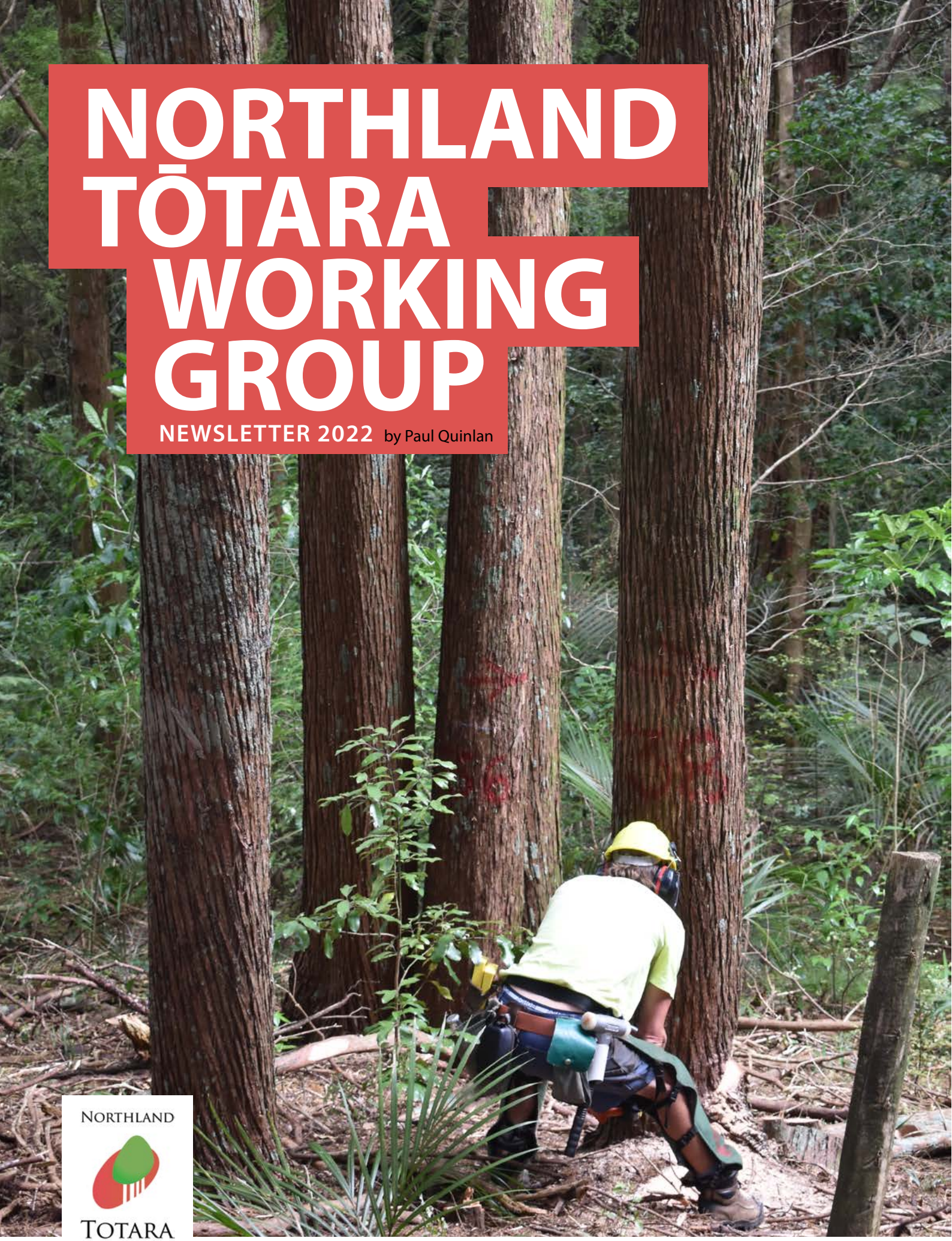
NORTHLAND TŌTARA WORKING GROUP

NEWSLETTER 2022 by Paul Quinlan



NORTHLAND TOTARA WORKING GROUP

Tāne's Tree Trust Native Trees for the Future

Northland Regional Council

SCION Forests • Products • Innovation

New Zealand Farm Forestry Association

NZ Landcare Trust

Reconnecting Northland

CAN SMALL-SCALE TŌTARA HARVESTS PAY?

