



## CHAPTER 11 - SUMMARY

### Ian Nicholas (Scion)

Interest in redwoods for commercial plantations has been revived in New Zealand. This has developed for two main reasons, the performance of second-growth redwood on the Californian market which is lower quality than old-growth-timber, and recent overseas investment in New Zealand redwood forestry. Furthermore, the formation of a Sequoia Action Group within the NZFFA has seen a focus on redwood by farm forestry members and specialist consultants. Also, a Redwood Group has been formed under the Diverse Species sub-theme within The Future Forests Research Ltd. These factors have combined to produce a redwood forest resurgence, creating interest and activity within the New Zealand forest industry. The move from amenity tree to plantation tree has generated research activities to provide confidence to those establishing redwood plantations. Information gained on siting and management will help ensure plantations are successfully established and well managed. Economic assessments, based on a range of assumptions, suggest that redwood plantations can be grown profitably. However, the variation in wood

properties, especially durability, must be overcome to produce a product that meets the expectations of both New Zealand and Californian markets.

Apart from some provenance trials, very little information is available for giant sequoia, despite it having potential for forestry on sites where traditional forest species are less well suited.

Growing redwoods is still a small portion of the New Zealand forestry scene. Further investment is required to know and grow improved stock, understand wood durability in New Zealand-grown timber.

However it appears redwood can perform very competitively with main-stream forestry species if it is sited and grown competitively.

As more information becomes available on redwood forestry topics this electronic handbook will be updated to provide the most up to date relevant information for those interested in redwood plantations.



## Key Points

- Growing redwood is a developing industry in New Zealand.
- Experience suggests that redwood plantations can be well grown and utilised in New Zealand.

Little information exists to evaluate the potential of giant sequoia for plantation forestry.

As new information is obtained, key results will be updated through the NZ Farm Forestry Association via this handbook.

## Suggested reading:

Nicholas *et al.* 2007

Tree Grower 2007





## CHAPTER 12 - REFERENCES and WEB LINKS

### References / Bibliography

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## Weblinks

- [www.nzffa.org.nz](http://www.nzffa.org.nz)
- [www.nzfor.co.nz](http://www.nzfor.co.nz)
- [www.maf.govt.nz/sff](http://www.maf.govt.nz/sff)
- [www.maf.govt.nz](http://www.maf.govt.nz)
- [www.scionresearch.com](http://www.scionresearch.com)
- [www.rarefind.co.nz](http://www.rarefind.co.nz)
- [www.proseed.co.nz](http://www.proseed.co.nz)
- [www.ebop.govt.nz](http://www.ebop.govt.nz)
- [www.horizons.govt.nz](http://www.horizons.govt.nz)
- [www.ffr.co.nz](http://www.ffr.co.nz)





## CHAPTER 13 - GLOSSARY

**Appearance grade:** Grades of timber for finishing and other uses determined basically from the appearance of the better face and edge, usually clearwood.

**Bare-rooted planting stock:** Plants (seedlings, cuttings or other) grown in open nursery beds rather than containers and lifted and planted with much of the soil gone from their roots.

**Basal Area:** The cross sectional area of all tree stems in a stand, measured at breast height and usually expressed per hectare of land.

**Basic Density:** The average density of the wood at 0% moisture content

**Breeding:** Intensive selection and subsequent mating of top selections to achieve cumulative genetic gain over time.

**Breeding population:** The population in which breeders carry out intensive selection and genetic recombination. It comprises the selections that are inter-mated and their resulting offspring. It requires a broader genetic base than the seed production (orchard) population.

**Cambium:** A layer of rapidly growing cells between the bark and the wood, from which new wood and bark develop.

**Clearwood:** A length of timber which is free of knots due to branch removal, usually achieved by pruning.

**Clearfell or Clearcut:** Harvesting of trees in which essentially all trees are removed in one operation.

**Clone:** A group of genetically identical plants, which have been vegetatively propagated from a single individual.

**DBH:** Diameter at breast height of tree stems, at 1.4 m in New Zealand.

**Family:** A group of individuals directly related by descent from a common ancestor.

**Followers:** Unpruned trees left in the stand with pruned trees at the time of thinning.

**Hardness:** A property of timber that enables it to resist indentation.

**Heartwood:** The inner, nonliving part of a tree stem. Natural chemicals are often deposited in the heartwood, making it more durable and darker in colour than sapwood.

