

A SURVEY OF LIMITED SCALE LOGGING OPERATIONS

W.B. Liley
Logging Industry Research Association

INTRODUCTION

In preparing for the 1985 LIRA Seminar on Limited Scale Logging it was considered important to review what logging systems were at present being used in the industry, especially by the less productive operations.

It was recognised that of all groups in the industry the Department of Labour Bush Inspectors had the best field coverage and accordingly their assistance was sought in completing a survey. The co-operation provided was excellent and a thorough coverage was achieved.

THE SURVEY METHOD

By law the Department of Labour must be notified of any contract for bush undertakings within seven days of letting. As a result Bush Inspectors have the best records of total numbers of logging operations in the country.

At the notification of a new logging operation the inspectors update their records with the name and location of the gang, the number of men employed and the equipment used. The inspectors also 'do the rounds' of the contractors as often as available time, and pressure from other duties, allows.

LIRA approached the Bush Inspectors through the Department of Labour for assistance with a survey of Limited Scale Logging operations. Because of difficulties in defining just what constitutes "limited scale", the inspectors were asked to provide survey returns for logging operations in all areas except the following forests :

Kaingaroa/Waimihia
Kinleith/Tahorakuri
Lake Taupo Forest
Matahina
Tauhara and Tarawera Forests
Golden Downs Forest
Tapanui

In the above forests, rightly or wrongly, it was assumed that the size of the resource, and the history of exotic logging, had allowed logging operations to become most efficient.

Bush Inspectors were issued with the survey forms shown in Figure 1 and an accompanying letter provided the following advice :

"... It is expected that questions on machinery and manpower can be answered direct from the Inspectors' office records. Hopefully, other questions can be answered from recollections of the Inspectors' last visit without special visits or enquiries being necessary. Inspectors are urged not to become preoccupied with precise answers - because the logging industry is always changing only a very thorough and very costly survey could give exact answers. Instead LIRA is adopting the QADI (or Quick And Dirty Inventory) approach. Therefore, some questions may warrant an educated guess for the answer."

FIGURE 1

LIMITED SCALE LOGGING SEMINAR

NAME AND LOCATION OF GANG :

MACHINERY : Please note model or approximate horsepower

- | | |
|---------|---------------------------|
| Tractor | Hauler - independent spar |
| Skidder | Hauler - integral tower |
| Loader | Farm tractor |
| Bell | Other |

MANPOWER (Number of men in gang)

AVERAGE PIECE SIZE (or approximate age of trees or rough diameter)

PRODUCTION TRUCKLOADS PER DAY (assuming average on-highway load of 25 tonnes)

Please circle the correct descriptions in the following options :

- State Forest/Private Forest
- Thinning/Clearfelling
- Native Bush/Exotic Forest (state species)
- Steep terrain/ Easy Terrain/ Mixed
- Medlum to large Forest/woodlot (less than 2 ha/shelterbelt
- Own truck/separate cartage contract
- Full year logging/seasonal

WHERE DOES THE WOOD GO TO ? (Mark one box)

- Sawmill
- Pulpmill or chipwood
- Plywood
- Posts and Poles

- Export
- Firewood

In fact many inspectors were very thorough in completing the survey and provided information which had clearly involved extra field research on their part.

The survey returns were coded onto LIRA's computer and then analysed using a statistical package.

SURVEY RESULTS

There were 351 individual survey forms returned with the following regional distribution :

