Tāne's Tree Trust
NATIVE FORESTS FOR OUR FUTURE
Hereherea te Wao-nui-a-Tāne

ANNUAL REPORT 2021

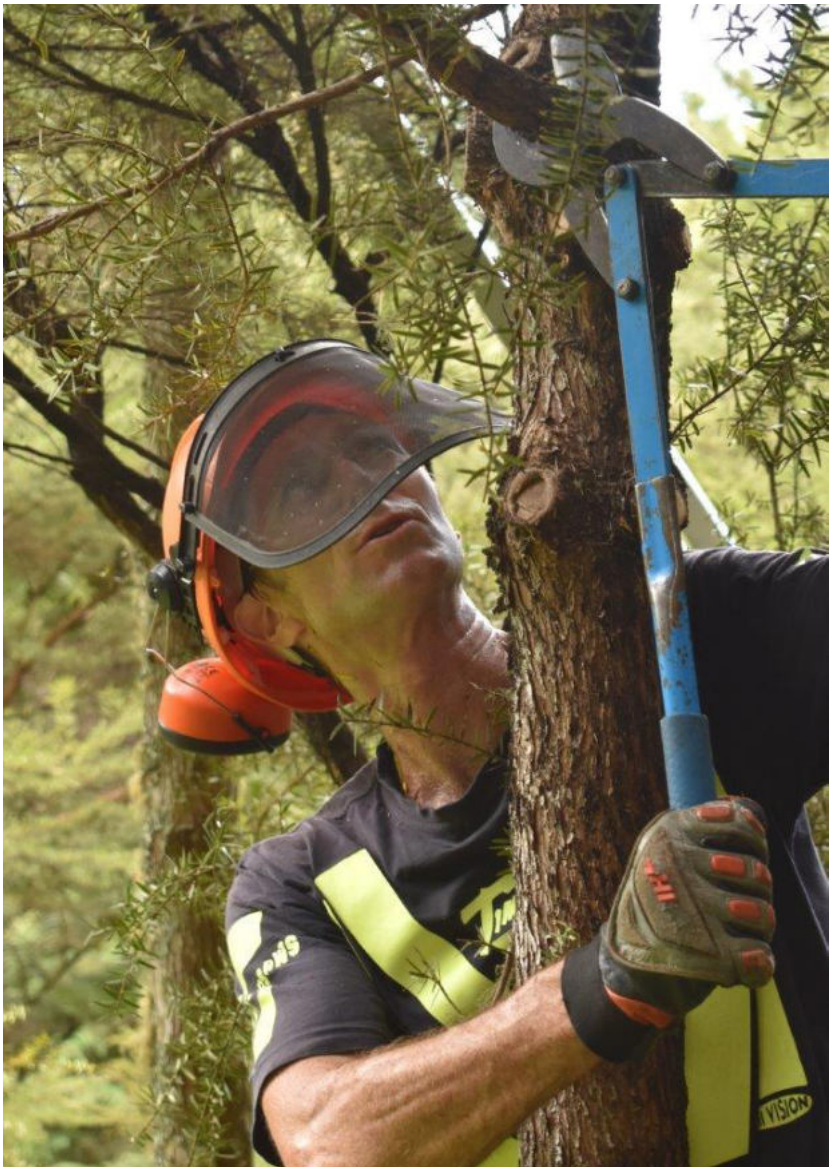


Photo: Paul Quinlan demonstrating pruning tōtara

To be presented at the Annual General Meeting
Friday 19 November 2021
10am online via Zoom (due to NZ COVID-19 restrictions)

AGENDA OF THE 2021 ANNUAL GENERAL MEETING

1. Welcome from Chairman Peter Berg
2. Apologies
3. Minutes of 2020 AGM
4. Matters Arising
5. Chairman's Report
6. Executive Officer's Report
7. Treasurer's Report
8. Trustee Appointments/Renewals
9. Project Updates
10. Other Business
11. Meeting Close

CHAIRMAN'S REPORT - November 2021

In my reports over the last 2-3 years, I have recorded a growing awareness in the wider community of the importance of our native trees to biodiversity, our economy and national character. Tāne's Tree Trust (TTT) has been an important contributor to this realisation, providing a plethora of information, fronting with workshops, case studies and hosting field days aimed at promoting and facilitating the establishment and management of native trees and forests.

Developing government policy on climate change, reflected at first in the One Billion Tree (1BT) programme and later picked up in the reports of the Climate Change Commission also demonstrates a change in attitude to planting native trees and managing native forests. While 1BT is now parked, elsewhere there is recognition that longer term establishing and managing native forests is critical to the ecological, social and cultural well-being of New Zealand-Aotearoa.

In a COVID-19 ravaged world it is hard to focus on the other crisis, climate change, but in practice it is critical to act now on each. In the case of forestry with native trees there are some obvious and not always difficult steps;-

1. Available land - is relatively straightforward to quantify, it is generally Class 6e, 7e and 8e in the Land Use Capability (LUC) mapping. These LUC classes are also often the areas unable to be intensively farmed and upon which areas of natural reverting scrubland and forest are found, and for which there is growing agreement that they should be returned to protection forest.
2. Existing reverting farmland, etc - is generally estimated to be more than 1 million ha, much on the land classes mentioned above but including other land with limitations such as difficult soils. This is the low hanging fruit, able to be quickly encouraged to increase growth, biodiversity, etc, simply by assisting landowners to fence and undertake weed and pest control. At least part of the landowner's hesitation is the cost in terms of time and dollars. One obvious option could be a change to the emissions accounting method to include pre-1990 (secondary) forests and reverting scrubland to enter the ETS and receive credits from the time of entry, while another is some form of biodiversity credit. There is no doubt that these areas are actively sequestering carbon at a rate that could be further increased.
3. Better technology - there are many situations where attempts to restore native forests falter in the early stages because there is inadequate attention given to all of the requirements of such a programme, e.g., lack of nearby seed sources to contribute to species diversity, food sources, etc, that make up thriving ecosystems. Early attention to establishing Seed Islands, both in relation to sites like 1 and 2 above, but in practice anywhere that landowners are looking to establish native forests would help measurably. Other techniques still being tested include establishment techniques like aerial seeding, direct seed sowing and so on.
4. Planting bare-land is significantly higher cost but is relevant to higher quality land where the early growth of planted seedlings is likely to be quicker and the new forest more obvious sooner (such as riparian zones, etc, on dairy and fattening farms).
5. Management post establishment is broadly relevant in all situations - weed, pest animal control and so on.
6. Nature based systems of forest management (Continuous Cover Forestry) are becoming synonymous with environmental protection and sustainable management and particularly suit NZ's native forests.
7. Making it pay - I believe that the government should be fostering an approach that provides the incentive for landowners to establish more forest without necessarily having to commit huge funds to the programme (such as a "Green" credit via the ETS, or a biodiversity credit). If landowners earned credits for their reverting scrub and secondary forest in return for looking after it (fences, weed and pest control, enrichment planting where required) they would be more likely to do so - making the most of something that already exists is often more attractive than the alternatives.

It has just been reported that New Zealand has signed a declaration with California and Quebec to collaborate on climate policy. At this stage, the declaration seems to formalise engagement that has already been happening anyway and its implications may be limited. However, under the declaration, each of the three jurisdictions agrees to promote environmental integrity of carbon pricing instruments to reduce greenhouse gas emissions worldwide and share learning on carbon pricing and market design - which could fit this sort of scenario very well.

Many of these matters are on our agenda - it is widely understood that if you plant or restore a native forest it is going to be there for a very long time and will meanwhile transform landscapes and the environment. Over time significant quantities of carbon will be sequestered and permanently stored on site, however, it is likely that the other values that the forest is providing (environmental, cultural, social, landscape, and so on) exceed the C-value. TTT Trustee Dr Jacqui Aimers has recently completed probably the most comprehensive treatise on the non-timber values of our native forests ever completed in New Zealand (available on our website), and the case for valuing native forest credits more highly is easy to see.

For those people looking for more emphasis on native forests and their important contribution to New Zealand, 2020-21 was particularly notable for the launch of O Tātou Ngāhere (Our Forests) – a programme developed and run in conjunction with Pure Advantage and presented widely via a formal launch at Te Papa, a series of webisodes and a lively website. Most spectacular, more than 40 people from a wide range of backgrounds and with quite different connections to forestry science freely contributed articles to the programme. O Tātou Ngāhere was timely relative to the work of the Climate Change Commission, changes in Te Uru Rākau – NZ Forest Service and is continuing to draw attention as further material is presented. It is certain that a number of initiatives in support of native forests were influenced by the programme and we expect that to continue.

Of course our ability to participate/lead in this way is very dependent upon a great deal of hard work and some wonderful supporters; I cannot say often enough how important that goodwill, support and the volume of work members, Trustees and funders put into our activities is. As a consequence, our profile, influence and progress are undoubtedly as great as they have ever been.

This year we completed the third stage of the “Our Forests-Our Future” (referred to as OFOF) project, which once again helped us to access/leverage other support and resulted in a large number of projects being undertaken and completed (as outlined later in this report) and has boosted our databases significantly. It has enabled us to provide better information in many respects, and to put a number of myths into extinction (e.g., a very recent review of the growth of planted native trees has shown that growth rates well in excess of those set out in the MPI ETS Look-up Tables are relatively commonplace). We obviously take some pride in this work and the influence it has upon wider policy decisions, but I am even prouder to report that as a consequence of these endeavours funding support has been extended for another three years thanks to The Tindall Foundation.

This Annual Report provides a number of additional updates on many of these matters and members and others will find it a fairly comprehensive account of where we have been engaged over the past 12-18 months – COVID-19 has meant things have been drawn out a little further than is usual.

TRUSTEES

The Trustees are:- Ian Brown, Ian Brennan, Peter Berg, David Bergin, Paul Quinlan, Robert McGowan, Warwick Silvester, Jon Dronfield, Gerard Horgan and Jacqui Aimers.

Trustees retiring by rotation were Warwick Silvester, Rob McGowan, David Bergin, Jacqui Aimers and Gerard Horgan, all of whom have agreed to continue for another term so the Board will remain the same for the

time being. We of course welcome additional Trustee applicants and note that presently we would be delighted to have more women and Maori representation.

NETWORK GROUP

The number of members/participants on our network group is reported on by the CEO, I simply note that events like O Tātou Ngāhere were instrumental in attracting new members, while our Facebook page and website has a growing number of followers. Subscription rates remain at $45 annually, although many members take the option of also providing a donation to the Trust and its various programmes and I am pleased to be able to report a particularly generous past year. This sort of support is particularly important in insulating the Trust against fluctuating income and ensures we retain the ability to maintain Trust services to members and our key programmes.

