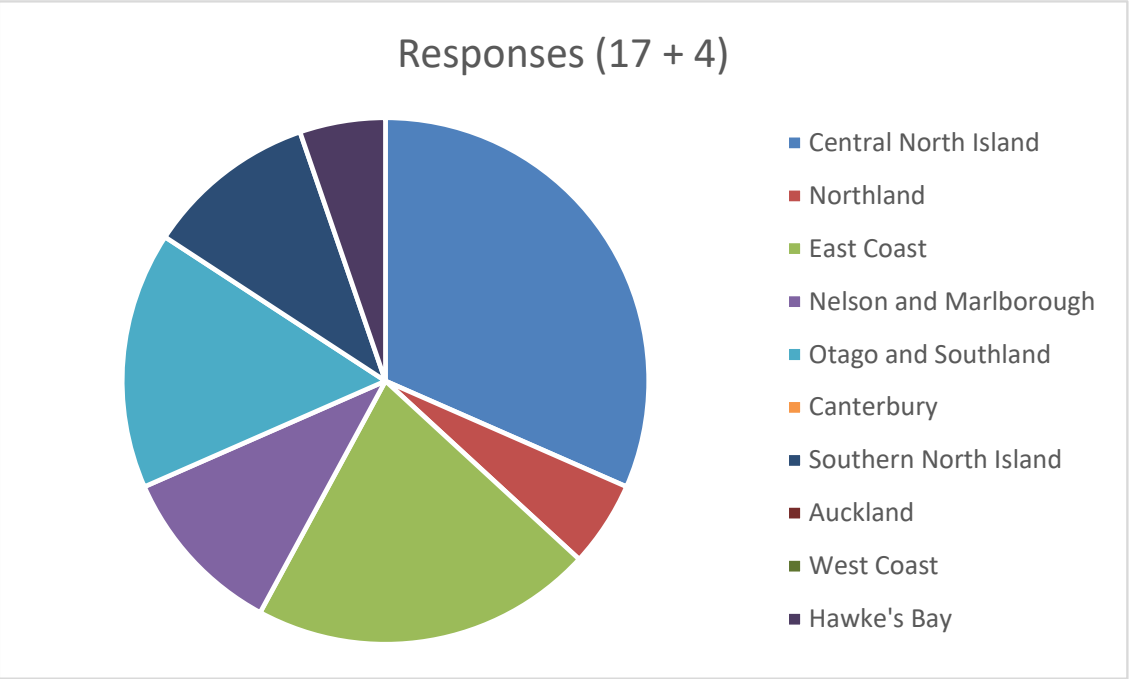
Metadata

- **100% (17) thin to waste**
- **29% (5) production thin**

- **23,350 ha thinned p.a.**
- **64.5 thinning crews**

- **Represents ~60% of NZ forestry companies (by area)[1]**
- **Limited representation of small forest growers**

