

Changing silvicultural practices in response to investor and market demand – A Nelson perspective

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Background

The Nelson region has a mature forest industry with the first large-scale exotic forests established in the 1920s at Golden Downs forest by the NZ Forest Service. The region has developed a good mix of wood processing plants, including one of New Zealand's largest sawmills at Eves Valley. This is a world scale LVL and MDF facility owned by Nelson Pine Industries, and New Zealand's largest post and pole processing plant owned by Goldpine at Tapawera.

The current annual harvest is around 1.3 million cubic metres of which 1.1 million cubic metres are from the owners of larger forests. Approximately 400,000 cubic metres of logs are exported from Port Nelson, or 30 per cent of the total harvest. Log availability is projected to be flat until 2020, constraining the ability of processors to build additional capacity and providing an underpinning of log price in the region especially for the higher quality unpruned log.

Forest growth rates are generally pretty average and many sites are characterised by low fertility and heavy weed infestation. However, close proximity to processing facilities, relatively cheap logging costs, and good local demand for quality logs make up for some of the region's shortfalls.

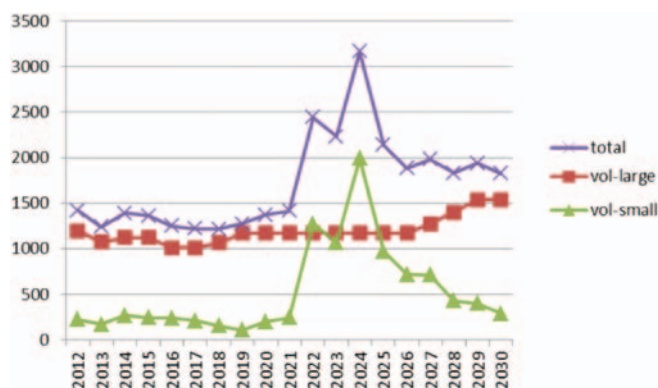
The ownership pattern of the forests in Nelson has been, and still is, dominated by the larger corporate forest owners with a relatively small number of private forest owners whose woodlots are in the size range of five to 100 hectares. There are some larger forests in the 1,000 to 5,000 hectare range owned by local councils and local wood processors. Radiata pine accounts for 90 per cent of all plantings and around 55 per cent is, or is expected to be, pruned to four metres or above. (Source MAF 2006 Nelson/Marlborough Wood Availability Forecasts)

Major processing plants

Plant	Products	Annual log demand in cubic metres
Nelson Pine Industries	LVL, MDF	LVL 100,000, MDF 300,000
Eves Valley Sawmill (CHH)	Framing timber	350,000
South Pine	Framing timber, some clears	130,000
Waimea Sawmillers	Framing timber, Douglas fir	100,000 (50 per cent radiata)
Goldpine	Posts and poles	80,000

Log supply

The forecast Nelson log supply under a likely harvesting scenario.



Volumes in thousands of cubic metres

Supply from the large corporate growers is fairly flat until 2027. The blip in 2022 to 2027 is due to the increase in small-scale forest owner volumes arising from the surge in plantings in the 1990s. Forecast supply of pruned timber as a percentage of the total harvest will progressively decline, and supplies of higher grade unpruned log will increase, although slowly.

Forest ownership

Owner	Type	Stocked area in hectares
Nelson Forests Ltd	CFL, freehold	40,800
Tasman Bay Forests Ltd, and CHH residual forests both managed by Hancocks	CFL, freehold	25,000
CNBM ex Rayonier forests Motueka	CFL	3,700
Nelson Pine Industries	Freehold	1,900
Tasman District Council	Freehold	2,700
Westfield Forest Industries (Waimea Sawmillers)	Freehold	2,200
Small-scale owners	Freehold	23,700
	TOTAL	100,000

Changes in forest ownership

The NZ Forest Service was the dominant forest owner in Nelson since the first of its plantings at Golden Downs in 1927. Ultimately it established over 50,000 hectares in Nelson including Golden Downs, the second largest state forest after Kaingaroa. In April 1987 the Forest Service became a State Owned Enterprise/NZ Forestry Corporation with its subsidiary NZ Timberlands Ltd. In July 1990 cutting rights to the forests at Golden Downs were sold to Tasman Forestry (Fletcher Challenge Forests).

In 1992 UBS Resource Investments International formed a joint venture with Fletchers and in April 1997 Fletchers sold 51 per cent of its interest in the joint venture to Weyerhaeuser, with the remaining 49 per cent held by UBS Resource Investments International. Subsequently in October 2007 Weyerhaeuser sold its entire interest to Nelson Forests Ltd, an international timber fund managed and advised by Global Forest Partners Ltd.

