1996 LIRO Conference
"Woodlot Logging"
5 Nov 1996

WOODLOT LOGGING - THE RESOURCE

John Eyre
Adviser, Forestry Development
Ministry of Forestry
September 1996

SUMMARY

The small forest (woodlot) resource in New Zealand, classed in this paper as those forest blocks or forest holdings of less than 1000 hectares, form an important and increasing proportion of the national forest estate. Within the next three to eight years there will be a significant increase in the volume of radiata pine available from small forests. Volumes during the period 2001 to 2005 are estimated to increase by more than three fold over the 1996 to 2000 period, from an average of 0.4 to 1.7 million cubic metres per year.

These increases will impact on many aspects of the forest industry and on rural life. The forest industry needs to start planning now to ensure that this largely unallocated forest resource is successfully and sustainably managed, marketed and harvested. This will require large investments in developing and maintaining a skilled labour force and in obtaining specialised machinery and equipment.

INTRODUCTION

Investment in planted production forestry in New Zealand has expanded dramatically since the early 1990s, both in the number of hectares planted and in the number of investors.

The rate of new planting (over and above restocking of harvested areas) rose to an all time high of over 98 000 hectares in the 1994 season (table 1). The previous highest level of annual new planting was 56 000 hectares in 1984.

Table 1: New planting - 1990 to 1996

	Hectares
1990	16,000
1991	15,000
1992	50,200
1993	61,600
1994 (provisional)	98,200
1995 (revised)	70,900
1996 (forecast)	77,800

Source: Ministry of Forestry, 1996

Much of the new planting is being carried out by forest growers other than the large forestry corporates. It is this group of "others", referred to as small forest growers in this paper, with forest holdings of less than 1000 hectares per owner, who are the subject under discussion at this seminar.

SMALL FOREST OWNERSHIP

The ownership of New Zealand's planted forests has undergone considerable change since 1990 with the sale of cutting rights to many government-owned planted forests. This allowed the entry of more companies into the New Zealand forestry scene, including North American and South-East Asian businesses.

Seventy percent of the planted forest estate is now owned by 11 major forestry organisations, many with considerable offshore investment. The remaining 30 percent is owned by small companies, local government, partnerships, joint ventures and many thousands of landowners.

Recently, the dominance of large forestry companies in planting new forests has started to give way to the activities of individuals and groups of smaller investors. Forest growers other than the main forestry companies and syndicates planted about 54 percent of the new forest area in 1995 (table 2).

Table 2: New planting by ownership category

	1994 (hectares)	1995 (hectares)
Forestry Corporates	14,300	17,600
Forestry Syndicates	20,000	15,000
Small Forestry co'ys	10,000	5,000
Others	53,900	33,300
	98,200	70,900

Source: Ministry of Forestry, 1996

While there is currently no way of sub-dividing the category "Other", it is reasonable to assume it consists of individual investors, small land owners (often absentee owners), lifestyle block owners, farmers, etc.

If this rate of new planting by small growers continues (and there is every reason to believe it will), it is possible that within 10 years they will own nearly half of New Zealand's planted forest estate.

Meat and Wool Board Economic Service farm surveys indicate woodlots increased from two hectares to five hectares per farm in the period 1984 to 1994. The Service also reported conversions of farms to forestry averaged 45 000 hectares per year over the decade to 1994, whereas the increase in new plantings within the remaining sheep and beef farms averaged only about 5500 hectares per year. A conclusion is that the majority of small forest growers are urban investors, small companies, partnerships, and individuals buying farmland and converting it to forestry, while farmers could be undertaking as little as 15 percent of all new planting.

However, many of the small forest blocks which are currently being harvested and will be due for harvesting over the next few years were planted under the Forestry Encouragement Grant Scheme, which was administered by the New Zealand Forest Service from 1970 through to the early 1980s. A majority of the landowners who took advantage of this grant scheme were/are farmers.

MEASURING THE RESOURCE

Information on the planted production forest resource in New Zealand is collected by the Ministry of Forestry through a National Exotic Forest Description (NEFD) survey. Data for the NEFD (forest area by species by crop type by age class) are collected through annual postal surveys.

Other sources of resource information used by the Ministry are:

Nursery surveys: Each spring the Ministry carries out surveys of tree sales by the main forest tree nurseries. Tree sales figures are used to calculate estimates of new planting in the immediate past winter. New planting figures calculated from the nursery survey results are cross checked with NEFD data, when the later becomes available, which is usually around 12 to 18 months after planting.