EXECUTIVE TEAM

CEO Mel Ruffell, ably assisted by Amy Spitzer, and through the ups and downs of COVID-19, has ensured we have remained on task and on time. The professionalism of both in this respect continues to be reassuring for our supporters, members and the Trustees (one of whom was heard to remark “with most of us in the grey brigade, it’s very reassuring to have a couple of young and switched on people showing the way”).

TRUST FUNDING

Elsewhere in this report significant projects and funding support is noted – we could not do anything of major value without our backers and we continually strive to ensure that they are thoroughly informed of progress and satisfied with the investment they have made in us and our work.

Draft annual accounts for the past year’s activity are attached for members’ advice. They have been independently reviewed and otherwise indicate the breadth of our effort and our present situation, and as mentioned above, we intend to hold the modest membership charge at its present level.

IN SUMMARY

2020-2021 has been a somewhat uncertain but also very fruitful year for the Trust with programmes like O Tātou Ngāhere and workshops, publications, etc, requiring close attention. Our team has once again worked brilliantly together and we expect to continue providing guidance and leadership in the establishment and management of native forests for many years to come.

Peter Berg - Chairman

CHIEF EXECUTIVE OFFICER UPDATE

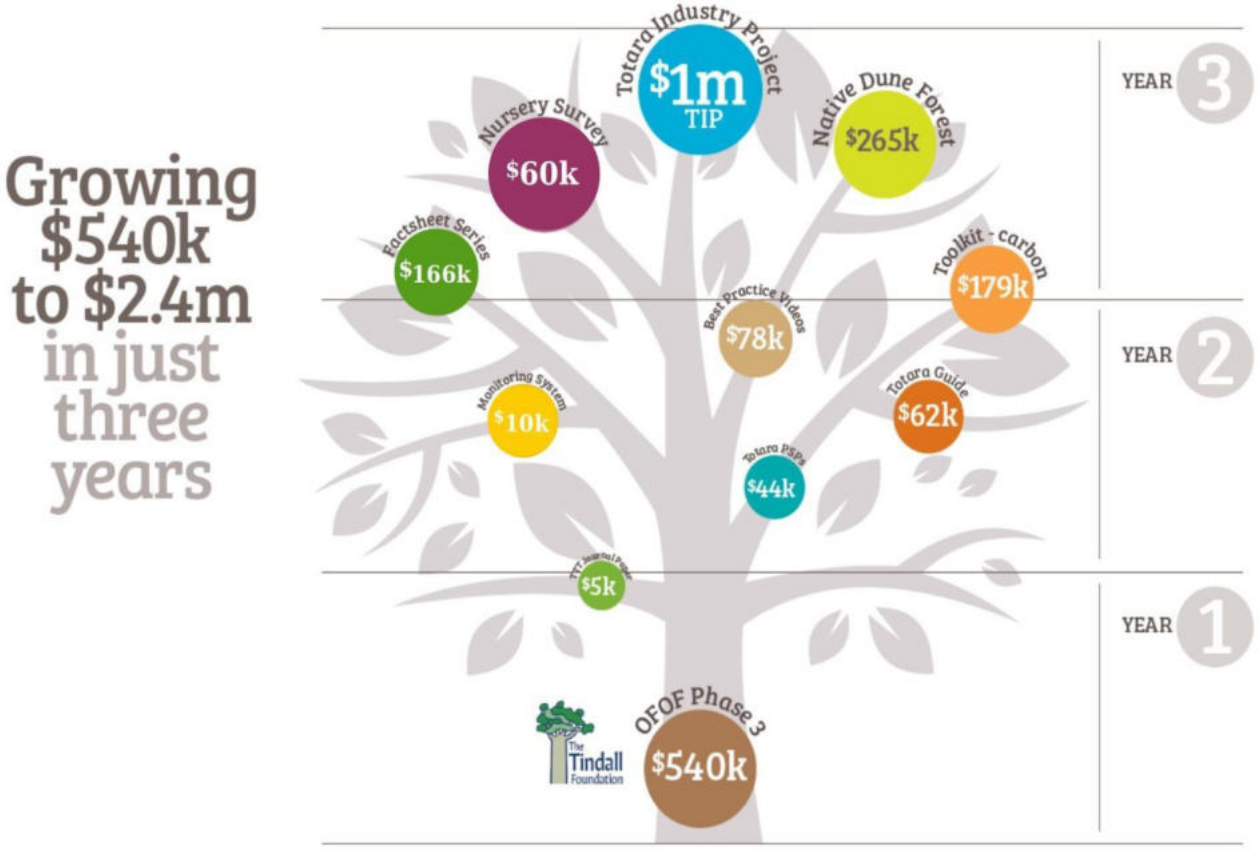
Subscriptions have been sent out for the 2021/22 year, and the annual subscription remains at $45.00. There are currently 342 members, which is fabulous growth in our membership. We have 213 paid members to date for the 2021/22 year, which continues the trend of good membership renewal. There has also been growth in our social media following on Facebook, along with TTT Newsletter subscribers.

Amy Spitzer took over in October last year in our administration role and is doing a wonderful job as Administration Manager. Thank you Amy for all your hard work, it certainly makes the office run very smoothly. Please contact either Amy or myself at the office, office@tanestrees.org.nz if we can be of any assistance.

Mel Ruffell - Chief Executive Officer

TREASURER'S REPORT

As we have just emerged from a three-year programme of work titled OFOF (Our Forests-Our Future) it is useful to reflect on its outcomes in this Annual Report and see how we managed the financial side. The grant from the Tindall Foundation has been a major stimulus to our work and their faith in us has allowed us to expand our reach enormously. The tree below shows how we leveraged the $540k OFOF money by co-funding to support a programme of work of $2.4M. That is a 350% increase in income and therefore output. The diagram shows roughly how this was achieved. The amazing matter, from a treasurer's point of view, is that the total overheads of TTT during this three-year period were just 3.3% of the $2.4M. We committed over 96% of our grant monies to the projects.



This report shows yet again that we have been highly successful in winning grants to continue our work, we are now funded for another three years in an extension of OFOF and are already using that money to leverage further project funding.

Our four programme leaders, David Bergin, Paul Quinlan, Jacqui Aimers and Ian Brennan, provide the energy and inspiration to keep our operation afloat financially and productively. Yet again, as I have said over the last three years, our success in gaining funding brings about increasing pressure on our staff, both in the field and in the office.

We need to continually assess our capability to service the work that we undertake. To this end, we have unanimously agreed to bring Mel into a wider role in management and in recognition have increased her status from EO to CEO. We owe an enormous debt to our office staff, and with Amy now with us for over a year, we are so grateful for the way they keep the ship afloat logistically.

The latest financial reports can be found in Appendix 1.

Warwick Silvester - Treasurer

PROJECT UPDATES

OUR FOREST OUR FUTURE (OFOF)

PROJECT STATUS: Phase 3 completed

Introduction

The third and final year of the implementation phase of Our Forests Our Future (OFOF) project, supported by The Tindall Foundation and managed by TTT, has been completed. This project aims to demonstrate the benefits of integrating native forest into our productive rural landscapes.

The project comprised five workstreams with the following outcomes:

Workstream 1 - Demonstration planted native forests

A network of 12 demonstration planting areas was established nationwide evaluating a range of planting treatments and sites from Northland to Southland. Key species planted include conifers, kauri, tōtara, rimu, tanekaha and kahikatea; tree hardwoods beech, puriri, rewarewa, kohekohe, kanuka; and shrubs manuka, kohuhu, akeake, karamu, ti kouka, tarata, five finger.

Data from monitoring plots provides valuable insights into refining best practice planting and management including planting density, use of nurse shelter, browsing animal protection, microsite selection and seedling grade.

Growth data from over 50 existing native plantations has been used to develop growth and yield models to underpin carbon sequestration and economic calculators. All sites are planted, monitored and maintained in collaboration with project partners including community groups, NGOs, councils, Pamu Farms, Maori Trusts, landowners, forestry companies, DOC and research providers.

Research leads for this workstream were David Bergin and Michael Bergin with substantial involvement of biometrician Mark Kimberley. For more information, contact Workstream manager David Bergin davidbergin.erl@gmail.com.

Workstream 2 – Building on the Northland tōtara work

This workstream focused on supporting the Northland Tōtara initiatives and advocating more generally for the management of naturally regenerating native forests on private land – not just tōtara.

This past year's work involved continuing to add to the Northland Tōtara Working Group database, responding to general enquiries, field trips, workshops and dialogue with regulators, policymakers, academics and students, supporting the next phase preparation for the Tōtara Industry Pilot, and contributing to the O Tatou Ngāhere campaign.

Highlights of the last year's accomplishments include:

- Thinning and pruning demonstration area developed within a tōtara forest under a SFM Plan on the Pāmu (Landcorp) Kapiro station property.
- A field day with Forestry students from the Canterbury University School of Forestry.
- Filming tōtara pruning for a Country Calendar episode that featured Cassie's Farm.
- Arrange Scion to investigate sites of apparent tōtara dieback.
- Scope new research project on managing exotic to native forest transitions.
- Providing advice to landowners interested in the management of planted and naturally regenerated tōtara.

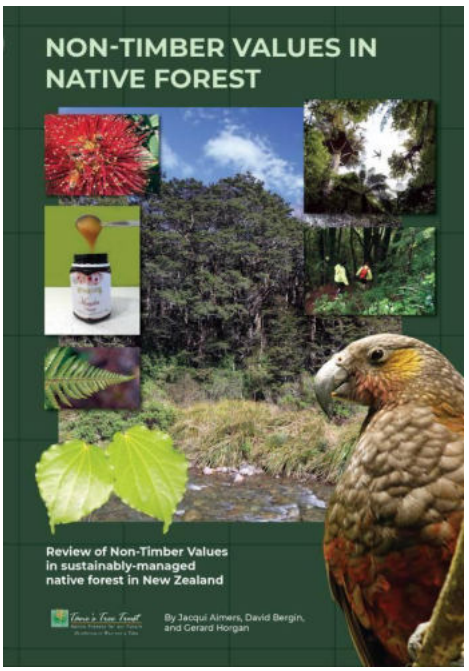
This work will continue under the Normalising Native Forestry Programme – as part of the new Workstream 2: Promoting Nature-based indigenous forestry in Aotearoa. For more information, contact Paul Quinlan pdq@pqla.co.nz.

Workstream 3 – Non-timber values and the business case for native forestry
The main aims of this workstream have been to identify and quantify non-timber values (NTVs) and raise awareness of the wider value of native forests among policymakers, land managers, and industry stakeholders. NTVs are any products or services associated with forests, other than timber or wood fibre. They are part of the concept of ecosystem services or 'natural capital', i.e., all aspects of natural environments needed to support life and human activity.

Credible business cases for native forests as a land use are dependent on the inclusion of NTVs and lowering the costs in native forest establishment. The latter has been a major focus of research and development for TTT. There is a good case for development of incentive schemes for native forest establishment, based on NTVs.