17 practitioners, 4 associates



[1]FGT Facts & Figures 2021-22, p.12

SURVEY – thin to waste

By type

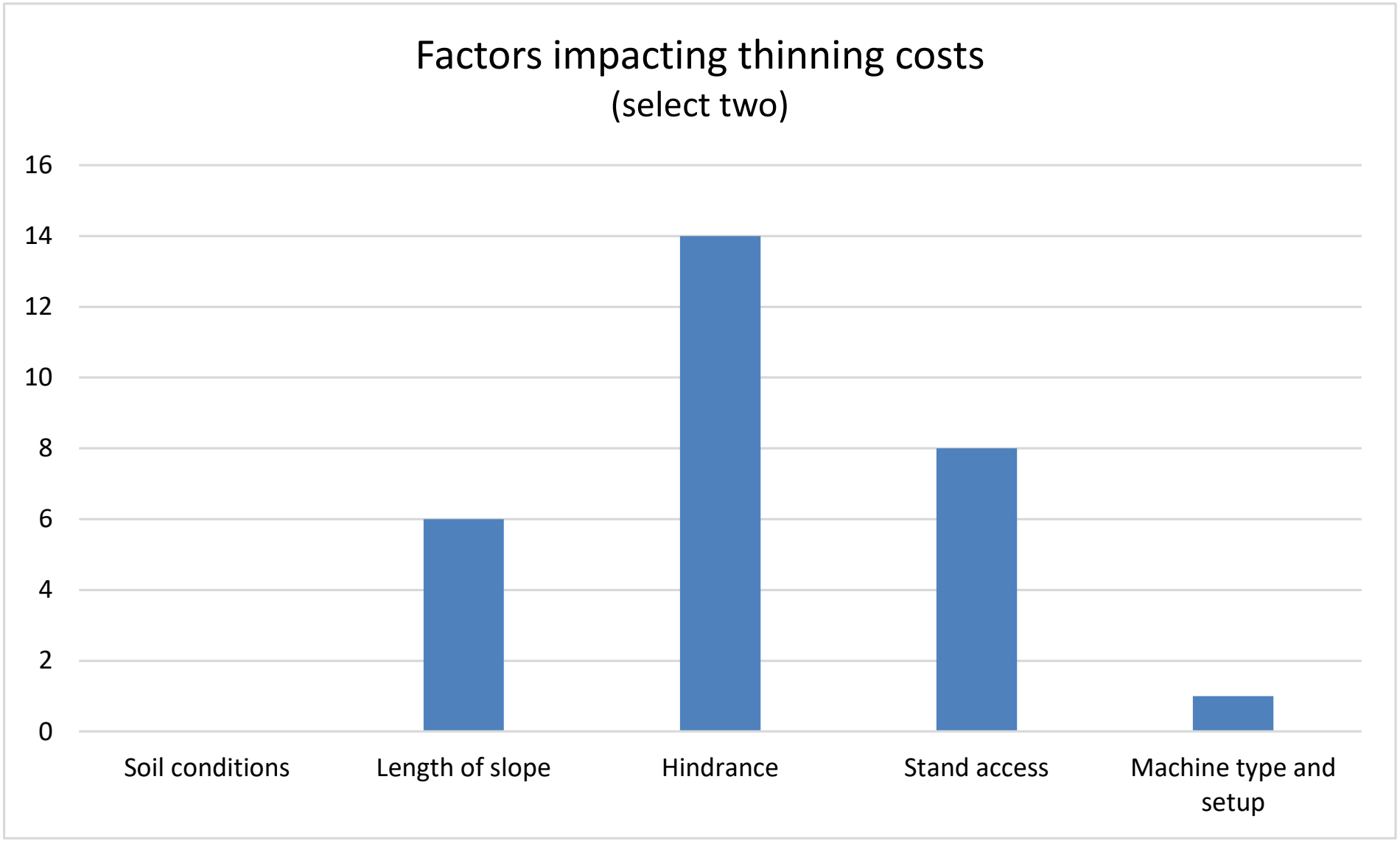
	Manual	Mechanical
Annual area thinned (ha)	20,850	2,500
Max. slope (degrees)	50+	30-35

Costs ($ per ha)