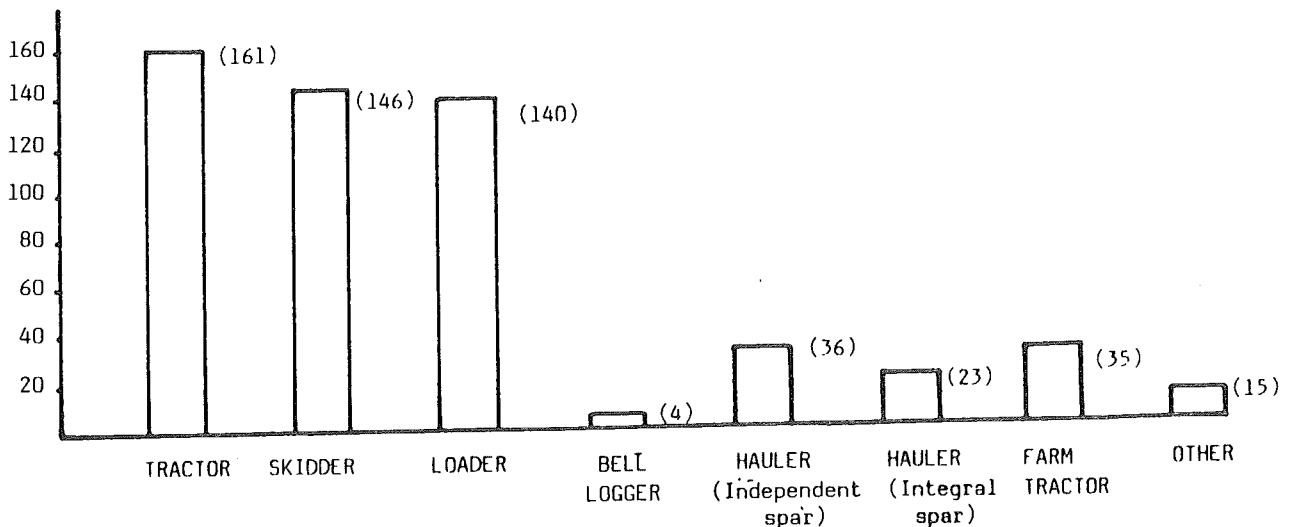
Northland	33
Hamilton	61
Napier/Gisborne	41
Wanganui	42
Wellington	50
Nelson	29
Westland	32
Canterbury	33
Southland	28

Those operations in the Rotorua area which are of limited scale have not yet been included.

It should be noted that apart from excluding gangs in the biggest forests from the survey results, no other attempt has been made to select limited scale operations. Thus, of the 351 returns a proportion of the gangs may not fit the 'limited-scale' description. Their data has been retained within the results for comparative purposes.

MACHINERY

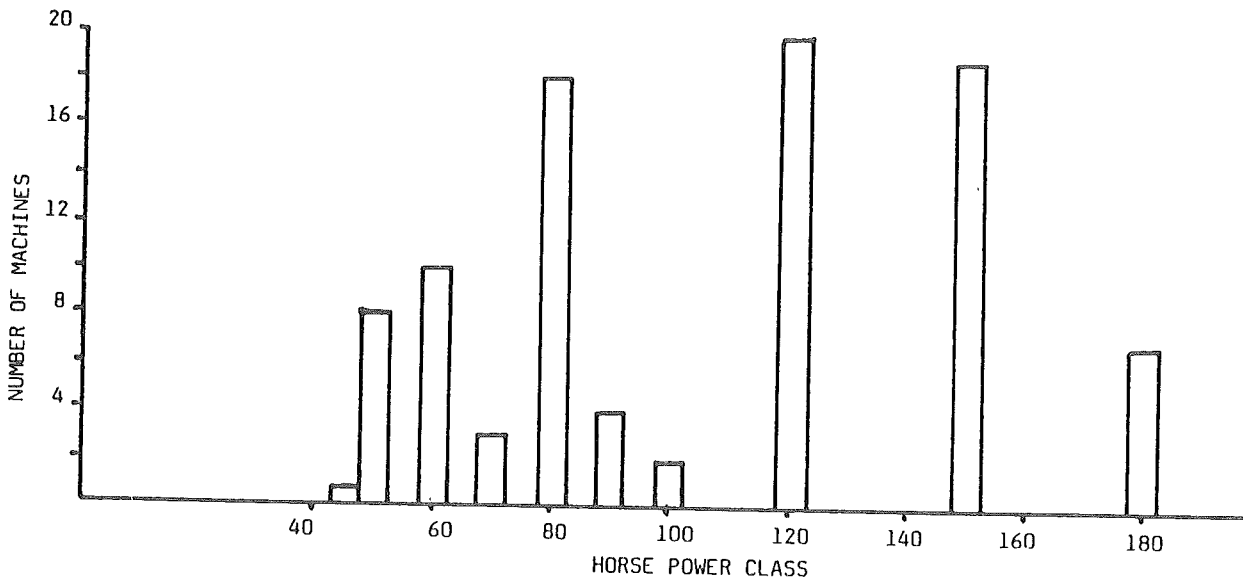
The combined data for all districts showed a distribution of equipment types as follows :



The predominance of tractors is not surprising - they have long been considered the most versatile unit, capable of working a wide range of terrain types, forming tracks and landings, and even push loading is necessary. Moreover they are a machine common in other industries which ensures a ready supply of second-hand units.

