

PROJECTED CHANGES IN THINNING REGIMES AND THINNING  
FREQUENCIES FOR RADIATA PINE FOR THE DECADE 1986-1995

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1. INTRODUCTION

A survey was carried out to record the forest industry thinning intentions for the next decade 1986-1995. The main interest lay in examining the proposals for production thinning but there was also interest in the potential of older stands being pre-commercially thinned to provide feedstock for wood processing plants.

The development of new technology, especially for reconstituted panel products, will provide market opportunities for roundwood from thinning in regions with forests on easy terrain. Improved methods of harvesting smallwood (organised felling, double-drum winches, chain strops, Bell logging machines) allow substantial cost reductions compared with the systems of even five to ten years ago.

2. METHOD

The major forestry organisations were asked to complete and return a LIRA Thinning Form circulated in early May and I am grateful for the co-operation of the resource staff for the prompt return of these forms. A copy of the form is attached in Appendix 1 with the data summarised. The terms are largely self-explanatory.

3. RESULTS

The information covered approximately 70% of the area of the 1976-85 age class and approximately 90% of the areas presently scheduled for production thinning, based on discussions with the major organisations.

Some information on species other than radiata pine was received but this has not been included because of the (nationally) small resource size.

(i) Initial Stocking

Most organisations have been planting around 1200 - 1500 s/ha, with some planting as low as 750 - 1000 s/ha, and a few as high as 1700 s/ha.

(ii) Pre-commercial thinning

An early pre-commercial thinning averaging 24,600 ha/yr is proposed by most organisations (even where these stands are to be production thinned at a later stage), usually around age 4 - 6 years to leave a residual stocking of 500 - 600 s/ha, in association with low pruning (when carried out). If there is no pruning, the residual stocking may be higher, up to 800 - 1000 s/ha if followed by a production thinning.

A second pre-commercial thinning is scheduled for age 8 - 10 years, usually in association with high pruning, to a final crop stocking of 200 - 375 s/ha. This will average 11,200 ha/yr, less than half the area already thinned. Only one organisation is considering a production thinning after a second pre-commercial thinning.

(iii) Production Thinning

Most production thinning is scheduled for stands aged 10 - 15 years that have received a pre-commercial thinning. Over the next 10 years, production thinning will yield 1.47 million m3/yr from an area of 13,800 ha/year. This is almost entirely from first production thinning operations and few stands (6% by area, 7% by volume) will receive a second production thinning. Where this is being considered, it is in stands aged 16 - 22 years to leave a residual stocking of 200 - 225 s/ha.

Piece size will vary from around .10 m3 in post and pole operations to .20 - .30 m3 in pulp operations for first thinnings and around .8 - 1.2 m3 in second thinnings to yield sawlogs. Piece size in the Central North Island stands is expected to be substantially larger than in similar-aged stands elsewhere.

(iv) Changes During the Decade

A major change is likely to occur in the early 1990's and this can be seen in Table 1 below. For convenience, it is shown to occur mid-decade.

TABLE 1 : CHANGES IN AREA AND VOLUME OF PRODUCTION THINNING DURING THE DECADE 1986 - 1995

<u>Period</u>	<u>Area</u>	<u>Volume</u>
1986-1990	15,620 ha	1.6 million m3
1991-1995	12,020 ha	1.2 million m3
Reduction	3,600 ha 23%	0.4 million m3 27%

There is to be a major reduction in the area and volumes of production thinning within the Central North Island, and a small but locally important increase in the Hawkes Bay region. These changes are substantial and will have significant local effects in terms of employment.

(v) Changes Since the 1982 Survey

Compared with the last production thinning survey carried out only five years ago (Vaughan 1981), there has been a major reduction in the areas and volumes proposed for second thinning, as shown in Table 2.

TABLE 2 : CHANGES IN AREA AND VOLUMES OF PRODUCTION THINNING SINCE LAST DECADE

<u>Production Thinning</u>	<u>Survey Date</u>	<u>Area</u>	<u>Volume</u>
First	Previous	13,100 ha/yr	1.1 million m3/yr
	Present	13,050	1.3
		50	.2
Second	Previous	3,400 ha/yr	.34 million m3/yr
	Present	800	.10
		2,600	.24

There has been little change in areas and volumes of first thinning over this time.

4. DISCUSSION

There has been a continuing reduction in the initial stocking of stands scheduled for thinning compared with those recorded in previous surveys (Bunn 1970, Williams 1981). This can be attributed to higher standards of site preparation, genetically superior seedlings, improved tree handling systems, better management information and a lot of cost-benefit analysis. In some regions without production thinning, there is a trend to move away from two pre-commercial thinnings to a single thinning down to final crop stocking. There are considerable cost savings in silviculture if final crop trees can be identified at age 5-6 years.

I suggest that what is occurring is a rationalisation of silvicultural regimes, at least within the Central North Island. Production thinning is to be limited to easy

topography where harvesting costs are considerably lower than on steep terrain. Volume constraints will still exist for major forest owners but are not as limiting as in the past. Regimes are moving towards those that increase forest profitability. Concern has been expressed in the past over the effect on crop trees of delaying thinning in high pruned stands. These fears seem to have abated as pre-commercial thinnings have become earlier, heavier and more widely applied. This has significantly delayed the onset of competition, removed small and malformed trees, increased extractable piece size and provided more room for logging machinery to manoeuvre.