The Baigent family name is well known in Nelson for their association with developing around 20,000 hectares of forest in the Moutere area. In 1985 Shell-Todd bought 80 per cent of Baigents' interest, and commissioned the building of the Eves Valley sawmills. Three years later Carter Holt Harvey formed a 50/50 joint venture with Shell, and bought out the remaining Baigent family interests. In 1992 Carter Holt Harvey bought out all of Shell's interest so that it owned 100 per cent of the forests and mill.

In 1981 CSR, a large Australian company with aluminum, sugar, and building interests, formed a consortium with the Baigent family to build a thermo mechanical pulp mill at the Eves Valley site, going as far as to buy the land that would later be used for the sawmill. The land is still zoned to allow a pulp mill to be built, but this is now unlikely to ever happen.

The Baigent family bought licences to the Hira and Waimea forests from the Crown in October 1990. Carter Holt Harvey subsequently bought out Baigents' interests in the CFLs, and some freehold land in 1992. Weyerhaeuser tried to buy these assets in 1998 from Carter Holt Harvey but was declined permission by the Commerce Commission. In 2006 the Carter Holt Harvey forests were sold to investors advised and managed by Hancock Natural Resource Group, with the Nelson forests held in a company called Tasman Bay Forests Company Ltd.

Cutting rights to Motueka Forest were sold to ITT Rayonier in April 1992. Rayonier then sold its interest to GMO in 2001, who then on-sold to Chinese National Building Materials Forest Products NZ Ltd in September 2011.

Historic tending practices

Historically Nelson has had a diverse mix of tending practices for its radiata pine stands. Generally these have been due to the long-term strategies adopted by the forest owner and their stakeholders, and in particular whether they own local processing facilities

New Zealand Forest Service

Until 1987, when the majority of the State forests were sold to corporate owners, the Forest Service adopted a policy of pruning where economics justified and sometimes for social reasons to provide employment. Most of its forests up to the time of the asset sales were intensively tended on a clearwood regime, with heavy gorse sites tended under a framing regime thinned to 500 stems per hectare.

During the 1970s and 1980s some intensive work was carried out by foresters at Golden Downs to rationalise tending regimes, as summarised in the table below.

Year	Forester	Pruned height metres	Final crop dollars per hectare
1972	Wylie	6.0 in three lifts	300 in two thins
1974	Boyd	6.1 in two lifts	270 in one thin
1976	Croawell	4.8 in two lifts	300 in one thin
1980	Chandler	5.5 in three lifts	300 in one thin

Much of the argument for selection of particular pruned heights was on the basis of the minimum pruned log length of 4.8 metres required by local sawmills and the IPL peeler plant at Greymouth which required peeler logs at a minimum length of 5.2 metres. Little consideration was given to the top log quality.

The work of Wink Sutton and Bob Fenton in the 1970s and 1980s leading to the Radiata Pine Taskforce provided the technical resources for young foresters armed with computers for the first time to assess a wide range of regimes and cost/revenue inputs.

In general, intensive tending of three lifts to six metres and thinning to around 250 stems per hectare became the norm supported by promises of high log prices and strong demand for pruned logs in the face of declining supplies of clearwood from traditional sources from Southern Pines in the United States and the tropics.

Tasman Forestry Limited

As the first owners of Golden Downs after 70 years of state ownership, Tasman Forestry Limited adopted a more rigid policy towards pruning and made a more concerted effort to align its forest management with the demands of its customers. Planting stocking rates were lowered to 800 stems

per hectare and higher GF seedlots were sourced from its North Island seed orchards. Pruning was no longer continued in the slower growing southern stands and these were thinned only to 400 stems per hectare. On higher producing sites, trees were pruned to a minimum of 5.3 metres in two lifts and thinned to 300 stems per hectare.

Weyerhaeuser (Nelson Forests)

Weyerhaeuser continued with pruning but its successor, Nelson Forests, stopped all pruning in 2009 and moved to a structural tending regime involving a thin at a mean top height of 14 metres at age 10, with a 27-year target rotation. Re-establishment involves using mainly bare root seedlings with high density and growth characteristics.

Baigent Forest Industries

The main aim central to the Baigent ethos, and carried on by Carter Holt Harvey, was to supply quality unpruned logs to its Eves Valley sawmill. The rationale for this strategy was that the forests in Nelson grew good form trees with small branching due to the low fertility sites. The mill was designed around the resource which would form the mainstay of its supply.

