



*Tāne's Tree Trust*

NATIVE FORESTS FOR OUR FUTURE

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***Submission for***

Climate Change Commission's Draft Advice  
on the second Emissions Reduction Plan

***Submitted to***

Climate Change Commission

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## Executive Summary

**Tane's Tree Trust (TTT) is a nation-wide organisation with a vision to support landowners in successfully establishing and sustainably managing native forest, for all the benefits they provide.** We are committed to scientific research as a base for best practice. Our resources are freely available. We have field trials and project work throughout NZ. We currently have over 700 members.

TTT's focus for this submission is on native forests, our *raison d'être*. However, **we support the overall advice for a balanced approach of emissions reduction, as well as carbon sequestration.**

**We are committed to seeing native forest cover woven back through our landscape;** and promoting all the benefits associated with native forests, including (but not limited to) carbon sequestration and adaptation to climate change. We advocate for continuous cover forestry systems, as opposed to clear-fell systems, as the many benefits associated with forest cover are retained. However, we believe there are roles for different types of forests with different species, as part of wise, sustainable land use. (Half our trustees have experience with exotic as well as native species).

**Additionality is the 'low hanging fruit' for carbon sequestration in native forests.** There are many (probably thousands) of native forest stands on farmland throughout NZ that are slowly dying, most of which could be retrieved through intervention. Fencing, pest animal and weed control can quickly result in a flip from carbon loss to carbon gain, plus a myriad of other ecosystem services. Ongoing monitoring and an adaptive management approach are recommended as all forests need active ongoing management.

**NZ urgently needs alternative forestry regimes for climate resilience and adaptation** - managed primarily for ecosystem services and the public good. However, landowners need revenue for forest cover on their land (whether exotic or native). Apart from carbon, there are few opportunities for those establishing (or restoring) permanent native forest cover to realise any ecosystem service benefits that this would provide, as most benefits accrue to the wider community - locally, regionally, and nationally - but particularly to downstream communities and businesses.

**Successful, cost-effective, large-scale establishment of native forest** will depend on working with nature, i.e., assisted natural regeneration, plus complementary planting where needed, e.g., seed islands. However, it takes longer to establish native forest this way and, therefore, this is unlikely to maximise carbon sequestration, in many cases.

Integration with supportive economic drivers is essential, i.e., investment, markets, industries, and incentives. **There is an urgent need for financial incentives to bridge the gap** between native trees becoming established and increasing their growth rate sufficient to earn enough carbon credits to reward landowners.

**We request that policymakers focus on scientific evidence provided by those with expertise.** Unfortunately, there is misinformation circulating on native forests promulgated by individuals who have no expertise in growing native species. This includes misinformation on the ability of native forest species to sequester carbon. The current MPI Look-up table for natives is based on (and accurate for) unmanaged regenerating shrubland on relatively unproductive land. This is routinely compared with data from managed radiata-pine plantations. This is not an equitable comparison.

**Published research on carbon sequestration**, based on TTT's databases, demonstrates that well-managed, planted indigenous forest is better at sequestering carbon and faster growing than

commonly considered. TTT's database represents the most comprehensive set of planted native tree and shrub measurements available. While native species do not have the initial very fast growth of radiata pine, once established, some native tree species grow at rates close to that of commercially planted exotic species and will continue to do so for many decades.

We could not find any reference in the Draft ERP2, to the Forestry and Wood Processing Industry Transformation Plan. **We think the draft advice should refer to and link in with this ITP**, which represents the collective government-industry vision for transforming the sector. This includes the sector's contribution to climate change mitigation and adaptation.

**We agree that there is a need for clear policy direction for forestry.** We believe that a forestry cross-sector working party would be useful in providing insight to policymakers, particularly regarding sector-specific policies to reduce emissions and increase emissions removals.

**TTT largely supports the Commission's Draft Advice on ERP2, particularly:**

- **The Commission's stance of reducing our gross emissions from all sources** as much as, and as soon as possible, rather than heavily relying on offsetting NZ's climate pollution. We agree that carbon sequestration should be focused on offsetting emissions from activities that are hard to decarbonise.
- We gratefully acknowledge the Commission's **recognition of the wider benefits** associated with increasing native forest cover, not just carbon sequestration and climate adaptation.
- We support the Commission's assertions that **the Treaty of Waitangi is recognised and embedded in NZ's efforts** to reach emissions reduction targets, mātauranga Māori is recognised, and collaborations with Iwi/Hapū supported – as we agree that this will lead to more locally relevant and enduring climate change solutions, and climate resilience, where inter-generational perspectives eclipse short-term thinking and exploitation of resources.
- We acknowledge the Commission's recognition of **risks associated with reliance on forests**; however, **we assert that there are multiple means of risk mitigation**, as described below. And indeed, there is good evidence that multi-age, multi-species, permanent native forests are more likely to be resilient to the impacts of climate change, than monocultures.
- We agree that **ensuring that the agricultural sector reduces emissions** will be an important factor in meeting the second emissions budget and the 2030 biogenic methane target.
- We agree that **agricultural emissions pricing should not be delayed further**.
- The agricultural lobby is powerful and has been successful in delaying tactics, but they fail to acknowledge the heavy price that farmers are already paying due to the devastation of extreme weather events, associated with climate change, and the willingness of many farmers to do their bit to reduce emissions.
- We also agree that **farmers will need support** to change practices.
- Farmers are keen to invest in native forest establishment and management, but they are crying out for financial assistance. We believe that even partial assistance with costs will help tip the balance to expedite the expansion of native forest establishment and restoration on farms.
- **We strongly support a biodiversity credit system** as an incentive for native forestation.
- We are aware of exceptional efforts in restoring, managing and establishing native forest, which we believe should be showcased to encourage the rest of the sector to also participate. There are catchment groups that are excellent exemplars of what can be achieved with collaborative work between landowners and supporting local council staff, central government and eNGOs.
- We applaud the Commission for striving to provide independent, expert, evidence-based advice.
- TTT is happy to provide further evidence to the Commission, in the form of data and insights around all aspects associated with native forests, relevant to the ERP2 advice to Government.