A practical trial found small-volume selective harvesting of farm tōtara was viable on a Northland farm.

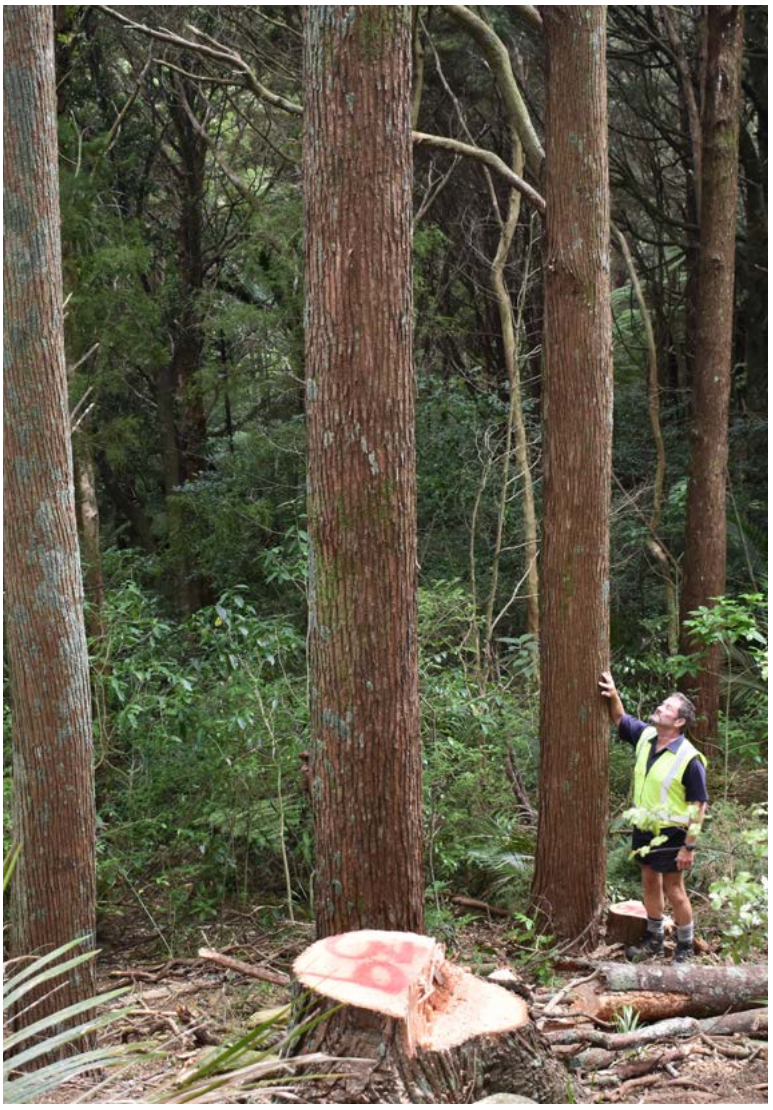
Li Legler used a European-style forestry winch mounted on a small 45hp 4WD tractor in a production-thinning operation. The tōtara forest was on a Pāmu (Landcorp Farming Ltd) property and had a Sustainable Forest Management Plan approved by MPI under the Forests Act.

The trial had the following objectives:

- Test the feasibility of using low-cost farm-based extraction machinery, for small-volume selective harvesting
- Commence active management in the forest by using harvest as a silvicultural intervention (i.e., applying a production-thinning approach)
- Test the viability of milling the logs onsite using a portable bandsaw mill and sell the timber
- Demonstrate continuous cover forestry practice.

Left: European-style forestry equipment – a 45 horsepower tractor with a PTO-driven winch on the 3-point linkage and a 4-tonne pulling capacity. **Right:** Li Legler re-purposed a mussel-farm buoy into a skiddingcone.

Production thinning in the tōtara pole-stand areas. Trees with the best potential to develop into high-quality timber trees are marked as 'keepers' using a blue band.



A demonstration of low-impact selective harvest. The poorer formed trees were **removed** and the best remain. This approach used production thinning as a silvicultural intervention to improve the future timber production value of this untended tōtara forest.