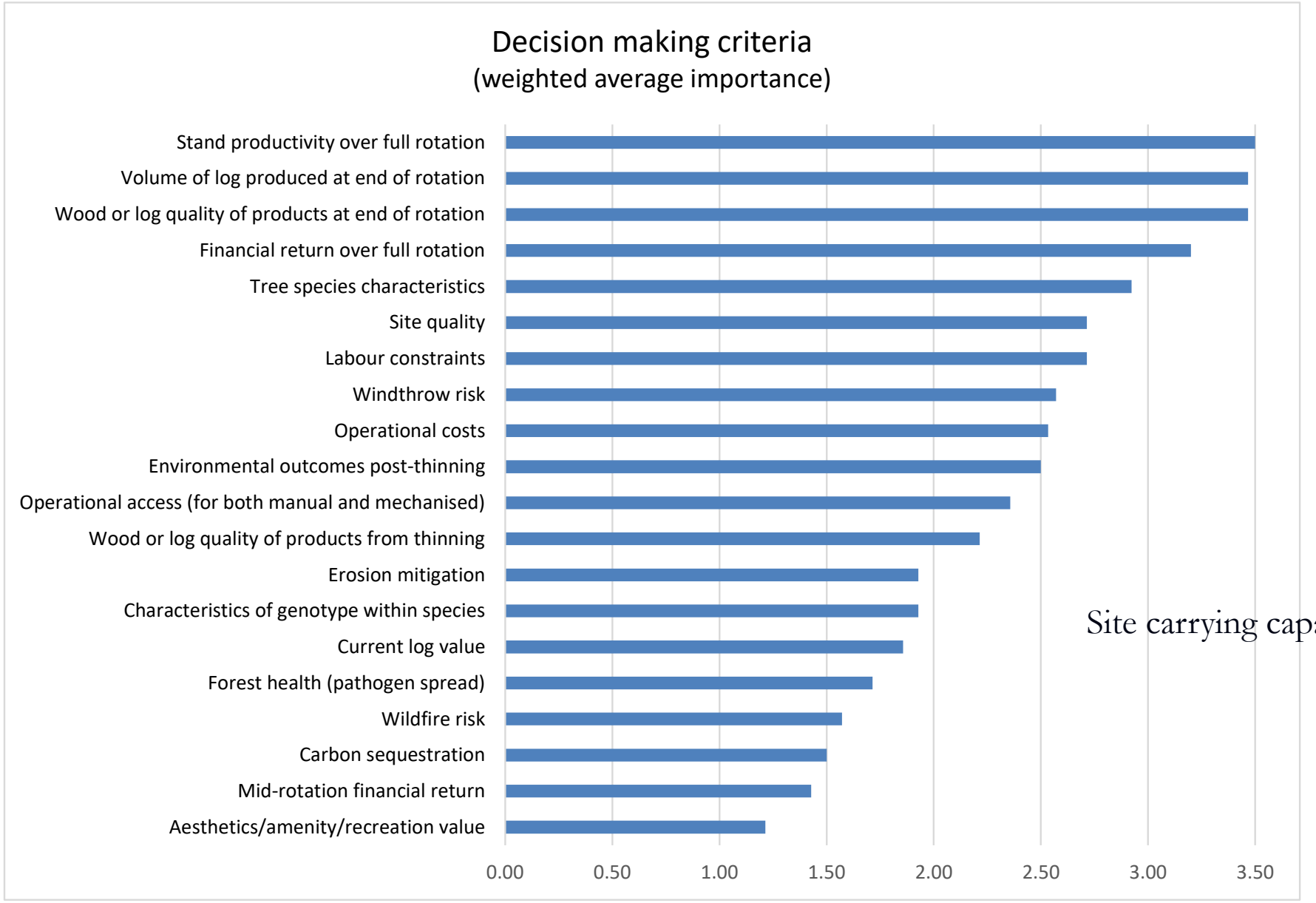
- **Manual**
  - **Productivity in steeper difficult sites reduces due to > transport costs & hindrance**

Site	Min.	Max.	Av.
Easy – Manual	450	1200	797
Easy – Mechanical	600	700	633
Difficult – Manual	1000	2000	1243
Difficult - Mechanical	850	2500	1483