Native forests provide many NTVs that most of us are not fully aware of until they are damaged or lost. Our very survival is dependent on the natural world – we all need food, water and shelter. However, there is now increased awareness of the importance (and vulnerability) of New Zealand's natural capital, which is becoming increasingly important in planning and policy matters.

Our research on NTVs has been (or will soon be) published in multiple forums:
- In August this year, a 120-page Tāne's Tree Trust bulletin on NTVs was published (see below).
- Spin-off articles were published via the O Tātou Ngāhere (Our Forest) campaign undertaken by TTT in collaboration with Pure Advantage – pureadvantage.org/o-tatou-ngahere.
- An academic paper for the NZ Journal of Forestry Science has been accepted, subject to amendments.
- An article was published in the November 2020 issue of the NZ Tree Grower.
- Multiple presentations have been made at workshops and seminars for industry organisations and stakeholder groups. A few presentations were cancelled or postponed due to COVID restrictions, and some were shifted online. Regardless, it is clear that there is considerable interest in NTVs and the business case for native forest establishment.



The NTVs bulletin is 120 pages, the Abstract at the front and the Discussion & Conclusions (pages 86 - 90) provide the gist of it. There is also a comprehensive table of contents. It can be downloaded from the TTT website and on this link. Hard copies of the NTV bulletin are also available from the TTT Office office@tanestrees.org.nz.

This publication is dedicated to the people doing the extraordinary mahi of restoring and sustainably managing native forest, for the myriad of benefits our ngāhere provides.

Salient points from the NTVs work:

- There has been an imbalance between those benefiting from short-term economic gains of natural resource exploitation and the local communities who suffer the long-term environmental, cultural, and socioeconomic impacts from non-sustainable use of our natural resources.
- Weaving native forest back into our rural and urban landscapes will provide a myriad of services that will improve environmental and cultural values; and it will help mitigate the effects of climate change, urbanisation, and intensification of land use.

- While there has been considerable research on some of the more easily quantified NTVs, this has generally been narrowly focussed, so that the aggregated wider value of native forests has not been fully comprehended.
- There is limited information on NTVs that are more difficult to quantify, particularly NTVs associated with cultural and spiritual values. These are important, nonetheless - *the challenge of valuing the invaluable* - i.e., NTVs that have no direct material benefits.
- The COVID-19 pandemic has helped change the way people think. There is an increased focus on natural health and wellness, with connection with Nature recognised as important for our well-being.
- Despite identified knowledge gaps, it is apparent that **sustainably-managed native forest deserves a higher profile as an economically viable land use**, particularly in environmentally sensitive catchments, on erosion-prone soils, in scenic landscapes, and where indigenous biodiversity and cultural and spiritual values are important.
- Aggregated NTVs of permanent native forests are likely to be greater than that for clear-fell, exotic plantations.
- Native forest in riparian areas is likely to have particularly high aggregated NTVs.
- **Native forestation should be incentivised** as the benefits accrue far beyond the sites where landowners sustainably manage and extend native forest cover.
- An evidence-based article on carbon sequestration in native species has recently been published pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/. It challenges the reliability of the MPI look-up tables for native forest, which are based on unmanaged, regenerating shrubland, not on managed native forest.
- There is a risk of perverse outcomes if there is a focus on a single NTV such as carbon sequestration, to the neglect of all other NTVs.
- However, **biodiversity is a pivotal NTV**, which is likely to leverage most other NTVs, i.e., actions to increase biodiversity values are likely to concurrently improve most (possibly all) other NTVs.

The reasons to love native trees by Ezra Whittaker-Powley, commissioned by Trees That Count, was inspired by TTT's research on NTVs. A poster is available via the Trees That Count website treesthatcount.myshopify.com/products/love-native-trees-poster.

The wider values of native forest have been recognised (along with carbon sequestration) in the Climate Change Commission's advice to government - *Ināia tonu nei: a low emissions future for Aotearoa,* which was publicly released on 31/05/21

www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/.

TTT and other stakeholders participated in an extensive, nationwide consultation process. The Commission requested a draft copy (which was near complete at the time) of our comprehensive treatise on NTVs.

Te Uru Rākau (MPI) have shown interest in our NTVs work, particularly around the assessment of ecosystem services and the implications for incentives schemes for landowners.

Future work by Tāne's Tree Trust's in this area will include:

- Use of the NTVs work in our ongoing advocacy for native forest to be woven back into all our landscapes, including intensively farmed lowlands and urban areas, as well as marginal hill country.
- A prototype NTVs assessment tool has been developed to support decision making in restoration of native forest. This needs to be evaluated by end-users and refined. It is part of a suite of tools being developed by TTT, as described elsewhere in this report.
- There is a case for compensating landowners for NTVs that accrue to the wider community, but do not currently have a market value. TTT will continue, where it can be justified, to advocate for incentives for landowners.
- We will also continue to provide technical support for developing an incentives system, based on biodiversity credits or payment for ecosystem services. This includes working with allied organisations and providing information for policymakers in the development of incentives schemes for native forest establishment and management.

For more information on this workstream, please contact Jacqui Aimers jacqui.aimers@xtra.co.nz or Gerard Horgan gerard@horganfamily.kiwi

Workstream 4 – Technical advisory role

The reach of technical knowledge on best practice establishment and management of native forests has increased exponentially over the 3 years of this OFOF programme. Some 16 conference, workshop and field-based presentations were undertaken nationwide promoting science-based best practice guidelines on planting natives to audiences including farmers, foresters, iwi, community groups, academics, policy makers and council staff. A key output is the co-funding initiative of a video series.

Over 30 visits were hosted to demonstration sites, farms and forests from Northland to Southland in collaboration with project partners. TTT continues as the key technical provider to Trees That Count with joint initiatives underway including development of a user-friendly online monitoring system for planted natives.

This workstream has culminated in the launch of O Tatou Ngahere, a joint campaign by Pure Advantage and TTT championing the role native species play in the future of forestry in Aotearoa.

Research leader for this workstream was Ian Brennan. For more information contact Workstream manager David Bergin davidbergin.erl@gmail.com.

Workstream 5 – Governance

The Project Governance Group comprising the executive of TTT provided both technical and financial oversight including delivery and promotion of the project.

For more information on the Our Forests Our Future project contact:

- Peter Berg, Chair, Tāne's Tree Trust peter@bergforests.co.nz
- Mel Ruffell, TTT CEO office@tanestrees.org.nz

RE-MEASUREMENT OF FARM TŌTARA PROJECT

PROJECT STATUS: Current

This TTT project is co-funded by Te Uru Rākau. The project involves the remeasurement of the tōtara silviculture trial plots established by the Northland Tōtara Working Group since 2007. Data from 60 Permanent Sample Plots (PSPs) will yield valuable information on growth rates, carbon sequestration, and management prescriptions for timber production and indigenous biodiversity management, associated with native forestry and native trees on farms.

Project term

It is a two-year project with a target completion date of 30 June 2022.

Left Image: TUR forestry intern Anna Manning remeasuring a tōtara tree in a sample plot.
Right Image: Michael Bergin measuring in a Permanent Sample Plot (PSP).

Background

This information is needed to complement and support other initiatives endeavouring to start a new regional industry based on the sustainable management of tōtara forests on private and Maori land.

It will also assist the Ministry of Primary Industries in their administration of the sustainable management requirements of the Forests Act, by providing updated information for growth and carbon modelling. Growth and biodiversity information is directly relevant to plantation tōtara forests and the aims of the One Billion Trees programme, as tōtara is the most common high native tree species planted nationwide.

Three areas of innovation are involved. These are:

- The inclusion of biodiversity surveying and assessment of groundcover to sub-canopy development changes including regeneration. This will enable a comparison of values between managed (thinned) and non-managed stands (N.B. – only on a limited selection of PSPs unless funding can be increased).
- The remeasurement of stands will be applied to stands where the Stand Density Index (SDI) model (based on northern hemisphere thinning forestry models) was first used in New Zealand to prescribe the level of thinning - as executed in 2012 as part of the SFF12-099 project. Updated growth data from remeasurement of these tōtara PSPs will validate/refine the use of the SDI thinning model for use in management of regenerating native forest.
- Improving the accuracy of a Northland regional growth model for tōtara.

Right Image - A thinned Permanent Sample Plot (PSP) within a natural stand. Note the shaded conditions in the unthinned area above this thinned plot. Growth response of the residual tōtara trees after thinning will be measured and also the response of understorey vegetation development to the increased light conditions.

In addition, the PSPs include thinned and pruned plots that will indicate the potential of future planted and managed plantations, in comparison to unmanaged natural stands. This will enable extremely useful predictions to be made concerning the performance of new planted tōtara forests. This is critical information to the business case for establishment and management of native forestry.

This information will assist Te Uru Rākau in administering the sustainability requirements of the Forests Act and it will help landowners and forest managers better plan and manage planted tōtara forests, including accounting for carbon sequestration, and refining silvicultural best practice (such as thinning regimes).

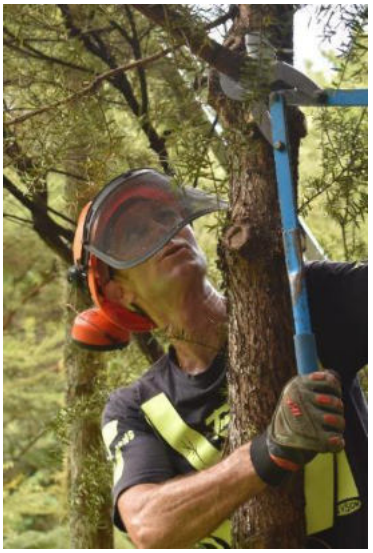
Progress to date
All PSPs have now been re-measured and the data entered – awaiting analysis.

Contacts for this project

- Project Manager, Paul Quinlan pdq@pqla.co.nz
- Mel Ruffell, TTT CEO office@tanestrees.org.nz

A PRACTICAL GUIDE TO THE MANAGEMENT OF TŌTARA ON PRIVATE LAND

PROJECT STATUS: Current



This TTT project is funded by Te Uru Rākau. It will create a comprehensive web-based manual, complemented with short instructional videos on the management of tōtara forests throughout New Zealand.

This will be a free-to-use resource providing the latest information on planning, planting, establishment, silviculture (e.g., pruning and thinning), harvesting, legal processes, protection, conservation and biodiversity management.

It will provide expert practical advice to realise maximum benefit from the One Billion Trees programme, and encourage and guide management of extensive areas of second-growth regenerating native forest on private land.

This is a two-year project due for completion on 30 November 2022. However, as chapters or topics and videos are completed, they will be posted on the TTT website.