A total of 15.72m^3 of log volume was harvested. This comprised 20 trees (22 logs). The mean DBH was 40.5cm (range 30-75), with a mean log length of 5.7m, and the mean merchantable log volume was 0.71m^3 but ranged from only 0.285m^3, up to 2.18m^3. The best formed 'future crop trees' were identified and left to grow on.

Low impact harvesting techniques included:

- Directional felling – including winch-assisted falling
- Use of a skidding cone, to prevent the log catching on roots, stumps, and rocks
- Deploying snatch blocks with tree-protectors to pull logs around obstacles and avoid damage to the residual forest
- Halting the winch to roll the log, or re-direct it to avoid unnecessary damage, then resuming winching
- Protecting the bark at the base of residual trees if they were at risk from accidental contact/damage from winched logs (e.g., with branches/stone buffers).

Click image for a short video of the harvest operation.

This trial demonstrated that low impact harvests can be done with small and relatively inexpensive farm-scale sized machinery and equipment. This may be very significant when dealing with small volume harvests – where the relocation costs for conventional forestry machinery and crews would be prohibitive.

For more details see the **full article** published in the New Zealand Journal of Forestry, volume 67, issue No.2 in August 2022.

2020 TŌTARA REMEASUREMENT RESULTS

Anna Manning remeasuring tōtara trees

This MPI funded project involved the remeasurement of silviculture trial plots established in naturally regenerated tōtara by Dr David Bergin and the Northland Tōtara Working Group.

Data from 50 Permanent Sample Plots (PSPs) has yielded valuable information on growth rates, carbon sequestration, and management prescriptions for tōtara timber production. It also documents comparatively better indigenous biodiversity and development of the understory vegetation in the thinned plots compared to the unthinned plots.

The results show that silvicultural intervention – i.e., thinning and pruning, enhance both the timber production potential and biodiversity/understory development within highly-stocked natural stands of regenerating tōtara.

The full results are set out in the project report on the Tāne's Tree Trust website.

Left: Control (no thinning) and no grazing.
Right: Thinned and no grazing five years after thinning. Significant understory development occurs following thinning in tōtara pole stands. Photo credit Michael Bergin.

Left: control plot (no thinning) with no grazing.
Right: the thinned plot of the pair with no grazing five years after thinning. Photo credit: Michael Bergin.

Results

Highlights of the results include:

- Thinning induced a genuine diameter growth response in the residual trees of thinned PSPs compared to the unthinned controls (Mean top diameter of 0.54 compared to 0.36 cm/yr.).
- Annual increments in stem volume and carbon per hectare were both significantly higher in the thinned plots than in the control plots (see Table 1 below).
- Understory development and biodiversity scores were significantly higher in the thinned than in the unthinned control Plots, and significantly higher in plots with no evidence of grazing or browsing compared with those with evidence of grazing (see Table 2 below).

Table 1. Means and 95% confidence intervals of mean annual volume and carbon increments in three types of naturally regenerating tōtara-dominated stands.

Stand type	Stem volume (m^3/ha/yr)	Carbon (tCO_2/ha/yr)
Unthinned pole stands (13 d.f.)	7.50 ± 1.86	8.95 ± 2.16
Thinned pole stands (13 d.f.)	9.66 ± 1.75	11.80± 2.01
Merchantable stands (6 d.f.)	12.36 ± 4.93	13.49 ± 5.64

Table 2. Mean biodiversity score in control and thinned PSPs, and in grazed and ungrazed stands in regenerating tōtara pole stands in 2020.

Treatment	Biodiversity score	Sig.
Control Thinned	2.05 3.62	**
Evidence of grazing/browsing No grazing/browsing	1.89 3.78	**

Statistical significance of differences between control and thinned PSPs and between grazed and ungrazed PSPs indicated as follows:
** significant ($p<0.01$).

Stand Density Index

Another aspect of the project reviewed previous recommendations for thinning tōtara stands based on Stand Density Index (SDI). The latest measurements suggest there may be advantages in thinning tōtara stands to slightly lower stocking rates than previous indicated. Consequently, a revised thinning schedule has been included in the project report.

It is based on overseas experience which suggests that for a wide range of species, stands benefit from thinning when the stocking is greater than 55% of the maximum SDI, and that stands should be thinned down to 25% of the maximum stocking. The following thinning schedule (Table 3) applies that rule.