SURVEY – thin to waste



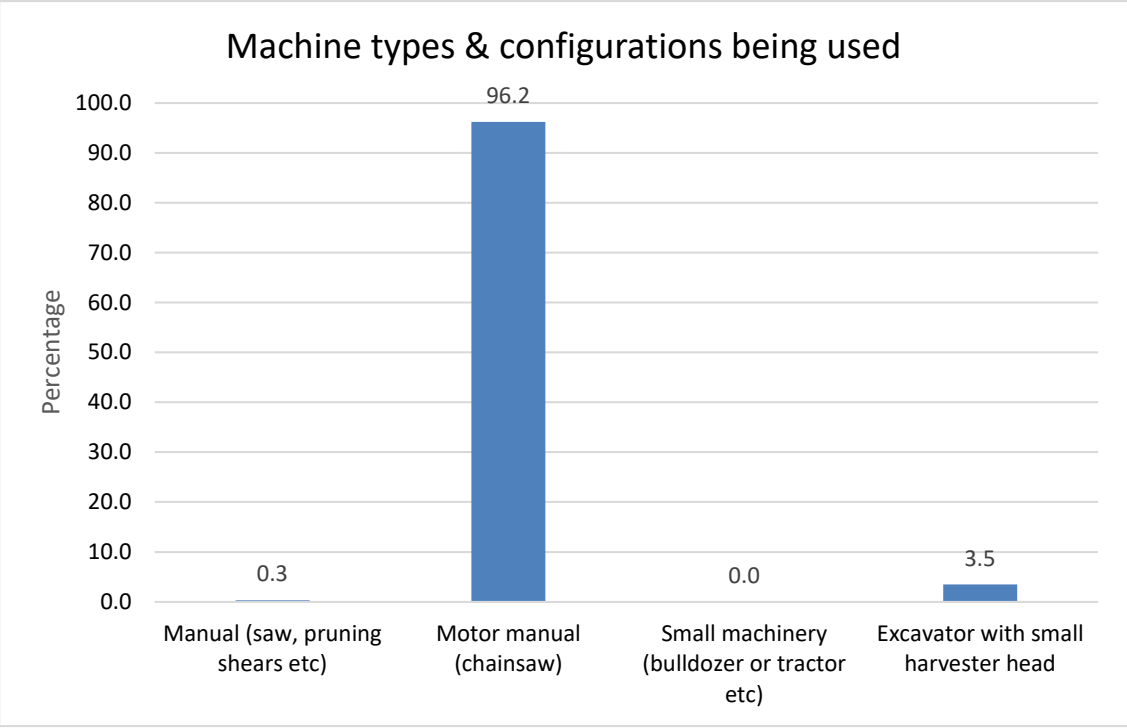
SURVEY – thin to waste



Site carrying capacity

SURVEY – thin to waste

Average of responses



Comments

- Other dedicated machinery
  - 14 tonne excavator
  - Small excavator base with shear heads

SURVEY – thin to waste

Damage

	Manual	Mechanical
Residual trees	<1% 1-5%	1-5%
Soils & site	<1%	1-5% 6-10%

Other concerns

- **Manual**
  - **H&S, tree selection & stocking, labour (cost, availability, experience, chemical v chainsaw risks)**
- **Mechanical**
  - **Suitability, low cost extraction, scale / enough work, damage to residual trees, removing too many trees, regen, cost of machinery, contour planting not allowing for access**