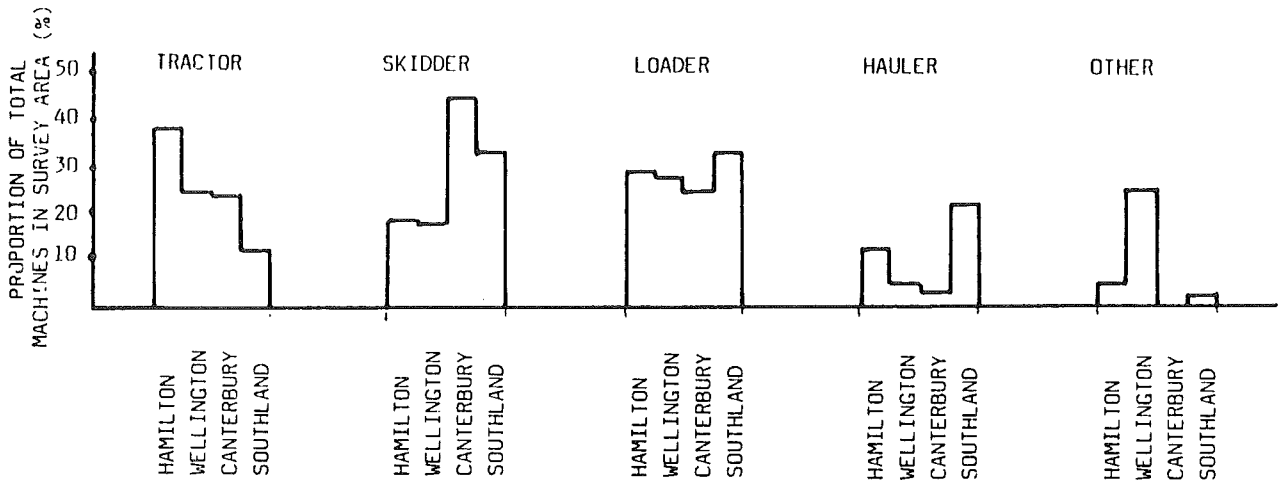
Several returns indicated that the gangs owned more than one tractor. However the machine model numbers, and the level of production suggested that such extra machines were more likely to be spare or back up units rather than engaged in full time production.

The distribution of tractor sizes (where this information was provided) appeared as follows :



The proportions of machine types differed quite markedly on a regional basis. This was to be expected with marked regional variations in terrain and frequency of production thinning.

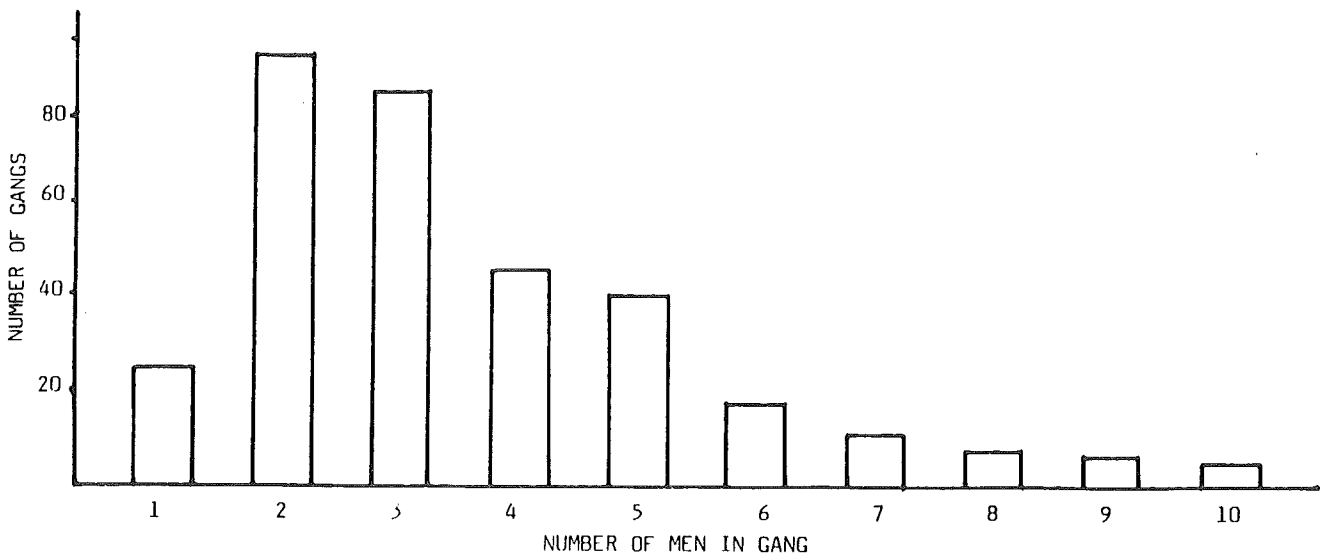
The relative proportions of several machine types for four different districts are shown in the following histogram :