Agricultural Census: Every three to five years, Statistics NZ (SNZ) carry out a full Agricultural Census which surveys all landholders. Lower level surveys are conducted in the intervening years. Part of the Census measures forestry on landholdings in terms of number of hectares of planted exotic trees. It does

not survey three very important components needed in the NEFD process, namely year of planting, species and regimes.

Historically, maintenance of the NEFD survey frame was fairly straight forward as only a few large forest owners held most of the total forest area, while a larger number of small owners accounted for a relatively small proportion. Generally, the numbers of owners (large and small) remained reasonably static, with most new planting being done by corporates. As shown in table 2, this situation is changing.

After maintenance of the Private Forest Owners (PRIFO) database was discontinued by the NZ Forest Service in 1985, less attention was given to collecting national inventory data from owners of small (<40 hectares) woodlots. Due to limited resources, the Ministry of Forestry has, since 1987, concentrated its efforts on the NEFD survey of those (known) owners with more than 40 hectares. Consequently, information for owners with less than 40 hectares became increasingly less reliable. To address this issue, in 1994 the Ministry negotiated with SNZ for a statistical sample of those owners with less than 40 hectares of forest. The results of the sample were incorporated into the 1995 NEFD survey results.

Remote Sensing

The Ministry of Forestry, in collaboration with interested parties, particularly regional and district councils, has a project underway to produce a forest Land Cover Data Base (LCDB). This GIS system uses SPOT 2 and 3 satellite imagery with a resolution of 20 x 20 metres. The positional accuracy of the mapped output is ±20 metres, which is the same accuracy as the 1:50 000 topomap series. The minimum land cover area recorded is one hectare.

SPOT satellite imagery captured more than 80 percent of New Zealand's land area in the summer of 1996. Over 30 percent has been classified to the LCDB specification during year one of this three year project.

Areas currently classified cover the Northland Regional Council, Environment Bay of Plenty, Hawkes Bay Regional Council, and Marlborough and Clutha District Councils. These councils have formed consortiums with the Ministry of Forestry to help cover costs associated with the work. Taupo District and Gisborne District have also been classified, funded through other arrangements. Further parts of the country will be classified as more local authorities and other organisations show their interest. At this stage the project is on track for completion in 1998.

Work has been done to show the difference between net stocked area from satellite inventory and the NEFD. For all areas completed to date, planted forest areas from satellite imagery shows consistently more forest than NEFD. For example, Taupo District = 5.6 percent more, Marlborough District = 8 percent more, and Gisborne District = 30 percent more. Estimates for the completed LCDB project are that it could show between 10 and 15 percent more planted forest than the NEFD. As mentioned in the section above, the NEFD is weakest in the capture of small forests, particularly those less than 40 hectares. It is likely, therefore, that the area of small forests described in the NEFD (and in this paper) is rather conservative.

As with all GIS systems, because the information has been digitised and is orthocorrected, a variety of outputs, for example, forest area by slope category or by topographic representation, can be produced. Other possibilities include address matching forest area to land owner (land owner data resides in the Digital Cadastral Data Base - DCDB).

Once the classification process has been completed for the country, updates measuring change will be more straightforward and less costly in time and money.

LOCATIONS OF SMALL FORESTS

The greatest number of small forests (all species) of less than 1000 hectares is in the Southern North Island wood supply region (table 3), followed by Canterbury and Otago/Southland. The West Coast has the fewest.

Table 3 (which is for all species) cannot be adequately reproduced for radiata pine because of the way forest resource information in collected and entered into the NEFD database (Statistics New Zealand for owners with <40 hectares and Ministry of Forestry for over 40 hectares),

Table 3: Number of Planted Forests by Size Class @ 30 June 1994 - All Species

	Size class (hectares)					
Wood Supply Region	<10	10⇨40	40⇨100	100⇨500	500⇨1000	Total
Northland	832	288	62	54	20	1 256
Auckland	1 156	301	68	37	23	1 585
Central North Island	1 458	468	93	80	36	2 135
East Coast	142	114	28	52	8	344
Hawkes Bay	492	258	52	66	5	873
Southern North Island	1 844	787	209	137	25	3 002
Nelson/Marlborough	491	290	122	69	18	990
West Coast	83	54	15	18	7	177
Canterbury	1 544	527	100	42	15	2 228
Otago/Southland	1 338	672	125	67	17	2 219
New Zealand total	9 380	3 759	874	622	174	14 809
Avge size per owner (ha)	3	18	58	209	678	27

Source: Statistics New Zealand 1994 Agricultural Survey

CONTRIBUTION TO NATIONAL RESOURCE

Nationally, small forest growers own one fifth of the total radiata pine estate (table 4) and one quarter of the pruned radiata pine estate (table 5).