SURVEY – production thin

By type

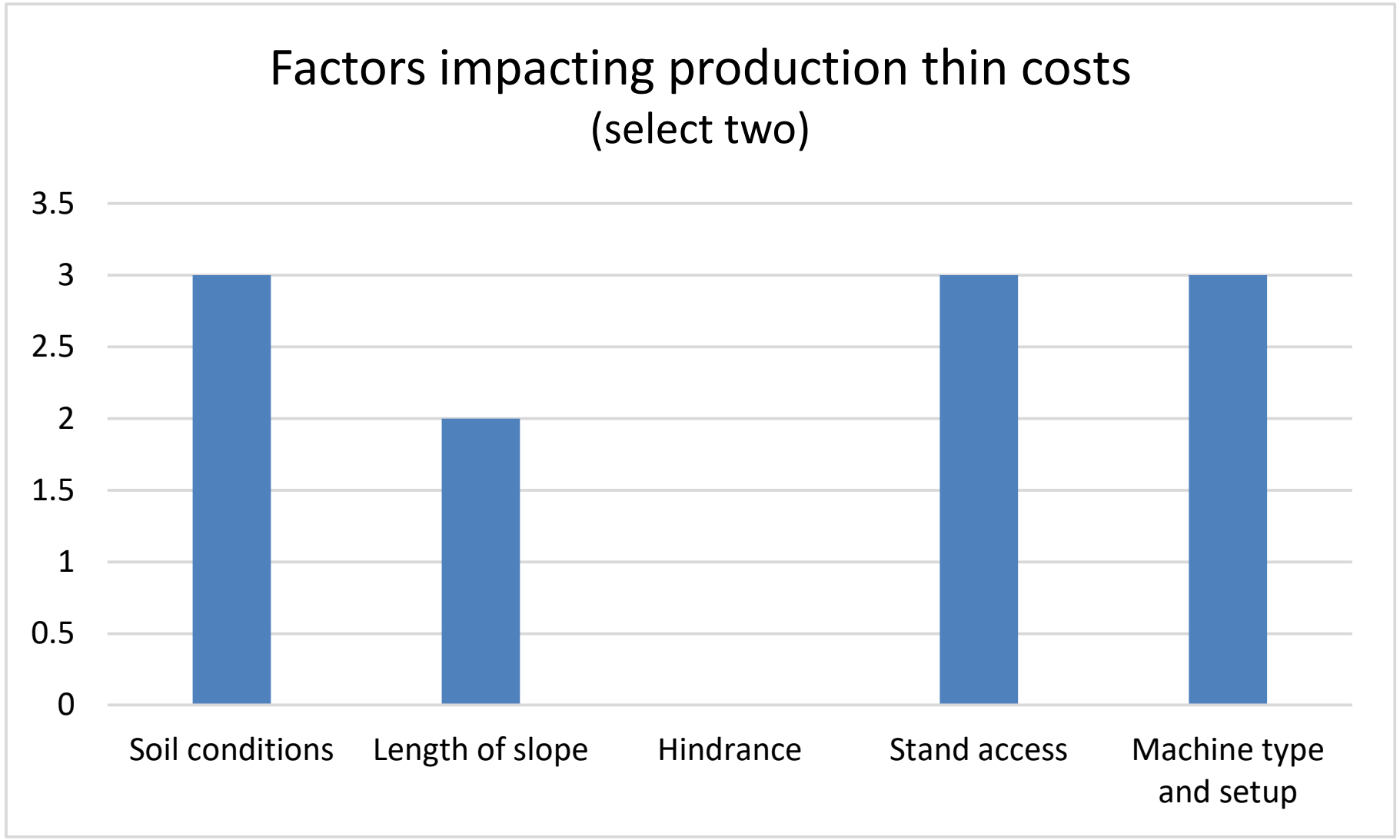
	Manual	Mechanical
Annual area thinned (ha)	-	3,465
Max. slope (degrees)	-	25-30