Background
Since forming in 2005, the Northland Tōtara Working Group has conducted a series of funded projects exploring the potential to sustainably manage regenerating tōtara on private land for high-value timber production - and the many environmental values associated with native forest cover. All have produced extremely encouraging results, including the updates. Indeed, the Tōtara Industry Pilot project indicates that there is a business case for a regional industry to start up based on sustainably managing the regenerated tōtara resource (refer: www.totaraindustry.co.nz)

Considerable knowledge and experience have been gained from these projects, and when combined with TTT's information on planting and establishing native forests, it comprehensively covers management of the species from planting and silviculture through to harvest, extraction and processing of the timber. However, this information has not been collated into a single, complete and easily accessible form. Some of it, such as practical silvicultural experience (e.g., form-pruning methodology and techniques, and harvest tree selection, etc.) has not been documented in any form and is therefore not accessible. This project will document and present this useful new information that has not previously been available.

It may seem strange that such an information gap exists, especially considering how many texts have been written on tōtara – one of the most iconic of our native tree species. However, these previous publications, such as Philip Simpson's consummate book: Tōtara, a Natural and Cultural History, while supporting the notion of planting and management for conservation and cultural use - including timber, does not specifically cover practical technical advice on management for timber production.

Consequently, TTT receives many enquiries from enthusiastic landowners who are keen to know exactly how they should be managing their plantations or naturally regenerating stands of trees.

Therefore, this project proposes to cover such topics as planting, pruning, thinning, harvesting of tōtara forests on private land.

At this stage, it is not proposed to cover milling and timber processing. However, such topics could be added in time.

Written content with graphic illustrations and photographs and three short, topic-specific videos are proposed. No hard-copy publications are proposed. The information will be freely available to all via theTTT website and links from other sites.

Progress to date
Chapters cover topics such as pruning and thinning. As they are completed, chapters and videos will be available on the TTT website for free viewing and downloading.

Outputs to date

- Quinlan, P. 2021: Pruning Tōtara – A Practical guide to managing tōtara on private land (PDF, 9.44 MB). Tane's Tree Trust. Unpubl. 32p.
- Quinlan, P. 2021: Thinning Tōtara – A Practical guide to managing tōtara on private land. (PDF, 7.61 MB) 12 Nov 2021 version videos still to come. Tane's Tree Trust. Unpubl. 24p.
- Video - *Form-pruning tōtara for timber production on private land.* By Paul Quinlan and Ian Brennan; Tane's Tree Trust. 2021. vimeo.com/580207222

Contacts for this project

- Project Manager, Paul Quinlan pdq@pqla.co.nz
- Mel Ruffell, TTT CEO office@tanestrees.org.nz

TĀNE'S TREE TRUST PLANTED NATIVE FORESTRY TOOLKIT

PROJECT STATUS: Current

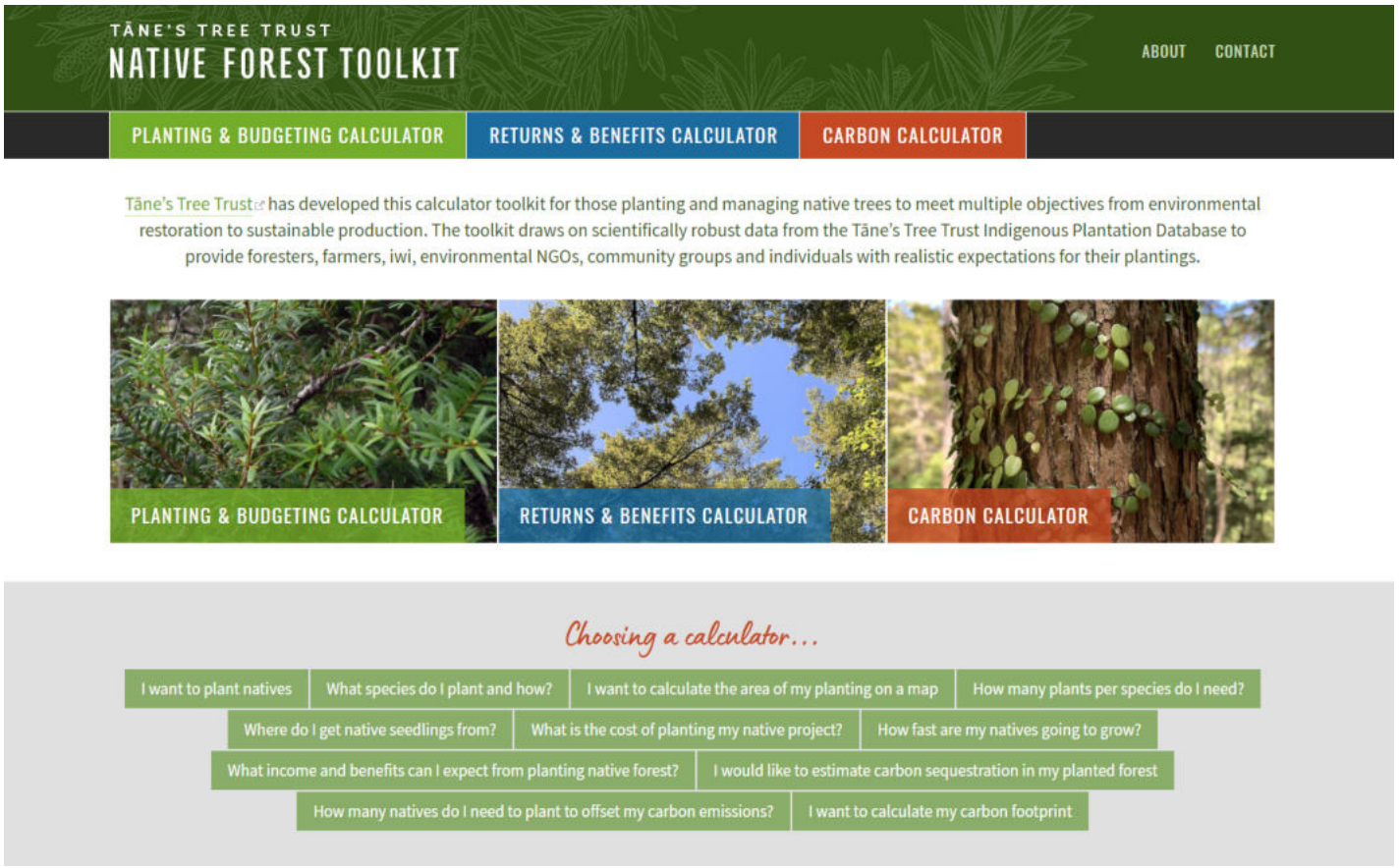
The third and final year of this project is nearly completed. The project is funded jointly by the Ministry for Primary Industries' Sustainable Farming Fund and TTT with co-funding from Our Forests Our Future programme, funded by The Tindall Foundation. It aims to provide a free comprehensive on-line toolkit from

planning to implementation for planting native forestry to meet multiple objectives from maintaining and improving environmental values through to sustainable production.

Calculators for Planted Native Forests

Four calculators have been developed for those planting and managing native trees to meet multiple objectives from environmental restoration to sustainable production. This includes the option of continuous cover forestry to provide a sustainable supply of specialty timber from appropriate sites planted with natives. The toolkit draws on scientifically robust data from the Tāne's Tree Trust Indigenous Plantation Database to provide foresters, farmers, iwi, environmental NGOs, community groups and individuals with realistic expectations for their plantings.

The Tāne's Tree Trust Toolkit of calculators for planted native forests will be available early next year and available on the TTT website.



Planting and budgeting calculator

This calculator allows you to calculate the number of plants you will require for your restoration project, and the costs of the project. The calculator can be used for any restoration project and by anyone who wants to do planting.

Growth and yield calculator

This calculator allows you to estimate the growth and yield of a planted native forest at various ages since planting. Species-specific growth and yield models have been used to develop this calculator for major native species represented in the Tāne's Tree Trust Indigenous Plantation Database. These models provide landowners and managers evaluating land use options with realistic estimates of growth and yield for planted native forests.

Carbon calculator
This calculator allows you to work out how much carbon your planted native forest is storing over a defined period of time. It also allows you to determine how many native shrubs and trees you will need to plant to off-set your carbon footprint.

Last year the TTT Carbon Calculator for Planted Native Forests was made available via the TTT website using this link www.tanestrees.org.nz/resources/carbon-calculator/.

Returns and benefits calculator
This calculator assists users who are wanting to develop a business plan for establishing native forestry for whatever purposes to determine realistic income streams. This can be for a wide range of multiple objectives from the costs and benefits of conservation planting to developing a business plan for establishing and managing native forestry as a long term specialty timber resource.

While valuing the non-timber benefits and the wider ecosystem services can be challenging, this calculator takes into consideration the wider biodiversity, landscape, cultural and social benefits of establishing and sustainably managing native forests.

Other calculators and applications
As part of the toolkit, we are also working on other calculators and apps for planted native forests that can be accessed by multiple devices that are under development and will be available over the next 1-2 years. These include:

- Monitoring system for newly planted native projects in collaboration with Trees That Count and other project partners (refer to separate update below).
- A searchable Reference Database for planted and managed regenerating native forest.
- Links to best-practice establishment and management guidelines.

For more information contact David Bergin davidbergin.erl@gmail.com

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ADAPTIVE MANAGEMENT OF COASTAL FORESTRY BUFFERS

PROJECT STATUS: Completed

Introduction
Sand dune exotic forests typically have a sacrificial exotic forest buffer zone providing critical salt and wind shelter to production stands landward.

The TTT Coastal Buffers project focuses on the upper North Island as a pilot study exploring practical options to transition failing exotic buffers to resilient permanent indigenous coastal forest buffers. To date the project has undertaken a review of existing experience, field surveys around upper North Island duneland and established two planting trials in collaboration with forestry managers, iwi, landowners, councils and communities.

We have just planted our third and last field trials and developed preliminary guidelines for transitioning exotic coastal dune buffers to indigenous buffers based on the project's findings.

The key objective is to determine a suite of cost-effective methods for conversion of the exotic dominated coastal buffer to natives. This is likely to comprise a number of approaches where the aim is to assist natural succession wherever possible.

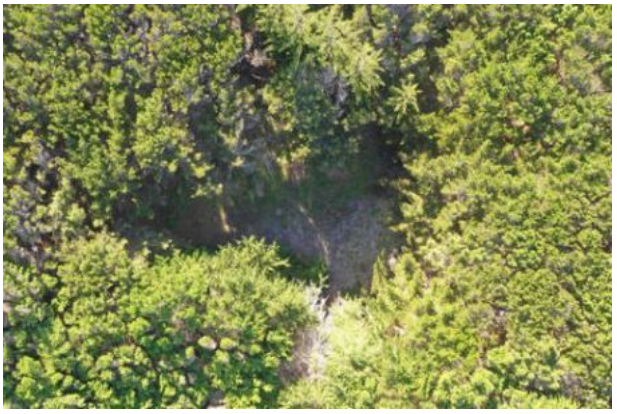
Te Hiku Forest (Summit Forests Ltd - Far North)

The initial 2019 trials at Te Hiku were severely hit by the 2019-2020 drought. The low survival rate made it hard to draw any definite conclusions, but indications are that there may be a beneficial effect from the pine buffer canopy. Browse from horses and rabbits/hares was more frequent in the open coast sites compared with the pine gap and canopy sites. Pohutukawa did not show any pressure from browse but there was heavy loss due to low soil moisture.