**IRR (Internal Rate of Return):** The discount rate that equates the various costs and benefits anticipated in future years of forestry (or other) operations.

**Knots:** A cross section of a branch that is imbedded in timber. The knots can either be live knots (branch was living when the tree was cut) or dead knots (from a dead branch) which often fall out.

**MAI (Mean Annual Increment):** The total increment of a stand up to a given age, divided by that age. Includes thinnings as well as standing crop.

**Mean (arithmetic mean):** The average value for a set of observations, obtained by dividing the sum of all observations by the total number of observations.

**MoE (modulus of elasticity):** A measure of stiffness in sawn timber.

**MoR (modulus of rupture):** A measure of bending strength in sawn timber.

**Mouldings:** High grade timber, usually clearwood, sawn for specific end uses e.g. skirting.

**MTD: (Mean Top Diameter):** The average diameter of the largest 100 stems/ha in a stand.

**MTH (Mean Top Height):** The average height of the largest 100 stems/ha in a stand.

**Native population (syn. native provenance):** A group of naturally growing trees found at a particular geographic location within the native range of the species.

**Pith:** The central core of a stem and roots, inside the first annual growth layer of wood

**Progeny trial:** Evaluation of parents by comparing the performance of their offspring, properly in a replicated field layout.

**Propagation:** Multiplication of plants. Can be either via sexual reproduction (seed production) or via asexual means (vegetative propagation).

**Provenance:** The ultimate geographic origin of seed, pollen, or trees.

**Provenance test:** A replicated field trial comparing the performance of trees grown from seed collected from different parts of a species' geographic range.

**PSP plots (Permanent Sample Plots):** permanent plots that have been set up throughout the plantation estate, to provide growth information for the national database on the plantation resource.

**Resistance:** The relative ability to repel or endure pests or other damaging influences. It may vary in degree from immunity, in which the attack or influence is completely without effect to absolute susceptibility, which may result in death.

**Sapwood:** The outer layers of a tree trunk, which represent living cells and conduct water up the tree, bounded by the cambium on the outside and heartwood in the inside. Generally lighter in colour than heartwood, and non-durable.

**Sarking:** Internal roof panelling.

**Sawlog:** A log that meets standards for diameter, length and defect, which is intended for sawing.

**SED:** The small-end diameter of a sawlog.

**Seedlot:** A collection of seeds, usually of known source.

**Seed orchard:** A plantation of selected trees, established and managed primarily for the early and abundant production of genetically improved seed. The seed orchard is isolated to reduce pollination from outside sources, and trees with undesirable characteristics are removed, based on ongoing evaluations.

**Seed stands:** A well-grown stand of trees, with good growth and form, selected and managed for abundant seed production.

**Seed stratification:** A treatment given to seed to break dormancy and improve germination, which usually involves a moist chilling.

**Shelterbelt:** A strip of trees established to shelter farm- or horticultural land from prevailing winds.

**Site index:** A measure of forest site quality expressed as the average height (actual or potential) in a specific stand of trees, at a specific age (40 years for redwood in New Zealand, 100 years for redwood in the USA).

**Standing volume:** The total volume of harvestable trees in a stand.

**Stocking:** The number of trees in a given area of a stand.

**Tissue culture:** (syn. micropropagation) Growing plantlets from small pieces of plant material on artificial media in a sterile, laboratory environment.

**Tree improvement:** Often equated with tree breeding, it includes species choice and provenance selection, but may also refer to breeding in combination with cultural practices, particularly propagation.

**Veneer:** A thin sheet of attractive wood, used to cover wood of lesser value.

**Vegetative propagation:** (syn. vegetative multiplication) Multiplication of plants via asexual means, i.e. without sexual reproduction. Includes tissue culture, rooted cuttings, and grafting.

**Virulence:** The ability of an organism to cause disease.