There are some significant regional differences, with the Southern North Island's small forest growers owning half of the region's estate (including half of the pruned resource). Similarly, small growers in Canterbury also own half of the pruned estate. Small forest growers as a group also own half of the national radiata pine estate in the 1 - 5 year age class, a reflection of the high rates of planting carried out by this group over the last four years.

To estimate the contribution made to the national forest resource by New Zealand's small forest growers, it is assumed in this paper that their radiata pine crops will be harvested at age 28 years, which means the area currently in the 26-30 year age class would be felled in the 1995-2000 lustrum, and so on.

Tables 6 to 9 show the harvest in thousands of cubic metres per year. Some information cannot be reported because of the Ministry of Forestry's confidentiality rules, as indicated by the asterisks (***).

Table 4: Small Forest Grower's Share of the Radiata Pine Estate

	Percentage of the national radiata pine estate, by age class						
Wood Supply Region	**1-5**	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**Total**
Northland	52	7	8	15	17	15	17
Auckland	54	23	15	18	14	12	25
Central North Island	18	2	3	2	3	1	5
East Coast	53	7	4	4	3	10	25
Hawkes Bay	38	10	9	9	7	9	18
Southern North Island	72	36	34	46	36	14	52
Nelson/Marlborough	61	19	17	19	16	14	29
West Coast	40	3	4	5	3	5	9
Canterbury	75	31	30	21	20	27	40
Otago/Southland	72	15	17	18	12	13	33
Total	49	11	10	11	9	8	20

Source: Ministry of Forestry, 1996

Table 5: Small Forest Grower's Share of the Pruned Radiata Pine Estate

	Percentage of the national pruned radiata pine estate, by age class					
Wood Supply Region	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**Total**
Northland	12	16	20	17	14	26
Auckland	30	23	29	29	13	39
Central North Island	2	3	2	4	2	6
East Coast	10	3	4	4	17	30
Hawkes Bay	13	13	12	9	17	23
Southern North Island	35	35	44	30	29	53
Nelson/Marlborough	21	19	23	18	13	35
West Coast	3	2	1	3	5	7
Canterbury	67	50	24	16	30	54
Otago/Southland	17	23	19	10	12	34
Total	13	12	13	11	10	24

Source: Ministry of Forestry, 1996

Table 6: Small Forest Grower's Harvest : Radiata Pine

	Total Harvest (000 m3 Per Year)					
Wood Supply Region	**1995-2000**	**2001-05**	**2006-10**	**2011-15**	**2016-20**	**2021-25**
Northland	27	193	356	309	263	1,291
Auckland	44	168	361	201	188	903
Central North Island	31	232	176	327	213	1,545
East Coast	17	29	79	100	183	3,082
Hawkes Bay	22	88	180	184	96	1,183
Southern North Island	52	350	751	574	648	3,510
Nelson/Marlborough	78	343	410	365	350	1,840
West Coast	4	9	24	17	5	91
Canterbury	55	107	184	226	256	1,024
Otago/Southland	50	175	311	284	203	2,214
Total	381	1,695	2,831	2,588	2,404	16,684

Source: Ministry of Forestry, 1996

Table 7: Small Forest Grower's Harvest : Pruned Logs - Radiata Pine

	Pruned Log Volume (000 m3 Per Year)					
Wood Supply Region	**1995-2000**	**2001-05**	**2006-10**	**2011-15**	**2016-20**	**2021-25**
Northland	6	33	62	61	59	262
Auckland	3	29	54	31	32	131
Central North Island	5	41	36	64	47	365
East Coast	4	6	15	14	44	770
Hawkes Bay	4	18	44	44	23	301
Southern North Island	13	59	153	124	151	898
Nelson/Marlborough	7	28	44	39	58	289
West Coast	***	3	2	3	2	30
Canterbury	8	10	25	33	39	133
Otago/Southland	10	39	69	72	54	494
Total	***	265	502	487	508	3,672

Source: Ministry of Forestry, 1996

Table 8: Small Forest Growers Harvest : Unpruned Logs - Radiata Pine

	Unpruned Log Volume (000 m3 Per Year)					
Wood Supply Region	**1995-2000**	**2001-05**	**2006-10**	**2011-15**	**2016-20**	**2021-25**
Northland	16	121	220	185	152	769
Auckland	33	109	242	133	123	612
Central North Island	19	139	102	193	120	869
East Coast	9	17	46	62	98	1,612
Hawkes Bay	13	51	96	99	52	622
Southern North Island	32	241	495	374	412	2,158
Nelson/Marlborough	52	230	268	239	214	1,134
West Coast	***	5	19	12	2	49
Canterbury	31	61	102	126	142	583
Otago/Southland	30	103	183	161	113	1,309
Total	***	1,075	1,773	1,585	1,429	9,717

