

Trends in radiata pine tending regimes being applied by large-scale entities – 2010 to 2020

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Abstract

In the November 2021 issue of the *New Zealand Journal of Forestry*, John Moore gave a very good summary of the trends in New Zealand plantation management over the last 100 years. To complement his findings, this note summarises some information on tending regimes that was collected as part of a recent project on the impact of changes in forest management on the level of carbon storage in New Zealand plantations.

Questions and results

Information was obtained from 19 of the largest New Zealand forest entities that collectively own/manage 1,073,000 ha of plantation, including 980,000 ha of radiata pine. Questions asked were:

1. What was the percentage of eligible (i.e. young) stands being pruned in 2020 compared to 2010?
2. What was the target final crop stocking for their pruned regime in 2020 compared to 2010?
3. What was the target final crop stocking for their unpruned regime in 2020 compared to 2010?

The results presented in Table 1 are for standard regimes. Variations occur, for example:

- ‘On some remote, low productivity sites we plant 833 stems/ha and don’t thin.’
- ‘On 25% of sites we do a regen treatment at age 2–3 with no further thinning. This results in a final crop stocking of 650–700 stems/ha.’

Percentage of eligible stands being pruned

Comparing 2020 to 2010:

- One entity continues pruning 100% of their eligible stands while five entities prune an increased proportion
- Six entities have reduced the proportion of area pruned, including two that have stopped pruning altogether
- Seven entities have continued to do no pruning.

Taking into account the relative size of each entity’s estate, the proportion of eligible radiata pine stands being pruned by large-scale entities has reduced from 28% to 19%. This reduction is almost solely due to the decision by one large entity to stop pruning.

Some comments from respondents:

- ‘Although the pruned regime IRR exceeded the hurdle discount rate it was lower than the unpruned regime IRR.’
- ‘We stopped pruning based on the return.’
- ‘We expect the price premium for pruned radiata pine logs over unpruned radiata pine logs to narrow.’
- ‘We continue to prune our better sites because over the last 10 years we have achieved a higher rate of return on our pruned regime than our unpruned regime.’

Table 1: Responses from 19 entities

Entity	Pruning %		Final crop stocking (PR regime stems/ha)		Final crop stocking (UP regime stems/ha)	
	2010	2020	2010	2020	2010	2020
1	0	0			450	450
2	0	0			413	500
3	0	0			400	550
4	0	0			475	450
5	0	0			550	550
6	0	0			425	500
7	0	0			475	475
8	0	10		350	600	600
9	2	20	320	363	450	450
10	10	33	250	313	500	600
11	30	80	335	335	400	613
12	40	0	370		400	500
13	66	80	270	300	388	388
14	70	60	330	330	450	450
15	95	90	350	350	475	475
16	100	0	250			500
17	100	40	325	375		550
18	100	65	350	350		475
19	100	100	375	375		

Note: The pruning % relates to the percentage of eligible (i.e. young) stands being pruned – not the percentage of the total estate that is in a pruned condition. Final crop stocking is reported for each entity’s standard regime. In some cases, variations are applied on specific sites. In cases where an entity reported a range for stocking, the mid-range value is reported.

- 'Our Board is keen on pruning for strategic reasons. We only prune our best sites.'
- 'Pruning provides employment over summer when we have high fire danger and provides continuity of work.'
- 'We are pruning low hindrance blocks of good site quality. We have good demand from local mills.'
- 'We are an integrated company. Market demand is increasing for appearance products.'
- 'We stopped pruning because the pruned log price premium didn't justify the upfront costs. We are reviewing this as there appears to be a greater willingness by wood processors to pay more for pruned logs. This is driven by a view about the market for heat or chemically treated wood where radiata pine is the preferred material.'

Pruned regime final crop stocking

Comparisons were made between 2020 to 2010, and only the nine entities that pruned in both 2010 and 2020 were considered. Five entities apply the same final crop stocking in their pruned regime and four apply a higher final crop stocking.

Taking into account the size of each entity's pruned estate, the average final crop stocking for a pruned regime has increased from 320 stems/ha in 2010 to 344 stems/ha in 2020.

Unpruned regime final crop stocking

Comparing 2020 to 2010 and considering only the 15 entities that applied an unpruned regime in both 2010 and 2020:

- Eight entities apply the same final crop stocking in their unpruned regime
- Six entities apply a higher final crop stocking
- One entity applies a lower final crop stocking.

Taking into account the size of each entity's unpruned estate, the average final crop stocking for an unpruned regime has increased from 457 stems/ha in 2010 to 504 stems/ha in 2020.

Some comments from respondents:

- 'We increased final crop stocking because:
 - the premium for log size (e.g. A grade vs K grade export logs) has decreased, and
 - there is a relatively flat harvest cost vs piece size curve.'
- 'We found that the higher stocking (500 stems/ha vs 425 stems/ha) had minimal effect on tree size.'
- 'We increased final crop stocking after seeing research results on carrying capacity.'
- 'We have increased from 400 to 500 stems/ha but are likely to end up lower than 500 stems/ha to provide more flexibility with harvest age. We lose optionality with higher stockings.'

Conclusion

An overall finding is that although there are some general patterns, a range of regimes is still implemented and in different proportions. This is not surprising given the diversity of owners in terms of objective, strategic vision, risk and perception about future markets. There are also differences in the interpretation of technical and market data by forest managers. Looking forward, climate change and an increasing emphasis on the bioeconomy could change perceptions of risk and reward. Given all these factors, the regimes implemented by different entities will no doubt continue to change.

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