Future thinning contractors will need to have high skill levels and a good track record as more and more forest owners are proposing to allow them into pruned stands. This is often a result of the owners' desire or need for an early cash flow. However, one major owner is considering restricting all pruning to stands on steep terrain and keeping all production thinning on the easier terrain. Supervision has obviously played a major role in developing and maintaining high standards of practise and will need to continue to do so if the investment in pruning is to be recouped.

The proposed change in the tax laws are still in the discussion stage and the regimes for stands planted after 1986 may change if these go ahead in their present form. It may have some effect on volumes and treatment of older stands as forestry organisations evaluate different options for generating cash flow. This could be a significant factor for the new Forestry Corporation with a high proportion of young stands in its age class distribution and a strong commitment to intensive tending.

Another factor in the rationalisation in the Central North Island is the future availability of wood from sources other than thinnings and the opportunity it provides for procuring lower cost wood fibre as the plantings of the 1950's and 1960's come on stream and the old crop stands are finally phased out. The thinnings from the expanded plantings of the early 1970's in the Central North Island will phase out around 1990 and the reduction in the volume of thinnings is also partly attributable to the lower levels of planting from the late 1970's. The proposed phasing out of steep country thinning in the next few years is another indication of this rationalisation.

This reduction in thinning volumes in the C.N.I. will inevitably result in a reduction in the logging workforce but, with luck and some careful planning, it could provide the basis of the skilled workforce for the new forest regions as the post-war plantings come on stream. Regions like Gisborne and Northland could benefit substantially from an influx of skilled bushmen to provide the informal on-the-job training to complement formal training available from organisations like LFITB.

There may be some changes in the type of machinery used as contractors move out of second thinnings into first thinnings. This could involve greater use of smaller and lower-powered skidders such as the John Deere 350 and the Iwafuji T30, fitted with double-drum winches and chain strops. This trend may be offset by the wider use of bunching machines such as the Bell Logger to accumulate larger payloads and requiring the larger machines for extraction.

## 5. CONCLUSIONS

The results of this survey suggest most stands will receive an early pre-commercial thinning, usually around age 4 - 6 years. Its intensity will depend on subsequent silvicultural treatment.

About half of these stands will receive a second pre-commercial thinning within 3 - 6 years. Most of these stands have been scheduled for pruning and the two thinning operations will be done in association with the commencement and completion of pruning operations.

Production thinning will generate an average of 1.4 million m<sup>3</sup>/yr of roundwood over the decade 1986-1995. Most of this will come from first production thinning operations in stands that have already been thinned some 6 - 9 years earlier. As a result of changes in age class, silvicultural regimes and wood supply, there will be a mid-decade reduction in volume from 1.6 to 1.2 million m<sup>3</sup>/yr. Much of this will occur in the Central North Island although it is partly offset by an increase in Hawkes Bay. This will have a major effect on employment patterns in these regions.

A comparison with industry thinning intentions five years ago shows a phasing out of second production thinning operations within the larger organisations, although it is still used by some groups on a small scale.

There appears to be a rationalisation of silvicultural regimes, at least within the Central North Island, with all the major forest-growing organisations proposing to carry out pruning over significant areas of young plantations and production thinning being restricted to the easier terrain. The easing of volume constraints has allowed forest managers to move towards the more profitable regimes (e.g. those that increase forest profitability).

The forestry industry in New Zealand is undergoing a major upheaval with the restructuring of the N.Z. Forest Service and the proposed changes in taxation legislation. A tight cash flow, generated by a contracting economy, high internal interest rates, an internationally strong dollar and possible changes in the tax laws, may force major changes to these regimes.

As the industry faces up to a market-driven economy and a fiercely competitive international market, it will need to move from a production-driven basis to a market-orientated one, but one that still recognises the importance of the basic resources of its forests and its people. Production thinning is another option that forest managers must evaluate in their strategic planning. As a senior forest manager noted "To be successful, it must involve a commitment by forest managers and purchasers to a soundly-based wood-procurement plan that dovetails with the forest management strategy".

6. REFERENCES

- Bunn, H.E. (1970) : Factors to be considered in determining a silvicultural regime. pp 193-198 in Sutton, W.R.J. (Ed), F.R.I. Symposium No. 12.
- Vaughan, L.W. (1983) : "New Zealand's exotic smallwood resource 1983-1992". pp 142-145 in "Research and Development in Tree Harvesting and Transportation" LIRA Seminar Proceedings, Rotorua. June 1983.
- Williams, F.N.J. "Review of 1979 New Zealand radiata pine management practices" F.R.I. Bulletin No. 11.

APPENDIX 1

LIRA FORM : THINNING PROPOSALS FOR THE DECADE 1986 - 1995

	Pre-commercial thinning		First Production Thinning	Second Production Thinning
	1st	2nd		
Area (ha/yr)	24 650	11 200	13 050	790
Volume to be extracted (000 m3/year)	-	-	1 335	105
Stand age (years)	4-6	9-12	10-15	16-22
Extracted piece size (m3/piece)	-	-	.10-.30	0.8-1.2
Stocking before thinning (st/ha)	1 000 - 1 5000	500 - 700	400 - 700	300 - 400
Stocking after thinning (st/ha)	250 - 750	200 - 400	200 - 375	200 - 225

NOTE: 1. 'Broad-brush' data summary