Source: Ministry of Forestry, 1996

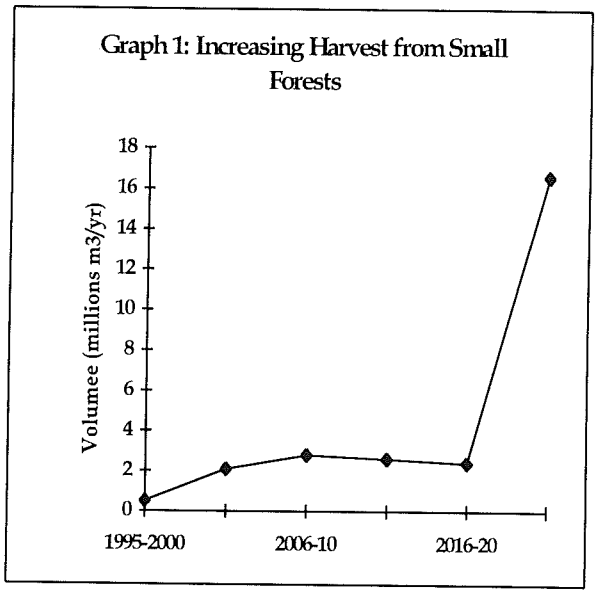
Table 9: Small Forest Growers Harvest - Pulp Logs - Radiata Pine

	Pulp Log Volume (000 m3 Per Year)					
Wood Supply Region	**1995-2000**	**2001-05**	**2006-10**	**2011-15**	**2016-20**	**2021-25**
Northland	5	40	74	63	51	260
Auckland	9	31	65	37	33	160
Central North Island	7	53	38	69	46	312
East Coast	4	7	18	24	41	700
Hawkes Bay	5	20	40	40	21	260
Southern North Island	7	50	103	76	85	454
Nelson/Marlborough	19	85	98	87	78	417
West Coast	***	***	3	2	***	13
Canterbury	16	36	57	67	74	309
Otago/Southland	10	33	59	52	36	410
Total	***	***	555	516	***	3,295

Source: Ministry of Forestry, 1996

CONCLUSION

Within the next three to eight years there will be a significant increase in the volume of radiata pine available from small forests. Volumes during the period 2001 to 2005 are estimated to increase more than three fold over the 1996 to 2000 period, to an average of 1.7 million cubic metres per year. In the next nine to 14 years, this will increase further to an estimated 2.8 million cubic metres per year (graph 1). This will level out through to the year 2021, when there will be a dramatic increase to over 16 million cubic metres per year - about half of New Zealand's annual harvest.



There are considerable regional variations in the increases. Initially over the next five to 10 years, the largest increase will be in the Southern North Island and Nelson/Marlborough (table 6). Other significant increases over the next five to 15 years will be in Northland, Auckland, the Central North Island and Otago/Southland. The really spectacular rises will occur at the end of the study period (2021-25) on the East Coast, in the Southern North Island and in Otago/Southland.

The current methods of collecting information on the small forest estate through the NEFD and statistical sampling are underestimating the size of the resource. A major limitation is that the data is not spatial, and therefore cannot show map locations of small forests. However, previous work by the New Zealand Forest Service, and recent work on remote sensing, indicates that the resource is quite scattered, even within those areas having large numbers of hectares in small forests.

A major limitation of the current data is a lack of knowledge about who owns the forest resource. It may or may not be the function of a central organization like the Ministry of Forestry to collect (or disseminate) this information. However this issue will certainly have to be addressed if the resource is to be successfully marketed to the best advantage of both grower and buyer.

The Ministry of Forestry has projects underway to improve the collection of both statistical and spatial data. Remote sensing offers one of the most promising tools, but it will need to be in conjunction with other surveys which provide age class and regime information.

The increases in small forest harvesting will impact on many aspects of the forest industry and, in many areas, on rural life. Planning should already be underway by the industry to ensure that this largely unallocated forest resource is successfully and sustainably managed, marketed and harvested. This will require large investments in developing and maintaining a skilled labour force and in obtaining specialised machinery and equipment.

REFERENCES

Meat and Wool Board Economic Service *New Zealand Sheep and Beef Farm Survey 1993-94.* New Zealand Meat and Wool Board Economic Service Publication No 2093, 1996.

Ministry of Forestry, *A National Exotic Forest Description as at 1 April 1995*, 1996

Ministry of Forestry, *NEFD Yield Tables as at 1 April 1995*, 1996

Ministry of Forestry, *NEFD Wood Supply Forecasts 1996*, 1996