Survival within the 2020 trial plantings was however much higher with initial results showing an increase in survival and plant vigour where pine canopy provides shelter.

The last 2021 trials have been planted to continue testing the survival of different shrub and tree species in open, shelter pine gaps and under pine canopy situations. This year the trials include taupata, karamu, akeake, mingimingi, wharangi, ngaio, mapou, harakeke, titoki, taraire, karaka, kohekohe, porokaiwhiri/pigeonwood, lacebark, tawapou, tōtara and pūriri.

Seed trials are also being repeated for a selection of large-seeded plants (karaka, pūriri, kohekohe, porokaiwhiri/pigeonwood and tawapou). So far, the seed trials are showing success with karaka however there are large losses due to rabbit or hare browse. The few taraire seedlings found in the seed plots had died from lack of water. No kohekohe or pūriri were found to have germinated and it is unclear whether their germination may be delayed or affected by moisture content.



Left Image - An example of a canopy gap within the pine buffer where natives have been planted to compare with planting under the surrounding dense canopy in the Te Hiku trials.

Right Image - The buffer of pohutukawa planted by the NZ Forest Service 40 years ago at Te Hiku warrants further investigation to determine practical establishment methods for extending native forest buffers to other coastal sites.

A 2020 planted tawapou under pine canopy (left); karaka showing browse on seed trial plants, Te Hiku.

Kāwhia Forest

Reassessment of the initial 2019 plant trial found similar plant losses with the extreme summer drought. Another finding from the plastic plant protector treatment (to avoid animal browse) was the unintended consequence of overheating some plants during the summer. There were indications that the natives planted in close proximity to shelter and shade provided by the northern slope of pine trees had higher survival rates. Similarly, there appeared to be higher survival rates for plants where there was extra shelter at a microsite level from slash piles, dead pampas or lupin.

During 2020 a further 4,000 plants were planted, 800 of which were incorporated into the 2019 trial site and the balance in the 2020 Takapuwahia site trials. This site was a relatively flat backdune with slash and scattered regrowth of mostly exotics including lupin, inkweed and pampas.

Further planting trials were established in 2021 trials located behind the frontal dunes at hot springs Ocean Beach road end. Twenty-four plant species were selected for the trial plots based on the likely range of possible historic coastal forest species and eco-sourced plant availability from nurseries). Plants were funded by the Waikato Regional Council. The trial plots and general planting included a total of 2,305 plants.

Planting out the trials - Takapuwahia trial site, Kāwhia Harbour (left). Planted 10m diameter trial plots (right).

Planting site one year after planting the Takapuwahia trial in 2020 showing typical weed growth, Kāwhia Harbour.

Opoutere forest

Reassessment of the initial 2019 plant trial found the plantings were significantly affected by the extended 2019-2020 drought. Some species were also affected by rabbit browsing. There were clear results for which species could survive planted out in the open and despite the summer drought, e.g. karo, akeake. Results from plants with some shelter from pines showed indications that a few canopy species could establish. However, firm conclusions could not be drawn due to the high mortality rate exacerbated by the drought.

In 2020 a further 3,455 plants were planted. This included the establishment of new trials under pine canopy and in a clearing surrounded by pine forest. The new trial sites included nine different tree species

with improved survival compared to 2019, reflecting the absence of a significant summer drought. Pines were clearly providing protection to underplanted natives compared to those planted in the open.

Pūriri planted in 2020 – salty wind damage (left), and more sheltered location with no wind damage (right), Opoutere, Coromandel.

The 2021 trial sites involved three different light/shelter environments (under pine canopy in from the seaward forest edge; in pine gaps in from the seaward forest edge; and under pine canopy towards the landward forest edge) with three replicates at each site. Each trial plot included eight species including whau, kanuka, pohutukawa, karaka, titioki, kohekohe, totara and puriri. Planted lines of totara, karaka and pohutukawa were also established running from the frontal dunes back to the inland edge of the pine forest. Early survival has been helped by a wet spring.

Support for this TTT project was gratefully received from project partners including the Sustainable Farming Fund, Summit Forests, Northland Regional Council, Far North iwi, Kaitaia Intermediate, Waikato Regional Council, Kāwhia-Tainui Inc, Kawhia community volunteers, Department of Conservation Hauraki, Ngāti Tara Tokanui, Opoutere community volunteers, Hancock Forest Management (NZ) and the Coastal Restoration Trust.

For further information contact Meg Graeme meg@ecologist.nz or David Bergin davidbergin.erl@gmail.com.

COST-EFFECTIVE PLANTING & REVERSION SCENARIOS FOR ESTABLISHING NATIVE FORESTS – FACTSHEETS

PROJECT STATUS: Current

Introduction

For the One Billion Trees Programme to have maximum impact, a range of site-specific, low-cost planting and regeneration scenarios are urgently required for establishment of permanent native forest, especially for scaling up the establishment of native forestry across marginal, pastoral hill country. The overall objectives of this project are to:

1. Promote reduced-cost, large-scale establishment scenarios for native forest; and
2. Demonstrate proof of concept by profiling low-cost establishment scenarios in collaboration with project partners, including native plant nurseries and planters/landowners.

We will do this by producing a minimum of 12 factsheets and 6 establishment plan templates for landowners and community groups interested in establishing permanent native forest for multiple purposes.

A project plan was completed and included in Milestone 1 deliverables for this project and details the work programme over the 3 years.

Draft factsheets
As part of the activities and outputs for Milestone 5, a minimum of nine further factsheets have been drafted and submitted. To avoid confusion, we have decided to call all of the outputs factsheets, which includes the planting plan templates. Also, note the numbering system for the factsheets will differ on the factsheet drafts to the list below. Factsheet numbering will be finalised into a logical order when the series is published online.

A brief summary of each draft factsheet is provided below.

1. **Right species right place**

An understanding of ecological requirements of each of the native tree species will allow matching each species to suitable sites that mimics natural regeneration and gives a natural appearance. This planting pattern is likely to give good survival and growth rates for most species.

There is considerable variation in the ecological requirements and site preferences for native species. Some require shelter in early years on open sites to improve growth while others tolerate specific site conditions such as greater moisture levels. Planting native species at random through an area is unlikely to match species to the most suitable sites and therefore will probably compromise overall performance.

Choice of species and planting patterns will also be influenced by the objectives of planting. Growth habit and performance of each species will influence which ones are most suited to specific objectives and whether management of part of the planting for timber production is feasible even if it may be a long-term option.

2. **Seed collection of natives**

Species selection and seed collection are critical steps in the restoration process, and because seed availability can be limiting, it needs to be considered long before the actual time of sowing. In most instances, seed is collected by hand from appropriate plants—a slow process that limits the quantities of viable seed available for large-scale restoration programmes.

Seeds of New Zealand native species are regarded as inherently poor germinators. Although low viability may be responsible for this, there is increasing recent evidence that low germination in a range of native species may be because of seed dormancy, i.e., the failure of a viable seed to germinate despite being exposed to favourable environmental conditions.

3. **Nursery raised native seedlings - selecting the right stock**

The use of strong, healthy planting stock is critical to the success of any planting programme. Seed must be collected from the best sources and nursery stock raised for the particular programme well ahead of the planting season. A variety of plant grades and container types is available. Experience in the evaluation of planting stock is described and other approaches used in operational-scale planting are discussed briefly. Most information is based on experience rather than on comparative experimental trials.

Factors that should be considered before planting include relative suitability of bare-rooted and container-grown stock; appropriate plant size and quality; and the type and size of containers.

4. **Controlling pest animals and livestock**

Farm livestock, many animal pests including deer, goats, pigs, possums, hares and rabbits, and even some native birds such as the pukeko can cause extensive damage to existing native forest and scrub and newly planted areas of native trees and shrubs. Effort should be put into controlling those animals that pose a risk

to newly planted natives prior to planting, and ongoing control is likely to be necessary until the planted trees are well established.

While the role of mammalian herbivores in primeval New Zealand was at least partly filled by the moa, most of New Zealand's tree and shrub species are highly palatable to introduced grazing animals. In addition, under intensive agricultural systems, our soils and plants cannot cope with the trampling and waste from stock.

5. Maintenance of planted natives

Weed control, often referred to as 'releasing', is essential with any planting project using natives. A nationwide survey of native tree plantations identified suppression by grasses and herbaceous weeds, ground ferns, and exotic scramblers and shrubs or brush weeds as the main cause of poor survival and slow growth. Many of our native trees and shrub species are relatively slow growing especially for the first year or two after planting. It is during this time that vigorous fast-growing exotic species can out-compete planted native seedlings for light, preventing growth and contributing to mortality.

Several factors need to be considered when undertaking weed control. These include the quality of site preparation done before planting, timing of weed control operations, site characteristics, and scale of planting and resources available to carry out maintenance.

6. Replacing logged pines with natives

There is increasing interest in landowners who have recently or are about to clear fell stands of radiata pine in replacing them with a permanent native forest. These are at all scales from small 1-2 ha blocks to substantial areas owned by iwi, some well over 1000 ha.

The options to convert clear-felled radiata stands, or indeed other exotic forests such as eucalypts, needs to be assessed on a site-specific basis as climate, site, soils, weed growth including wilding pines, and pest animals are all factors that will influence decisions.

This factsheet provides landowners with some of the issues to consider when contemplating converting a productive exotic stand that has been logged to natives.

7. Monitoring success of planted and regenerating natives

Most native planting projects are focused on planting and few follow up with monitoring other than a cursory glance that hopefully most planted natives have survived and beaten the weeds. Planting trees is only the first step toward establishing new areas of native forest.

Monitoring early survival and growth of your plantings will provide you with valuable insights into what is working or not. It will help you schedule in timely weed and pest animal control and enable you to learn from any failures.

Councils and some community groups are very keen to see a more formal quantitative approach but few have the skills, resources or practical methods to undertake monitoring, so it is hardly ever carried out. This factsheet outlines the options for monitoring newly planted native forest. Natural regeneration is increasingly being promoted for large scale establishment of native forest and some insights into monitoring of natural regeneration are provided.

8. Building resilient new native forest

Greenhouse gas emissions have significantly altered the composition of the atmosphere and subsequently changed the global climate. Deforestation has also had an impact as fewer trees mean less absorption of carbon dioxide. Also, forests influence the local climate, providing shade and the cooling effect of evapotranspiration, making the surrounding environment more mesic (i.e., higher levels of moisture).

In New Zealand, we need to identify methods to improve the survival of native tree plantings and naturally regenerating forest. Wildfires have always occurred, but predictions of increased fire risk associated with anthropogenic climate change means that massive wildfires, similar to what was experienced recently in the South Island, are likely to become more common in parts of New Zealand. Effectiveness of green firebreaks largely depends on the selection of suitable native plant species with low flammability.