Costs

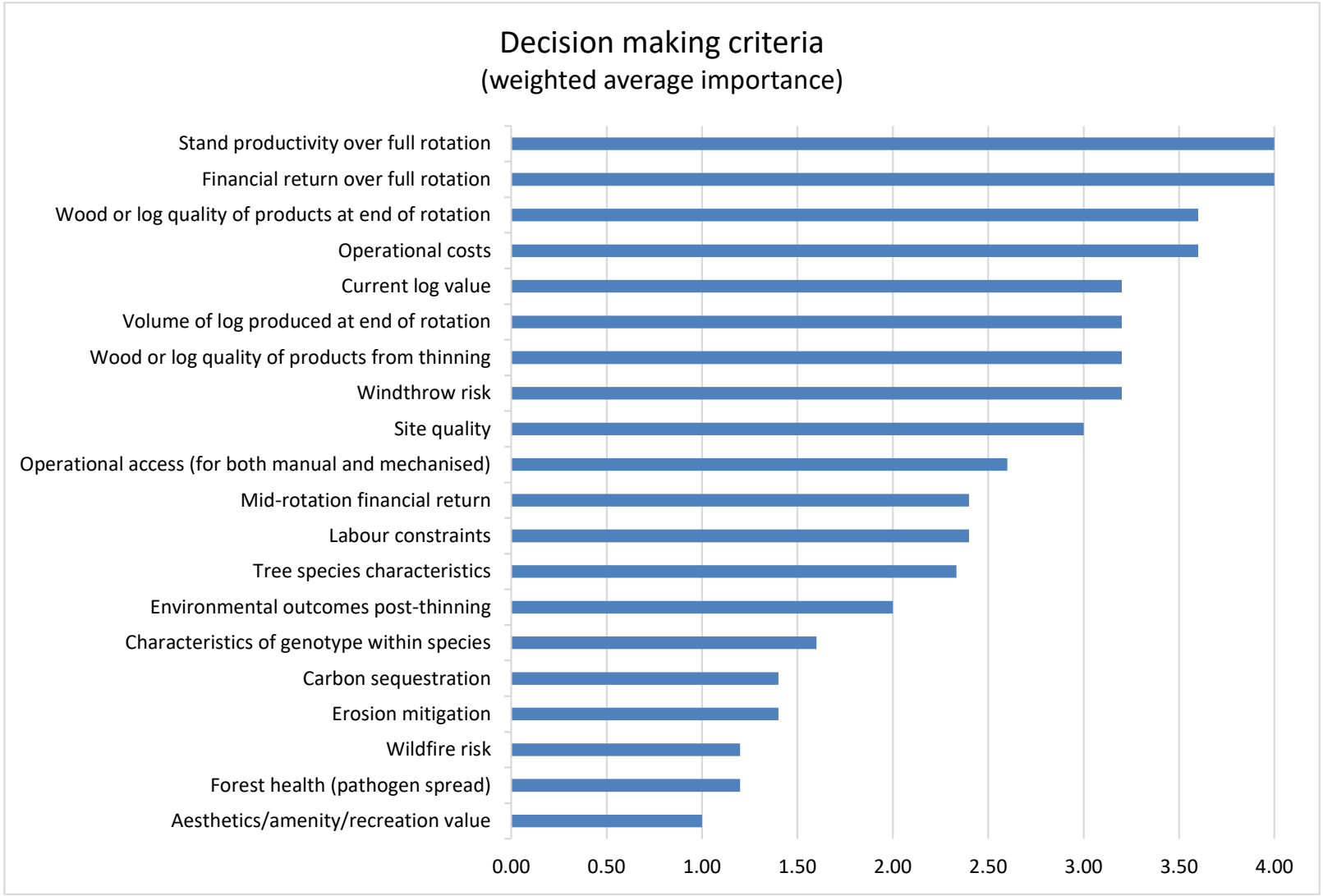
- **5 responses, no manual production thinning**
- **Costs $/t**

Site	Min.	Max.	Av.
Easy – Manual	-	-	-
Easy – Mechanical	33	40	38
Difficult – Manual	-	-	-
Difficult - Mechanical	41	60	52