The high proportion of skidders in Canterbury is not surprising in view of its flat terrain. The low proportion of loaders there also no doubt reflects the wide use of self-loading trucks. The high number of haulers in Southland is a relatively recent phenomena, and mostly arises from the hardwood chip export operations of Tokanui Wood Export Ltd. Wellington's high proportion of 'other' machines (mostly farm tractors) is most probably a result of the large number of small blocks of mostly young age.

NUMBER OF MEN IN THE GANG

It is in this category especially that limited scale logging shows its colours. A histogram of gang sizes for all survey returns is shown below :



This kind of distribution would certainly not be characteristic of those areas of the country where logging is well established and has had the opportunity to expand. There most gang sizes would be larger than four men.

The limited-scale logging gangs then would appear to have a higher ratio of mechanical input to labour input than is strictly efficient - or, expressed another way, the machinery is under-utilised. But for the fact that many of the machines are cheap secondhand models, it could be claimed that limited scale logging was over-capitalised.

Limited scale logging operations should benefit from a maximum of flexibility in their structure. This is particularly so when such characteristics as the lack of assured continuity of work and the variations in logging sites are considered. Of the various inputs to any production system, labour is regarded as one of the more flexible - it is supposedly easier to employ or lay off labour to meet the demands of a particular situation than it is to change major items of plant.

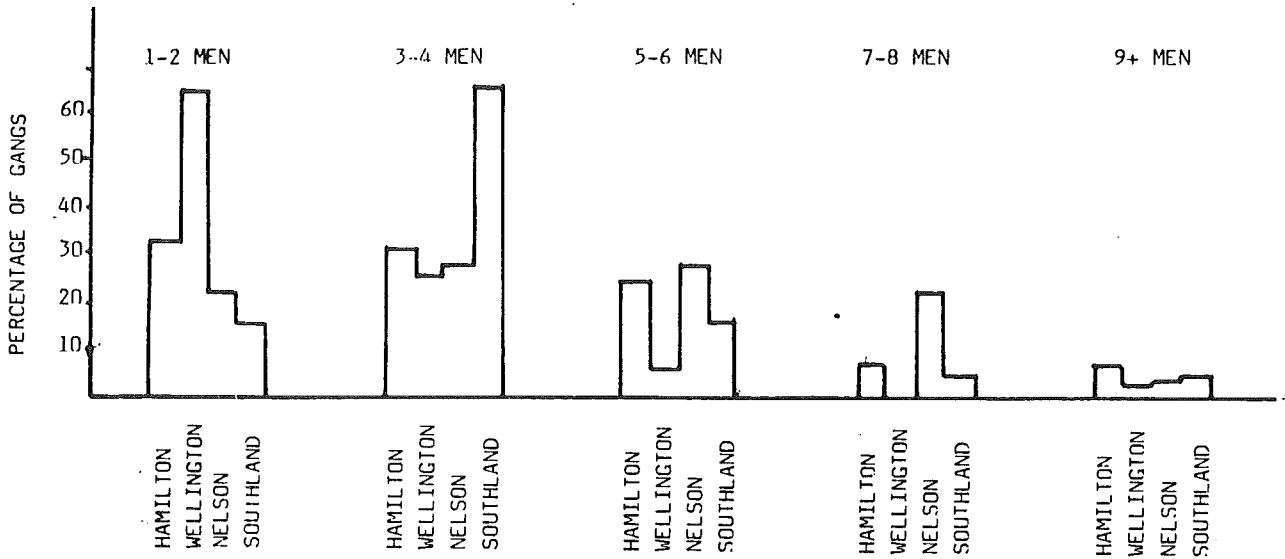
On this principle one would expect that limited scale logging would benefit from the very reverse of the situation we have identified - i.e. a low mechanical, high labour structure. The apparent irony is explained by the nature of the raw resource - most of the trees to be logged demand a certain minimum size of extraction equipment. (It is difficult to log 3 m³ radiata with a farm tractor.)