9. Long-term management of planted natives

Many native tree species show excellent potential for plantation management to produce timber. Woodlots of key native timber trees will give optimum growth as part of single or mixed-species plantations – if they are established on sites that suit the ecological characteristics of their species and they are managed appropriately.

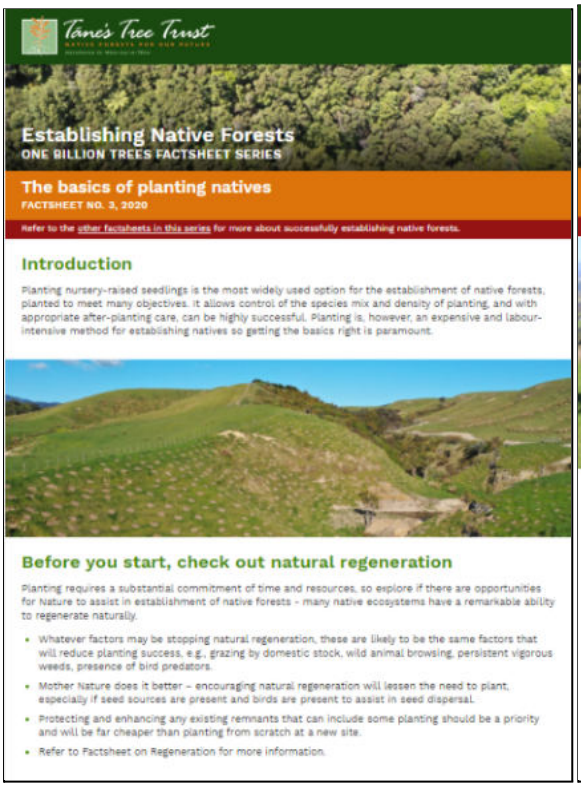
Those planting native trees for multiple reasons are establishing a resource where future generations have the option to manage for extraction of high-quality, high-value specialty timber. Sustainable harvesting plans can be designed to ensure that the non-timber values of planted native forest will be preserved using continuous cover forestry principles, i.e., only a small proportion of the stand is harvested at a time to leave the high forest structure and associated environmental values intact.

Available online

The aim is to have the factsheet series available on the TTT website with links to websites of other stakeholders as requested. Formatted versions of the factsheet series as a full colour illustrated publication with high-quality images with captions are shown below (on the next page).

Project partners

This TTT project is jointly funded by the Te Uru Rākau's 1BTs Partnership Fund, with co-funding from the TTTs research fund and the Our Forests Our Future programme supported by The Tindall Foundation, project partners including Pamu Farms (Landcorp), other landowners and community groups, and Trees That Count. We are also collaborating with the research providers Scion and Auckland University of Technology in the delivery of the latest information on best practice methods for establishing multiple-use native forestry as part of the government's current One Billion Trees programme.




Tāne's Tree Trust

Establishing Native Forests
ONE BILLION TREES FACTSHEET SERIES

Ecosourcing of native species for planting
FACTSHEET NO. 5, 2020

Refer to the other factsheets in this series for more about successfully establishing native forests.

Introduction

Ecosourcing is defined as the sourcing of seed (or vegetative material) from nearby natural populations to propagate native planting stock for planting in the same locality, i.e., collection of seed from wild populations that are as close as possible to the area being planted. Ecosourcing should be included in the planning stages of all native plantings.

The fundamental unit for ecosourcing is the local population, or provenance; i.e., a group of individuals of the same species that live in a particular geographic area. Ecosourcing is particularly important for ecological restoration projects but may be less relevant for other types of plantings, as discussed below.

The ecosourcing concept also includes collecting seed across a large range of individuals within the source population. This results in a broader and more representative genetic base, which increases adaptive fitness and decreases the risk of inbreeding depression in forest plantings.

The concept of genetic pollution

- Natural wild populations will occasionally have new genetic material introduced via pollen or seed dispersal. This adds to the within-population genetic diversity.
- However, if a large amount of new genetic material is artificially introduced into an area, then this could change the genetic character of the local population over time, i.e., genetic pollution could undermine the unique inherited characteristics of the local populations.
- Care needs to be taken to avoid planting either different provenances or commercially-bred strains near natural forest of high conservation value that contains the same species - due to the risk of genetic introgression or 'genetic pollution' undermining the unique inherited characteristics of the natural population.


Tāne's Tree Trust

Establishing Native Forests
ONE BILLION TREES FACTSHEET SERIES

Natural regeneration of native forests
FACTSHEET NO. 12, 2020

Refer to the other factsheets in this series for more about successfully establishing native forests.

Reversion of pastoral hill country is a common in many regions in New Zealand such as this natural regenerating totara-dominant forest in Northland, and in this case in the presence of grazing.

Introduction

Regeneration or reversion of native forest is the process by which land reverts either naturally, or with human assistance, back to a vegetation cover dominated by native species. Natural regeneration is promoted and partially funded by the One Billion Trees (1BT) programme where active management is undertaken by the landowner.

This factsheet considers the opportunities to work with nature to establish native forest. While the success of regeneration can be site-specific, there are options for landowners to encourage regeneration of native forest. Successful regeneration requires a nearby seed source, birds to spread seed, and typically involves exclusion of livestock by fencing, control of animal pests, and where necessary, selective control of potentially aggressive and persistent brush weeds such as blackberry. Supplementary planting is another management option that can speed up regeneration.

For more information on this factsheets project contact David Bergin davidbergin.erl@gmail.com

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TRAINING VIDEOS AND WORKSHOPS FOR BEST-PRACTICE RESTORATION

PROJECT STATUS: Current

Introduction

The Department of Conservation's Community Fund is partially funding this project to provide training videos and contribute to workshops promoting best-practice restoration of indigenous ecosystems by planting and natural regeneration. The project is aligned with the OFOF Technology Transfer Workstream and will deliver free, instructional training videos, accessible via mobile devices and websites, along with field-based workshops, on restoration of our indigenous ecosystems. The project is in collaboration with community groups, iwi and landowners, Department of Conservation, regional, district and city councils, NZ Farm Forestry Association, The Tindall Foundation, The Project Crimson Trust and Trees That Count, research providers, and regional staff of the One Billion Trees Programme.

Progress to date

Six videos have been produced during the first years and these are loaded on the TTT website www.tanestrees.org.nz/resources/videos. The focus is on best-practice practical methods including site preparation, planting, weed control and encouraging natural regeneration.

A minimum of 18 informational and instructional videos will be produced by TTT over 3 years targeting priority topics. The topics for the videos are:

- Riparian restoration over 24 years near Rotorua
- Pruning tōtara for timber
- Case study: Woodside – black beech managed as continuous cover forestry
- Case study: Cassie's Farm – establishing native forest from scratch
- How to plant native seedlings at scale
- Research topic: native forest regeneration under wilding pines.

Refinements will be added to videos including standardised introductory title pages and acknowledgements to the DOC Community Fund and other project partners for support.

Planning and footage of the next six videos is well underway with the next priority topics including:

- Community-based monitoring of planted native early survival and growth
- Concept of 'seed islands' to supplement establishment of native forest at scale
- Thinning planted and naturally regenerating tōtara
- Sustainably managed continuous cover forestry for natives
- Maintenance of planted natives – weed control
- Nursery raised seedling grade, size and quality for planting native forest.

Workshops held during this 6-month period have been interrupted by COVID-19 lockdowns so have included both field-based and online versions. These include:

- Cassie's Farm – various field-based workshops with local interest groups by Ian Brennan
- ReCloaking the Whenua – online presentations including TTT presentation on best practice native forestry
- Tairawhiti native tree planting and field monitoring for farmers, Maori block owners, community and catchment groups.

Demonstration site case studies progressed as part of this project include:

- Waikeruru Ecosanctuary seed island and monitoring, Gisborne
- Cassie's Farm 30 ha native forestry planting programme, Waikato (refer video).

The videos will be made available on the TTT website. For more information contact Ian Brennan ianatcassiesfarm@gmail.com

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MANAGING DELAYS IN PLANTING NATIVES DUE TO COVID-19

PROJECT STATUS: Completed

Introduction

With the nationwide COVID-19 lockdown in early 2020 and subsequent partial lockdowns since then, there was concern that the planting of native trees and shrubs would be delayed. At the time of the March-April 2020 lockdown, millions of seedlings were in native plant nurseries ready for planting in the planting season (late autumn to early spring) that year. Te Uru Rākau commissioned TTT to undertake an analysis of the effects of lockdowns in 2020 on the propagation of seedlings from native plant nurseries and at planting sites.

The project reviewed existing information sources, carried out interviews of selected practitioners in the native plant nursery and planting sectors, and conducted online surveys of native plant nurseries and those planting natives.

Nursery survey

The COVID-19 lockdown in autumn 2020 coincided with the peak period of seed collection, one of the critical phases of nursery operations essential for raising stock for the following year. However, nursery operations would potentially be disrupted at any time of year as growing natives (or exotics) have a rigid sequence of essential requirements throughout the year.

Native plant nurseries consider more flexibility is required for continuing their operations during future lockdowns as these

follow a largely rigid seasonal pattern of seed collection, seed preparation, sowing, potting on, hardening off and dispatch to the planting site. As with other farm or rural-based enterprises, nursery operations are largely outdoors where safe work bubbles can be set up for all operations.

Options to mitigate disruption of nursery propagation included:

- Topping to hold stock over for a few months but only practical for selected species such as shrub hardwood species.
- Repotting into larger containers to hold stock until the next planting season to avoid bound and distorted root systems but requires more labour and extra nursery facilities.
- Collecting and storing more seed to provide flexibility if disruptions occur, although seed viability reduces over time.

Larger grades of native seedlings such as those raised in PB3 planter bags may be more resilient to later planting compared to plugs or root trainers as a result of delays from COVID-19 disruptions but will take more space for transporting and will be heavier and larger for planters to handle at planting sites.

Planter survey

The effect of a disruption at the planting site depends on the time of the year, duration and severity of the requirements restricting activities. The COVID-19 lockdown in autumn interrupted site preparation just ahead of the main planting season resulting in later planting and potentially higher mortality during dry summer months.

Options for coping with delays in planting and extending the planting season included:

- Planting larger stock, which may be more resilient to delayed planting but takes more space for transporting and is heavier for handling at planting sites.
- Using plant protectors to reduce exposure and mulching to maintain soil moisture, either used singly or in combination. Both are expensive and labour-intensive to implement.
- Selecting hardier species to plant and avoiding problem planting sites.

Practical options for coping with a delay at the planting site included:

- Herbicide spraying of problem woody weeds that can invade delays at planting sites.
- Maintain grazing of pasture sites but requires fencing.
- Grassing bare sites to reduce invasion of exotic woody weeds, but this is an additional cost.