As a result it targeted the recovery of framing timber and later adopted machine stress grading. The log in-feed was designed to only cater for logs up to 60 cm large end diameter and there was no provision for processing pruned logs and clearwood recovery. In the 1980s extensive sawing studies were carried out and the conclusion was that a one-hit framing regime with thinning to 500 stems per hectare on a 28-year rotation was the optimal regime, and superior to a pruning option.

The Baigent family, and later on Carter Holt Harvey, stuck rigidly to the no-pruning regime. This was despite the prevailing wisdom at the time being for intensive pruning as advocated by FRI and adopted by most of the larger forest growers in the Nelson area.

Carter Holt Harvey

From 2000 to 2005, Carter Holt Harvey implemented its infamous millennium regime of plant-and-leave at 550 stems per hectare. As expected these stands are of variable quality with some having poor form and heavy branching. In 2006, planting stocking rates increased to 830 stems per hectare with the intention to thin to 500 stems per hectare at age eight to nine.

Tasman Bay Forests Ltd (Hancocks)

Hancocks has continued the tending regime adopted by Carter Holt Harvey in 2006. The target is to grow a good form tree with small branching on

a 27-year rotation, mainly as a supply to the Eves Valley mill. No specific measures are carried out to segregate out high stiffness logs at the harvesting site and testing for sonics is done at the Eves Valley mill log yard.

Current and future market log demand

Pruned

Nelson has a fairly weak pruned log market. The majority of the larger diameter pruned logs from the Nelson Forest Limited estate go to its Kaituna sawmill complex in Marlborough. This mill processes around 85,000 cubic metres of pruned logs a year, and is gearing up for expansion to capitalise on the large volume increases forecast in the Marlborough region. Smaller diameter pruned logs are either exported or sold to local mills.

	Estimated cubic metres a year
Southwood-Motueka	3,000
South Pine	3,000
Pruned export	10,000

Nelson Forests Ltd only own about 30 per cent of the Marlborough planted resource. Therefore it is confident of securing sufficient pruned log volumes outside its own estate, even though it has elected to stop pruning in its own forests.

There appears to be a significant under-use of Nelson's pruned resource with relatively poor pricing that would not cover the cost of the pruning investment. Often pruned logs are sold as unpruned simply because there is no demand for the volume produced. With the largest regional consumers of pruned logs being either in Marlborough or on the West Coast, the additional costs of cartage make the returns on pruning barely viable. South Pine once had a strong market in the United States but withdrew from this market some 10 years ago. It is now mainly selling clears into a very competitive Asian market, or selling cut-of-log pruned to the Australian outdoor and landscape market.

Unpruned

The introduction of machine stress grading in 2007 and the start of the Nelson Pine Industries LVL plant in 2002 has created strong demand for quality unpruned logs with high density and stiffness. Had it not been for the downturn in general construction and weak overseas markets over the last few years the shortage of quality unpruned logs in Nelson would have reached critical levels. Most of the larger users of these logs have been running well below capacity until recently, and there is still scope for production increases without building new plant. However lack of guaranteed supply has meant that mills are reluctant to commit capital to fund expansion.

Unpruned log demand, excluding export and chip or roundwood, for the major companies is shown in the table.

Company	Estimated cubic metres a year	Sonic testing required	Product
South Pine	135,000	Yes	MSG timber
Eves Valley-Carter Holt Harvey	350,000	Yes	MSG timber
Waimea Sawmillers	48,000	Yes	MSG timber
Nelson Pine Industries	100,000	Yes	LVL
Other sawmills and processors	50,000	No	Unverified timber

A considerable volume of unpruned logs are brought in from Marlborough to supplement the Nelson supply. Increasing volumes of logs from older age forests in the Marlborough Sounds are being harvested and the high density logs find a ready market in Nelson.

Only certain areas of the Nelson region are capable of growing high density logs on sites near the coast or at lower altitudes. Density increases directly with age and is helped by maintaining higher final crop stockings. Some forest owners are also electing to use genetically improved seedlots with high GF plus density classification as well as existing rotation length to a target of 30 years, specifically to improve average tree quality.

Sonic testing of logs in harvesting operations at sites of known high density is now common as a screening tool to weed out low sonic logs and as a means of providing a guarantee to the log processors of minimum sonic values. Local processors who require sonically tested logs are responding to the shortage. They are paying very good prices for logs where the seller can guarantee they exceed a minimum sonic threshold. Recently prices have been within \$10 to \$20 of similar sized pruned logs.