SURVEY – production thin

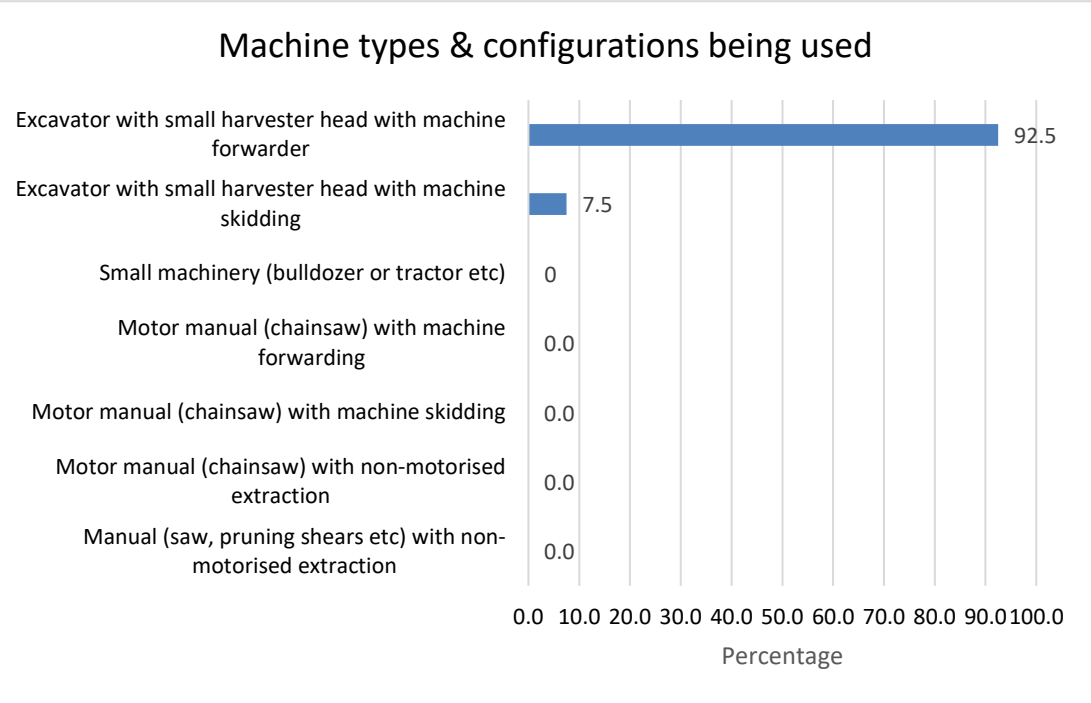


SURVEY – production thin



SURVEY – production thin

Average of responses



Comments

- Other dedicated machinery
  - Wheeled harvester & forwarder
  - Small wood thinning crew
  - Forwarder John Deere, processor
  - Track based harvester forwarder combination
  - Rubber tyred harvester forwarder combination
  - Excavator with small harvester head & forwarder

SURVEY – production thin

Damage

	Manual	Mechanical
Residual trees	-	<1%, 1-5% 6-10%
Soils & site	-	<1%, 1-5% 6-10%

Other concerns

- **Mechanical**
  - **Rutting, steep slopes, labour constraints, site suitability, productivity, tree selection, stocking, distance to log supply**

SURVEY – reasons to thin

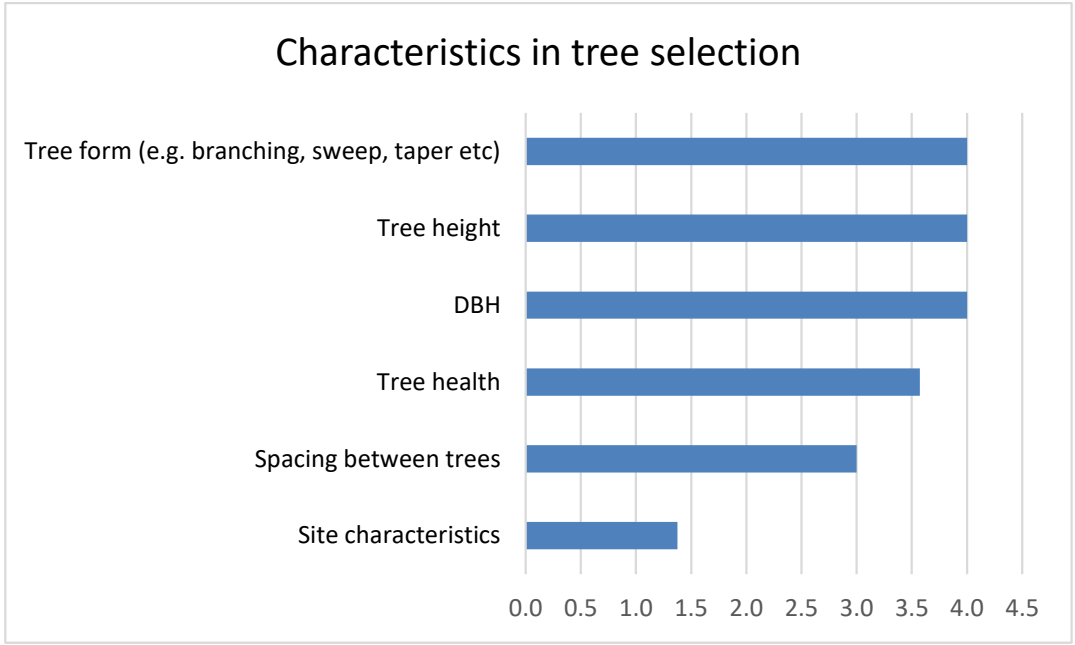
- Improve quality of residual trees
- Maximise recovered volume
- Forest health
- Mid rotation yield, recover costs mid-cycle
- Add value, maximise return
- Even stands with best log grades
- Prevent windthrow
- Year round silvi workforce, lack of pruning labour
- Control of branches
- Remove regen