Planters responding to the questionnaire ranged from contractors planting large sites (left & middle) to community volunteer groups planting on a small scale (right).

Conclusion
The major conclusion from the surveys is that COVID-19 had a small to moderate impact on nurseries both operationally and financially but had less effect on planters.

The question of whether propagation should be regarded as a permitted activity during COVID-19 type disruptions was raised, particularly by the nursery sector in the survey. Nurseries see themselves as an essential service working with a live product similar to the animal and food industries requiring ongoing management during periods of COVID-19 type disruptions.

Planters suggest more flexibility in allowing planting of natives to continue under a COVID-19 type lockdown as it is an outdoor activity, and social distancing and managing bubbles can be managed.

For further information on this project contact David Bergin davidbergin.erl@gmail.com

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MONITORING NATIVE PLANTING PROGRAMMES

PROJECT STATUS: Current

Introduction
Monitoring early survival and growth of plantings will provide valuable insights into what is working or not. It will help with scheduling timely weed and pest animal control and allow learning from any failures. We have several project partners engaging TTT in developing not only field methods for a quick, low cost but scientifically robust method of monitoring native plantings, analysing data and providing easy to interpret results.

Field monitoring system
TTT is therefore continuing to develop a monitoring system in collaboration with Trees That Count involving:

- Recording planting site information including species planted, plant spacing, location of planting site on a map, etc;
- Setting up sample plots to assess a proportion of planted natives across a representative area of the planting site to quantify survival and growth by species;
- Undertaking regular inspections particularly in the first few months after planting to record any issues that may be reducing early survival and growth;
- Taking a photographic record of the development of natives on the planting site;
- Print field sheets for collection of growth data at your planting site.

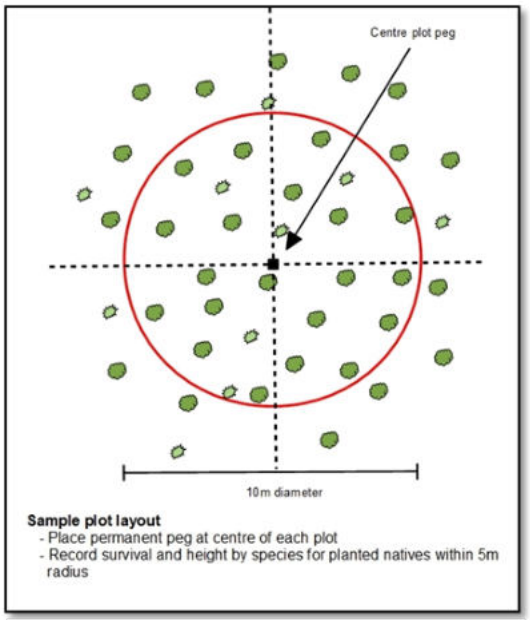
After planting is completed, we highly recommend regular inspections starting within a few days after planting to check your planting is still there and there is nothing affecting early performance. Early inspection and action to address any issues affecting your planted natives could mean the difference between success and failure and provide insights into what is required for future planting plans.

For monitoring performance, usually at approximately 12 months intervals after planting, we are recommending selecting one of two options based on the scale of your planting:

1. ***BASIC walk-through method –*** For plantings >100 to 1000 plants a subjective method to estimate overall performance from a walk-through. The aim is to estimate how well a smaller planting is progressing without imposing an undue burden on planters who may lack the time or resources to carry out quantitative monitoring.
2. ***ADVANCED rapid plot-based quantitative method –*** For larger plantings >1000 plants quantify survival and growth by species using a network of rapid survival plots. The plot method is based on sampling a small proportion of planted natives using a network of plots placed across a representative area of the planting site. This level of monitoring has been designed to be as quick and easy to implement as possible while still collecting high quality data.

While community groups and landowners prefer the walk-through method, interest in the quantitative plot-based method is high with councils, large NGOs and corporate landowners who are investing substantial resources into planting 10s to 100s of hectares in natives per year keen for a reliable method for quality control and reporting of accurate performance.

The basis of the plot-based method is to establish a minimum of six circular bounded plots across representative areas of the planting using a grid or transect with fixed distances between plots to avoid any sampling bias. For most planting projects a 10m diameter plot will contain between 20 and 40 trees. Sufficient sampling plots need to be established to ensure a minimum total sample of about 200 planted natives are measured.



A circular 10m diameter plot for sampling planted natives for large scale planting to determine early survival and performance for larger scale plantings.

Data processing system

There is no point in collecting monitoring data unless the data is analysed and presented in a form that allows users to determine the success of their plantings and identify the issues that may be causing losses or poor performance. TTT in collaboration with project partners, is developing an easy-to-use online data processing and results system for users including:

- Entering field data directly online including photographs and any comments; and
- Automatically generating a project results page with summary tables and graphs.

Project partners

In addition to support from The Tindall Foundation and Trees That Count, key project partners include Pamu Farms, Tasman Environmental Trust and Auckland Council.

For further information on this project contact David Bergin davidbergin.erl@gmail.com.

NORMALISING NATIVE FORESTRY (NNF)

PROJECT STATUS: Current

Introduction

TTT is to undertake a 3-year research programme funded by The Tindall Foundation (TTF) to continue developing and providing the urgently needed tools, resources, and advice to support native forestation in Aotearoa. This follows on from the recently completed implementation of Phase 3 of the Our Forests Our Future programme.

Background

There is currently unprecedented interest in establishing native forest from farming and forestry sectors, Maori, public and investors. This has been spurred on by Trees That Count, the One Billion Trees Programme, and the Climate Change Commission promoting more permanent native forest.

This new programme builds on previous work of the Our Forest Our Future programme with a new direction, particularly the urgent need for science-based information and technical advice for establishing native forest at scale to address climate change and environmental degradation.

This programme focuses on working with nature, demonstrating managed regeneration to cost-effectively establish native forest at scale, and promoting nature-based native forestry. The project will explore the drivers and barriers to landowners establishing native forest, novel approaches such as the role of fast-growing exotics, monitoring and innovative methods to reduce the cost of establishment. We need to better demonstrate the economic, environmental and cultural benefits of native forests, and help develop incentive systems. And we need to overhaul our databases, to provide a more user-friendly interface, and refine our science-based growth and carbon estimates.

For more information on the Normalising Native Forestry research programme, contact:

- Peter Berg, Chair, Tāne's Tree Trust peter@bergforests.co.nz
- Mel Ruffell, TTT CEO office@tanestrees.org.nz

Proposed work

Each of the six workstreams has a list of project areas with flexibility to include new related work as priorities and funding opportunities arise over the next 3-years.

1. Working with Nature - native forestation at landscape scale

The Climate Change Commission recommended a major upscaling of native forestation efforts, nearly 300,000 ha of new native forests within the next 15 years. With the cost of planting often at $20,000 per hectare, cost-effective establishment at scale will require working with Nature by encouraging natural regeneration as well as planting.
Contact for this workstream: David Bergin davidbergin.erl@gmail.com

2. Promoting Nature-based indigenous forestry in Aotearoa

We are well positioned to develop nature-based forestry in NZ, with a good track record already with tōtara (Northland) and beech (Westland). NZ currently imports about $100 million per year in specialty timbers, some of which could be substituted with sustainably grown native timbers.
Contact for this workstream is Paul Quinlan pdq@pqla.co.nz

3. Making the most of Tāne's Tree Trust's databases

TTT has the most comprehensive national database for planted native forests, which has been used to develop models and calculators. This database and associated tools are providing essential data for policymakers, investors, and the forestry and farming sectors.
Contact for this workstream: Michael Bergin michaelbergin.erl@gmail.com

4. Incentivising landowners – an economic case for native forestation

The cost of planting natives remains a limiting factor for landowners. The business case for native forestation, therefore, relies on decreasing the costs, and also compensating landowners for the non-timber values that accrue to the wider community, but do not currently have a market value. The Climate Change Commission's advice to the government includes creation of incentives for establishing native forest.
Contact for this workstream: David Bergin davidbergin.erl@gmail.com

5. Evaluating novel ecosystems – transitioning exotics to natives

Exotic woody plants that dominate many of our landscapes can potentially be transitioned to native forest. Carbon forestry interests are currently investing in permanent carbon forests, capitalising on the fast early growth of radiata pine, then leaving it as a nurse for permanent native forest. This needs urgent research work.
Contact for this workstream is Paul Quinlan pdq@pqla.co.nz

6. Collaboratively building capability

A holistic, multi-agency approach is required for native forest to be successfully established at scale. Herbivory, bird and seed predation, and vigorous weeds need to be tackled. We must work together and develop more capability in establishing and managing native forests.
Contact for this workstream: Michael Bergin michaelbergin.erl@gmail.com

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COLLABORATION WITH TREES THAT COUNT

Trees That Count (TTC) is part of The Project Crimson Trust. TTC's vision is to help New Zealanders to plant millions of native trees across the country to ameliorate climate change and restore and enhance our environment. Planters are encouraged to register their planting projects to add their trees to the count of native trees planted each year as a measure of the positive impact of the work underway to improve the environment. TTC is bringing together business, community and the public to help plant more native trees by providing support via the TTC Marketplace.

TTT continues to partner with Trees That Count in providing technical support including best establishment and management practices for planting native forest, as well as growth, yield and carbon modelling based on the TTT Indigenous Plantation Database. The TTT Carbon Calculator for Planted Native Forests can also be accessed from the TTC website. Ongoing collaboration has seen the launch of an online system on the TTC website for a community-based rapid monitoring system of early survival and growth of planted natives to quantify the success of plantings.

Check out the Trees That Count website www.treesthatcount.co.nz for more details and for registering your planted native trees and shrubs. For more information contact Michael Bergin michaelbergin.erl@gmail.com.

COLLABORATION WITH PAMU FARMS

Pamu Farms (Landcorp) are partners in several TTT projects and provide additional co-funding to expand applied research across their stations from Northland to Southland.
Collaborative projects include:

- Setting up demonstration planting sites on a minimum of 8 Pamu blocks to evaluate lower cost establishment and management practices.

- Monitoring of their operational native planting programmes using the Trees That Count field methods of establishing rapid survival plots and the data processing system under development by TTT and TTC.
- Evaluating use of herbicide as a large scale overspray to control vigorous brush weeds in the establishment of tōtara by planting and natural regeneration.
- Recent work with others in evaluating the role of native ecosystems integrated within their working stations including quantifying the wider ecosystem benefits.
- Providing latest best-practice guidelines on establishment and management of native forest to Pamu forestry managers.
- Silviculture and continuous cover extraction harvesting of naturally regenerating tōtara from Pamu Farms stations in Northland, with the Northland Tōtara Working Group.