Response of major forest companies

Nearly all of the major forest growers in Nelson have interests in log processing plants and are therefore closely in touch with the market for processed timber products. They are also strongly motivated to maximise the long-term returns for their shareholders, and in the case of Tasman Bay Forests and Nelson Forests Ltd, overseas absentee investors. Their perspective on what kind of logs are required into the future to maximise returns, and the management regimes to produce these logs, are therefore very closely connected.

Nelson Forests Ltd

This company recognises that the Nelson

region inherently grows good framing logs. Its own economic analysis confirms that there is no financial justification for pruning on any of its sites. To capture the value of the unpruned resource, Nelson Forests Ltd carries out log segmentation for some of its customers using the Hitman tool and is looking at stratifying its estate to closely identify which sites are best at producing high density logs. On some low-producing and high risk sites a plant and leave option is also adopted.

With the Nelson region having been affected by large wind storms in 2004 and 2008, and a series of smaller storms more recently, many forest owners including Nelson Forests Ltd are now questioning the value of growing radiata pine, beyond age 27. Windthrow risk is known to increase significantly once trees are over 20 years old with the cost of recovery and safety risks being substantial. Investing in pruning adds yet another financial risk.

Tasman Bay Forests

Hancock Forest Management, as manager of Tasman Bay Forests, has maintained a standard, framing regime for some time as the predominant supplier to the Eves Valley mill. They do not see any reason to deviate from this strategy other than some fine tuning around planting stockings depending on site.

Chinese National Building Materials Forest Products

Since acquiring the estate in 2001, Chinese National Building Materials Forest Products NZ Ltd have maintained a structural regime and do not prune any of their sites. The mainly granite soils of the Motueka forests are known for being of very low fertility but producing trees with excellent form and small branching.

These forests were severely damaged during the 2004 wind storm and the soils, particularly when wet, are unstable with low anchoring ability. The managers report that as a result, wind damage is common and seen with increasing frequency. While targeting high density logs they recognise that long rotations expose the forests to excessive risk. Therefore a 26 to 27-year rotation age is targeted, even though this compromises the ability to produce a high proportion of the higher density LVL grade logs.

Nelson Pine Industries

Nelson Pine Industries have a narrow focus on producing small branched high density trees on all its sites to supply LVL logs. The average log sonics have a significant bearing on recovery of the higher value E13 LVL grades. Currently the mill demands a minimum of 3.1 km per second but would prefer to raise this to 3.3 km per second if the log supply

was available. At present the limited availability of the higher sonic log grades in Nelson are hindering their ability to ramp up production, which could be doubled with more resources.

As with some of the other companies Nelson Pine Industries is targeting lower rotation ages in response to what it sees as an increasing severity of wind storms. To offset the adverse effects on sonics from lower rotation ages they are stepping up the use of clonal seedling material with known high density properties.

Tasman District Council

Pruning is carried out only at Rabbit Island and some of the hill forests with low operational costs. Most of the Tasman District Council forests produce good quality framing logs with high density which command high prices. With modest local pruned log demand there is little incentive to increase the amount of pruning. Since the introduction of the GFPlus scheme in 1998 the Tasman District Council has deliberately targeted high density tree stock.

Waimea Sawmillers

As an integrated company owning a medium sized sawmill and 2,200 hectares of forest, Waimea Sawmillers is well placed to make an informed judgment about how management of its forests in response to the future anticipated market timber demand. It sees strong demand for timber that can be

applied for high machine stress grading ratings MSG8 and above, cuttings grades, and finger-jointing. The company has long abandoned purchase of pruned logs but does buy some part-pruned logs, which it finds suitable for outdoor timber for the Australian market, and engineered wood products for the local and export markets.

Conclusion

Pruning has largely been discontinued by the larger forest companies in Nelson. There is now general consistency around producing small branched high density logs by planting high density tree stocks and thinning to around 500 stems per hectare. Rotation ages are targeted to come down to between 26 and 28 years, mainly to reduce the potential risks and costs associated with windthrow.

Regimes are now firmly focused on capitalising on the inherent good form and density of structural logs grown in this region and to produce the type of log that is demanded in increasing volumes by the major log processors in the region. The close match between what is being grown in the forest and what types of logs are required by industry in response to timber markets is evidence that, despite the general lack of vertical integration, the two sides in the forest industry are working together for the common good.

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