Indeed, it is only in the small piece size production thinning operations where one man can handle the logs that the truly low capital/high labour cost systems such as chute logging can be used.

The existence of the numerous small gangs has important consequences for recruitment and training. The effect of illness, injury or loss of a gang member is also likely to be more dramatic in a small gang than a larger one.

In the smaller gang some members at least must be versatile having a combination of fallers, breakerouts, machine operators and skidworkers skills (and usually some mechanics skills as well). Where there is the loss of a gang member, the chances of finding a replacement with those skills are low. The need to train a novice in a variety of skills simultaneously may be more disruptive to gang performance than if the newcomer only has to tackle one new task at a time.

Again a regional comparison shows interesting variation in the gang size distribution.

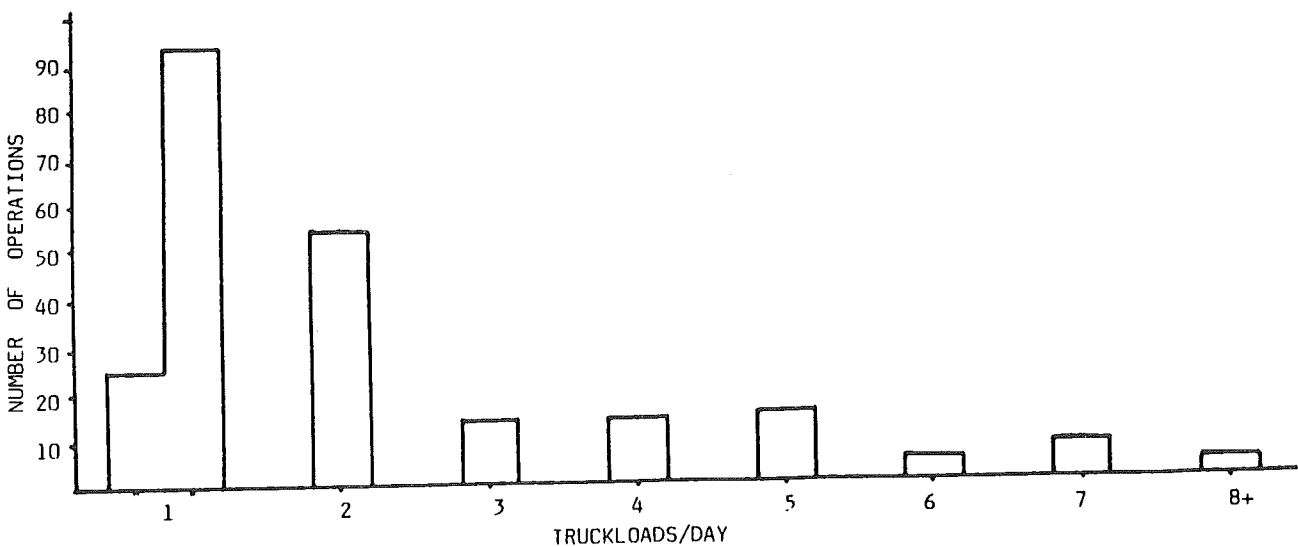


In the Wellington area a considerable majority of gangs have just 1 or 2 men, whereas in Southland a similar majority have 3-4. In the areas shown above only Nelson has more than half the gangs with more than 4 men.

PRODUCTION

Estimating gangs production levels is not an easy question for anybody, including Bush Inspectors whose visits to individual operations may be infrequent, and whose responsibility is to assess safety rather than productive performance.