For more information contact:

- Michael Bergin michaelbergin.erl@gmail.com
- Paul Quinlan pdq@pqla.co.nz

O TĀTOU NGĀHERE (OUR FOREST)

O Tātou Ngāhere (Our Forest) was launched early in 2021 as a dynamic communications campaign focused on the economic, environmental and socio-cultural benefits of native forests, as well as ensuring they have a significant role in New Zealand's national forest strategy. The project is a collaboration between Pure Advantage and the foresters and scientists of TTT, who champion the valuable role our native species can play in the future of forestry in Aotearoa New Zealand.

O Tātou Ngāhere – Our Forest, details how native forests can be integrated into our whenua for the benefit of all. Indigenous forests of Aotearoa are unique biological and environmental treasures. They are taonga, part of our cultural heritage, and important to our identity as New Zealanders. Native forests have a myriad of ecosystem services and play a vital role in our economic, environmental, social and cultural well-being.

The campaign included a suite of essays from some of Aotearoa New Zealand's foremost thinkers and practitioners in areas related to native forests as the first stage of this campaign.

The cumulative knowledge and expertise underpin these 37 contributions in five sections:

1. Section One: Unlocking the Narrative of Native Forests
2. Section Two: Near to Nature Forestry
3. Section Three: The Forest Economy
4. Section Four: The Way Forward
5. Section Five: On Review

In addition, seven webisodes have been produced featuring many of the experts and practitioners involved in promoting, establishment and management of native forests to meet multiple objectives:

1. The pure advantages of native forests
2. The native forest opportunity
3. How to grow a forest
4. The many benefits of native forest
5. The carbon sink
6. Making it happen
7. Envisaging the future

An overarching goal of the campaign is to influence a mindset shift from a perception of native forests being an unproductive land-use, to where they are seen as a valuable use of land that every landowner integrates into their best practice land management.

O Tātou Ngāhere (Our Forest) is being promoted to a wide range of target audiences with the aim to give native forestation a higher profile as well as debunk misinformation and make a stronger case for planting more native trees. The link to the O Tātou Ngāhere project is pureadvantage.org/o-tatou-ngahere.

For more information contact:

- Peter Berg, Chair, Tāne's Tree Trust peter@bergforests.co.nz
- Simon Millar, Executive Director, Pure Advantage simon@pureadvantage.org

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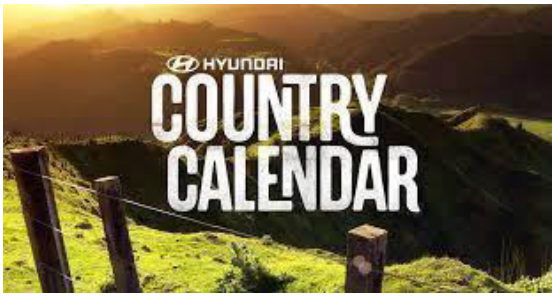
TĀNE'S TREE TRUST FEATURED ON COUNTRY CALENDAR



No doubt helped along by the O Tātou Ngāhere campaign, TTT was profiled on a recent episode of Country Calendar. This was aired on 19 September 2021 and featured Trisha Wren & TTT trustee Ian Brennan of Cassie's Farm in the Waikato. Cassie's Farm is a 90 ha drystock farm where they currently run dairy grazers – dairy calves and heifers that haven't started milking yet – plus some beef cattle, and two horses.

They soon realised after purchasing the land that parts of their 90 ha farm were too steep to graze stock easily, so they've been planting the gullies in high-value native timber that can eventually be selectively harvested under a continuous cover regime. As Ian says…

> *Our dream is to reverse the damage that has been done to this land over the past 100 years. We are gradually fencing off, protecting, and replanting with natives all seven of the streams that start on this farm, and all of the steep gullies that should probably never have been cleared of native bush in the first place.*

As a TTT trustee and farmer, Ian is passionate about promoting the benefits of retiring erosion-prone hill country and planting native forestry for multiple benefits including the sustainable production of high-quality specialty timber of a range of native trees species in the longer term using continuous cover forestry. Cassie's Farm is one of the major demonstration planting areas for TTT comprising various planting trials and monitoring plots.

Check out the Country Calendar episode on cassiesfarm.co.nz/country-calendar.

For more information contact Ian Brennan ianatcassiesfarm@gmail.com.

INTERNSHIP WITH TE URU RĀKAU

Te Uru Rākau asked if TTT were interested in hosting a forestry intern for the 2020-2021 summer. Each year Te Uru Rākau awards Ngā Karahipi Uru Rākau – Forestry Scholarships. These are aimed at increasing the numbers of Māori and women undertaking forestry science or forest engineering degrees in New Zealand.

TTT hosted its first student internship last summer. We were lucky to have Anna Manning who had just finished her first year in Forestry Engineering. Anna was a joy to work with, enthusiastic, quick to learn and mature beyond her years. As indicated by Anna…

> *This internship allowed me to travel to places around New Zealand that I have never been to before and gave me the opportunity to learn from those who have already worked in the forestry industry. I was also able to apply what I have learnt from my studies so far and relate them to my work. Working with Tānes Tree Trust not only provided me with opportunities to learn, grow and develop my skills in the forestry industry but also opened my eyes to the many opportunities we have to greater our indigenous forests for both environmental benefits and social benefits. Getting to meet, work, and learn from everyone at Tānes Tree Trust was an amazing experience and I am so grateful for all I have learnt.*

This coming summer we have accepted a new forestry intern who will be working across several TTT projects comprising fieldwork measuring native plantations and setting up seed island trials, growth data entry and quality control, and developing the TTT planted native forestry reference database.

For more information contact Michael Bergin michaelbergin.erl@gmail.com

ACKNOWLEDGEMENTS

Tāne's Tree Trust would like to thank all those who we collaborate with for ongoing funding and support for another successful year across our range of projects and initiatives.

Project funders include:

- The Tindall Foundation
- Te Uru Rākau One Billion Trees Programme
- Ministry for Primary Industries' Sustainable Management Fund
- Department of Conservation Community Fund
- Pamu Farms
- Auckland Regional Council
- Tasman Environmental Trust

Project partners and collaborators include:

- Pure Advantage
- Te Kohaka o Tuhaitara Trust
- NZ Farm Forestry Association
- Trees That Count
- AUT
- Scion
- Tainui Kawhia Incorporation
- Kawhia community volunteers
- Discover Waitomo, DOC's Jobs for Nature
- Waikato Regional Council
- Christchurch City Council
- Northland Regional Council
- Far North iwi
- Summit Forest
- Kaitaia Intermediate
- Department of Conservation
- Ngati Tara Tokanui
- Opoutere community volunteers
- Hancock Forestry
- Coastal Restoration Trust of New Zealand

APPENDIX 1 - FINANCIAL REPORTS

AUDITORS REPORT

TO THE TRUSTEES OF THE TANE'S TREE TRUST
FOR THE YEAR ENDED 31 March 2021

I have audited the attached financial statements for The Tane's Tree Trust. The financial and service performance statements provide information about the past financial performance and activities of the Trust and its financial position as at 31 March 2021. This information is stated in accordance with the accounting policies set out with these statements.

Auditor's responsibilities
It is my responsibility to express an independent opinion for the financial and service performance statements presented by the Trust and report my opinion.

Basis of Opinion
An audit includes examining, on a test basis, evidence relevant to the amounts and disclosures in the financial and service performance statements. It also includes assessing:

- The significant estimates and judgement made by the Trust in the preparation of the financial statements; and

- Whether the accounting policies are appropriate to the circumstances, consistently applied and adequately disclosed.

I conducted an audit in accordance with generally accepted auditing standards in New Zealand, except that my work was limited as explained below. I planned and performed my audit so as to obtain all the information and explanations which I considered necessary. I obtained sufficient evidence to give a reasonable assurance that the financial statements are free from material mis-statements, whether caused by fraud or error. In forming my opinion, I also evaluated the overall adequacy of the presentation of information in the financial statements.

Other than in my capacity as Auditor, I have no relationship with or interest in the Trust.

In my opinion, the financial and service performance statements fairly reflect the results of the activities and the financial position of the Trust as at 31 March 2021.

My audit report was completed on 27 August 2021 and my unqualified opinion is expressed as at that date.

Graham Haines ACCM, DipMgtSt

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Haines and Associates

TANE'S TREE TRUST
STATEMENT OF FINANCIAL PERFORMANCE
FOR THE YEAR ENDED 31 MARCH 2021

	2021	2020
Operating Revenue		
Sustainable farming fund	136,997	141,404
Tindall Project	160,000	190,000
Joint Projects Grants and Sponsorships	-	55,637
Project Co-Funding	16,067	29,500
TUR - Te Uru Rakau	129,954	27,029
TIP Project	5,200	60,960
Other Grants	20,679	39,151
Subscriptions	7,122	6,730
Donations received	5,068	4,357
Interest received	85	554
Other income	2,558	8,744
Plus Income Received in Advance from Last Year	107,656	67,722
Less Income Received in Advance for Next Year	(94,520)	(107,656)
	496,866	524,132
Expenses		
Accountancy	165	-
Administration	8,750	8,820
Advertising and Promotion	25,000	-
Audit fees	800	800
Contractors and consultants TTT projects	340,492	242,015
Depreciation	488	475
Donations	5,000	-
Executive officer	10,500	9,625
General expenses	106	690
Insurance	1,165	885
Intern Expenses	4,975	-
Joint projects	-	206,896
Newsletter	795	319
Office Expenses	23	11
Postage	1,049	1,262
Printing and stationery	2,586	1,378
Rent	1,200	1,200
Seminars and Conferences	22	5,132
Subscriptions	141	69
Telephones and tolls	319	646
Travelling and accommodation	-	7,558
Trust Meeting Expenses	970	2,425
Website & internet	2,309	907
	406,855	491,113
Nett Surplus (Deficit) For Year	**90,011**	**33,019**
Less Transfer of Donations to Research Funds	5,068	4,357
Operating Surplus (Deficit) For Year	**$84,943**	**$28,662**

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Haines and Associates

TANE'S TREE TRUST
STATEMENT OF FINANCIAL POSITION
AS AT 31 MARCH 2021

	2021	2020
Current Assets		
Bank Star Transaction	188,167	196,764
Bank Funding Account	18,495	18,450
Bank Call Investment Account	94,542	86,292
Accounts Receivable	109,655	42,333
GST	-	3,930
Petty Cash	78	78
	410,937	347,847
Non Current Assets		
Fixed assets (as per schedule)	1,801	646
Total Assets	412,738	348,493
Current Liabilities		
Accounts payable	100,279	114,582
GST	1,673	-
Income Received in Advance	94,520	107,656
	196,472	222,238
Total Net Funds Employed	**$216,266**	**$126,255**
Represented By:		
Trust Equity		
General funds	186,185	101,242
Research funds	30,081	25,013
Total Trust Equity	**$216,266**	**$126,255**

For and on behalf of the trustees

_____ Chairman 20-08-21 Date

_____ Treasurer 20-08-21 Date

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