SURVEY – strong biomass / bioenergy market

- More production thinning, including steeper slopes
- Change regimes e.g. energy crops, earlier rotation lengths, leave heavy stocking & spray out stand to leave to dry standing, & chip whole trees
- Improved reason to thin
- In-field chipping or similar, normally the domain of harvesting
- Biomass / bioenergy price point
  - FGR need to analyse this
  - Where production thin cost is in-line with the cost of waste thin
  - Need to break even, $16-18 per GJ, $80-90 per ton, supersede KIS grade price, > $70 per ton

SURVEY – tree selection

Weighted average of responses



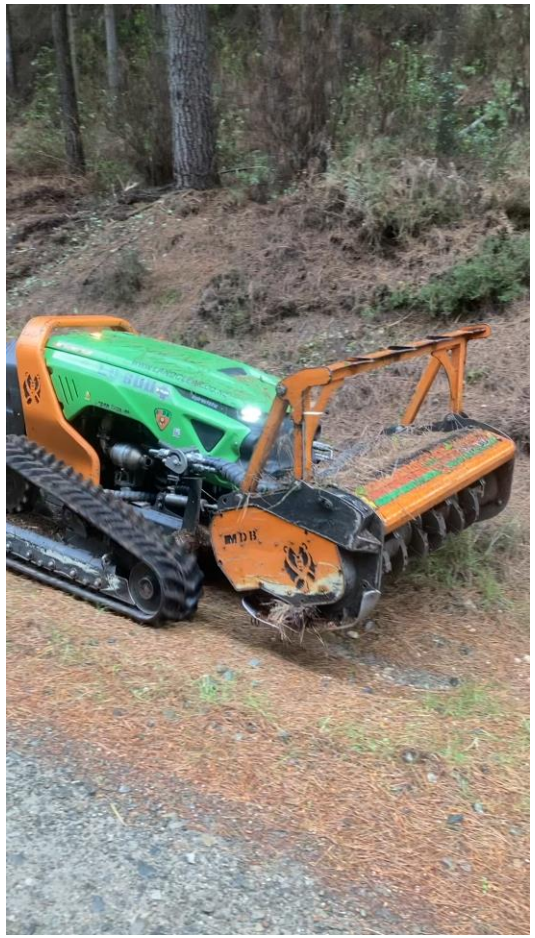
How are trees selected for removal

- Size (dominance & vigour), form, spacing
- Pruned or not

- Training
  - Formal modules for thinning, unit standard 6951, on the job training – tree selection manual
  - Refreshers, Topspot audits, certification, pre & post assessment plots, tree selection policies
  - Supervision, reliant on operator

SURVEY

- Tethering
- Other – remote sensing, UAV, LiDAR



REALITY CHECK

- **Facilitated discussion further to anything arising from the information presented - Lania**

Parking notes - Yvette

WHAT WORKS / PAIN POINTS

- **Facilitated discussion further to anything arising from the information presented - Lania**

Parking notes - Yvette

Precision Silviculture Partnership

LUNCH BREAK

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Ministry for Primary Industries
Manatū Ahu Matua

supported by forestgrowers commodity levy

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