Where the inspectors were in doubt they did not complete this section, but a large number of replies were nevertheless received. The results from all returns are shown below :



The unit of production suggested was the 'truckload', representing between 20 and 25 tonnes of wood. Some of the gangs to the right of the histogram do not really represent limited scale logging. Within the survey data they are few in number.

In a very rough analysis based on the survey data presented thus far, it would appear that much of the wood produced in limited scale logging operations should be fairly expensive.

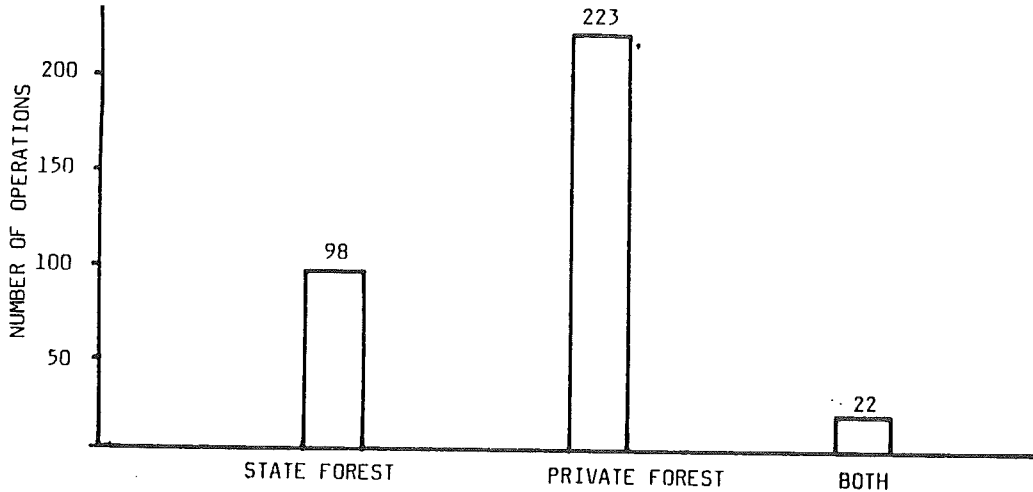
Consider for instance a gang of 2½ men, operating a tractor or skidder and producing 1½ loads per day. Indicative costs might be :

Machine	: owning and operating costs	\$150/day
Labour	: 2.5 x \$95/day (This includes holiday pay, any bonuses, ACC Levy etc)	\$238/day
Chainsaws	: 1½ saws @ \$16/day	\$ 24/day
Gang truck	: 80 km/day @ \$0.40/km	\$ 32/day
Overheads	: e.g. tools, gang hut, etc	\$ 8/day
Administration	: Accounting, legal, postage etc	\$ 15/day
		<hr/>
		\$467/day
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For a production of 30 tonnes per day, this represents a logging cost of \$15.50/tonne. While this might be considered in a central North Island thinning operation, it would rather startle the clearfelling manager, more used to rates less than half this amount.

FOREST OWNERSHIP

The alternatives here were 'State Forest' or 'Private Forest'.



Nearly two thirds of all returns were operating in private forests, as might be expected. The State forests, generally established on a larger scale, should support higher- production contractors, of whom fewer would be required.

Again the proportions of forest ownership varied between regions. Thus in Northland 42% of the surveyed operations were in State forest and in Westland 81%, whereas in Hamilton and Canterbury districts the figure was only 25% and in Napier/Gisborne 10½%.

CLEARFELLING OR THINNING

On a national scale 70% of the operations surveyed were involved in clearfelling, 25% in thinning and 5% in both.

Not unexpectedly there is considerable regional variation in the proportions, although the variations themselves offered some surprises. One would expect for instance to find that the proportion of thinnings operations was highest in those areas where a substantial market existed for thinnings wood, such as a pulp mill or MDF plant. On this basis the proportion of thinnings operations should be high in Canterbury (to CTP), the Napier area (to Whirinaki mill) and parts of Hamilton district (to Kinleith). In fact the highest proportions of thinning operations were found in Wellington, Northland and Wanganui

districts as shown in the table below :

	<u>Clearfelling</u>	<u>Thinning</u>	<u>Both</u>
Northland	58%	36%	6%
Hamilton	87%	13%	-
Napier/Gisborne	62%	33%	5%
Wanganui	64%	36%	-
Wellington	58%	34%	8%
Nelson	90%	10%	-
Westland	100%	-	-
Canterbury	73%	12%	15%
Southland	71%	7%	21%

It appears then, that the post and pole market is of greater influence than the pulp mills in determining the number of thinnings contractors in a given district. (The proportion of wood production arising from thinnings may of course be another matter.)