Implications for management

These results of this project indicate multiple benefits arise from silvicultural management of naturally regenerating tōtara pole-stands. These include:

- Lower mortality rates
- Thinning can significantly increase volume growth and carbon sequestration rates
- Thinning enhances understory development and indigenous biodiversity values.

The implications are that natural pole-stands of tōtara can be managed for improved timber production potential and that this is compatible with improving biodiversity values within a developing forest.

Table 3. Recommended thinning schedule for young naturally regenerated tōtara-dominant pole stands.

For any given quadratic mean DBH, a stand with stocking greater that 55% of the fully-stocked stand density should be thinned down to 25% of the maximum stocking.

Mean DBH (cm)	Stem density (stems/ha)		
	Fully stocked	55% stocked	25% stocked
10	7,686	4,227	1,921
15	4,017	2,210	1,004
20	2,535	1,394	634
25	1,774	976	444
30	1,325	729	331
35	1,036	570	259
40	836	460	209
45	693	381	173
50	585	322	146
55	502	276	126
60	437	240	109

Understory development in a heavily thinned tōtara stand where grazing has been excluded.

A PRACTICAL GUIDE TO MANAGING TŌTARA ON PRIVATE LAND

Dr David Bergin from Tāne's Tree Trust and Helen Moodie from the NZ Landcare Trust formed the Northland Tōtara Working Group in 2005.

A comprehensive guide to managing tōtara is now available free to view and download from the Tāne's Tree Trust website.

It has been funded by Te Uru Rākau to assist landowners and forest managers with practical silviculture for tōtara on private land.

https://www.tanestrees.org.nz/projects/a-practical-guide-to-managing-t-tara-on-private-land/

Check out our videos on tōtara pruning, silviculture, & harvesting

Chapter topics include:

- The tōtara opportunity
- Planting and establishment
- Pruning
- Thinning
- Sustainable harvesting

NORTHLAND TŌTARA WORKING GROUP (NTWG)

The NTWG formed in 2005 by a group interested in the potential to manage regenerating tōtara on private land.

It had five broad objectives:

- Quantify the resource of naturally regenerating tōtara on private land.
- Demonstrate the growth response of naturally-regenerating and planted tōtara to silvicultural treatment (thinning and pruning).
- Determine wood qualities and potential uses of farm-grown trees.
- Investigate the feasibility of developing a supply-chain from resource to market.
- Identify and overcome hindrances and disincentives to sustainable management of naturally-regenerating and plantation tōtara.

The group has completed many projects aimed at addressing these objectives. So far, all projects have concluded with encouraging results. Mostly the projects have been funded by the Ministry for Primary Industries through the Sustainable Farming Fund, but with support from many other organisations too. Progress on all the objectives has been made and the results of the various projects are available via the 'NTWG Publications & Resources' tab of the NTWG pages on the Tāne's Tree Trust website.

However, there is still considerable work to do to realise the potential that the Northland tōtara opportunity presents. This will be ongoing and includes submissions and discussions with authorities on the regulatory and planning issues.

NTWG Membership

A database of NTWG stakeholders is kept, including landowners with an interest in managing tōtara on their land. It is not exclusive to Northland. Latest developments and project results are sent out in NTWG newsletters to people on the NTWG mailing list. Membership is free. And anyone, throughout the country, who is interested in managing tōtara, is encouraged to join. Click here for the new membership page.

For more information, contact:

Tāne's Tree Trust: www.tanestrees.org.nz
or, email **Paul Quinlan**: pdq@pqla.co.nz

NTWG – Remember to join! It's Free!

Make sure you stay on the mailing list – register on the NTWG database (membership).

Who should join?

Everyone with an interest in growing, managing, processing, researching, buying or using farm-tōtara throughout New Zealand.

Acknowledgements

Many thanks to the landowners who granted access for the remeasurement of the tōtara PSPs and to biometrician Mark Kimberley for analysis of the data. The ongoing support from The Tindall Foundation, Te Uru Rākau, and from Gordon Williams at Pāmu Farms (Landcorp Farming Ltd) is gratefully acknowledged. Also from Scion, and the Northland Regional Council. Technical guidance from David and Michael Bergin and Tāne's Tree Trust trustees has also been appreciated. Likewise, Ian Brennan's enthusiasm and skill at producing videos, and Abby Davidson Design for the graphic layout. Many thanks to you all!