EXOTIC FOREST OR INDIGENOUS FOREST

The survey results date from before the Forest Service's more recent policies on logging indigenous forest, although it must also be remembered that a substantial proportion of the indigenous forest logged is on private land.

For all returns the breakdown was as follows :

Exotic forest	66%
Indigenous forest	32%
Both	2%

TOPOGRAPHY

In this classification, with the possible choices being 'steep', 'easy' or 'mixed' terrain, the responses could be expected to be fairly subjective. For all survey returns the results showed :

Easy	:	21%
Steep	:	23%
Mixed	:	56%

Although with the imprecise definition of topography, regional comparisons are not particularly meaningful, Nelson and Wanganui districts were singular in their high proportion (40%) in the 'easy category'.

FOREST TRACT SIZE

Again the classifications could be interpreted subjectively, but for all survey returns were as follows :

Medium/large forest	:	54%
Woodlot	:	19%
Shelterbelt	:	6%
Combination	:	21%

While the definition of what constitutes a woodlot was not supplied, it is interesting that more forests were not in this category. Not unexpectedly Canterbury had the highest proportion of loggers working exclusively in shelterbelts (39%).

CARTAGE - OWN TRUCK OR SEPARATE CONTRACT

In New Zealand's high production logging operations it is uncommon to find that the logging operators have their own trucks. In the limited scale operations this is a much more common practice. For all survey returns, the results were :

Own truck	:	31%
Separate cartage contractor	:	69%

The own-truck situation was highest in the Wanganui and Napier areas (59% and 48%) and lowest in Southland (11%).

FULL YEAR OR SEASONAL LOGGING

The results for all returns were :

Full year logging	:	72%
Seasonal logging	:	28%

The incidence of seasonal logging could be expected to reflect both the terrain and climate within different districts, particularly insofar as they affect accessibility to the site.

A comparison of the districts produces some interesting results :

	<u>Full Year Logging</u>	<u>Seasonal</u>
Northland	48%	52%
Hamilton	64%	36%
Napier/Gisborne	44%	56%
Wanganui	76%	24%
Wellington	75%	25%
Nelson	76%	24%
Westland	94%	6%
Canterbury	91%	9%
Southland	96%	4%

WOOD DESTINATION

The results for all survey returns are shown in the following table :

	Sawmill	Pulp or Chip	Plywood	Posts and Poles	Export	Firewood
Northland	23	-	-	18	1	-
Hamilton	50	1	-	7	-	3
Napier/Gisborne	28	13	-	4	-	2
Wanganui	31	2	-	9	-	-
Wellington	36	-	-	22	-	2
Nelson	13	20	5	8	13	1
Westland	30	2	-	-	-	-
Canterbury	29	13	-	13	-	-
Southland	23	8	-	6	6	1
	263	59	5	87	20	13

The question in this case was not well worded. It seems likely that some bush inspectors recorded only the gangs predominant product, and others the range of products. Sawmills are clearly the predominant destination for the wood from limited scale logging. The effect of the available pulp or chip markets shows up clearly in the Napier, Nelson, Canterbury and Southland districts.

CONCLUSION

1. The survey has identified over 300 operations throughout New Zealand which could be described as 'limited scale logging'. In general they are characterised by small gang sizes (2-3 men) and low production (1-2 truckloads per day).
2. Since, by law, Bush Inspectors should be notified of all logging operations their records offer a good overview of the industry, ideal for a survey such as this.
3. In hindsight some questions in the survey form could have been rephrased and others could have been included. In the interests of obtaining a quick response the survey was kept brief, and as it was often necessary to rely on the Inspectors' recollection, questions of fine detail were not appropriate.
4. The last thorough survey of the logging industry (and it was indeed very thorough) was completed by Fraser, Murphy and Terlesk of the Forest Research Institute in 1974.

Now, slightly more than a decade later some comparative, although less detailed, information is available.

5. To facilitate comparisons it is planned to extend this survey data with information from the forests deliberately excluded.

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