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## Details of Submitter – Tāne’s Tree Trust

- **Tāne’s Tree Trust (TTT) was established in 2000**, with the vision to support landowners in successfully establishing and sustainably managing native forest, for all the benefits they provide – <https://www.tanestrees.org.nz/>
  - Our resources are freely available to all – <https://www.tanestrees.org.nz/resources/>
  - **We are a nation-wide organisation** with 13 trustees, who have expertise in forestry science, management, restoration, conservation, ecology, genetics, physiology, economics, policy; & farm forestry, dry stock farming, landscape architecture, rongoa, Wai 262, & sustainable land use.
  - We currently have 701 TTT members throughout Aotearoa NZ.
  - We are among the best informed and most experienced in native forestry in NZ.
  - **We have a comprehensive R&D work programme** (APPENDIX 1).
  - **We are committed to scientific research** as a base for best practice guidelines.
  - We embrace the broader concept of forestry, i.e., the science and craft of establishing, restoring, and managing forest for all the benefits it provides for humanity and the environment.
  - **We are researching a range of options to cost-effectively establish native forest at landscape scale**, including assisted natural regeneration and use of seed islands (APPENDIX 2).
  - **Our Annual Report details our comprehensive research & development programme** – [https://www.tanestrees.org.nz/site/assets/files/1037/ttt\\_annual\\_report\\_2022.pdf](https://www.tanestrees.org.nz/site/assets/files/1037/ttt_annual_report_2022.pdf)
  - **We are highly qualified and experienced** – eight trustees have postgrad qualifications, including three doctorates. Between us, we have 43 years of experience in government organisations, 55 years in university academia, 68 years in CRI research positions, 70+ years in technical roles and private consulting, and 100+ years in professional forestry management.
  - **We manage NZ’s largest national database** on planted natives with over 60 different native tree and shrub species measured throughout NZ from over 100 stands, age 5 to over 100 years old.
  - **We have field trials throughout NZ** that underpin our databases and development of resources.
  - **We have developed an online Native Forest Toolkit** <https://toolkit.tanestrees.org.nz/> - a suite of calculators designed for those planting and managing native trees to meet multiple objectives from environmental restoration to sustainable production. It draws on scientifically robust data from **TTT’s Indigenous Plantation Database** to provide farmers, iwi, environmental NGOs, foresters, community groups and individuals with realistic expectations for their plantings.
  - **The Toolkit** includes a Planting & Budgeting Calculator, a Growth and Yield Calculator, an Economics Calculator (which includes non-timber values), and a Carbon Calculator.
  - **The Carbon Calculator:** <https://www.tanestrees.org.nz/resource-centre/carbon-calculator/?highlight=carbon+calculator> is for planted native forest. TTT data shows that the Look-up tables significantly underestimate C sequestration in planted, managed native forest – <https://pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/>
  - **We are currently developing a fact sheets series**, to assist those establishing and managing native forest to meet multiple objectives. These will soon be uploaded to our website.
  - **We hold workshops & training throughout NZ**, for iwi, NGOs, Councils, catchment groups, educational and community organisations, etc.
  - **We have expertise in and are proponents of continuous cover forestry:** [https://www.tanestrees.org.nz/site/assets/files/1069/continuous\\_cover\\_forestry\\_-\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1069/continuous_cover_forestry_-_web.pdf)
  - Several trustees have hands-on experience in sustainable indigenous forestry management via continuous cover forestry (CCF) regimes, under part 3A of the Forests Act.
  - **We convene the Northland Tōtara Working Group** and facilitate research into the sustainable management of this naturally regenerating native forest resource (APPENDIX 3).
  - **We co-hosted a conference at Te Papa**, Wellington, in October 2022 – *O Tatou Ngāhere – Regenerating our landscape with native forest*. Over 1,000 people attended. (APPENDIX 4).
  - Most of our trustees have worked with both indigenous species and exotic plantation species.
- We are happy to provide further information and are best contacted via [office@tanestrees.org.nz](mailto:office@tanestrees.org.nz)*

## General Comments

- **TTT's raison d'être is native forests**, and our focus in this submission is on **carbon sequestration, climate resilience, cost-effective establishment, and incentives for the establishment and sustainable management of native forest**.
- However, TTT strongly supports the Commission's stance of reducing our gross emissions from all sources as much as (and as soon as) possible, rather than heavily relying on offsetting climate pollution.
- **TTT unanimously strongly supports the Climate Change Commission's advice** for native forests to be a vital part of NZ's integrated response to the climate change crisis - in terms of carbon sequestration and climate change adaptation. This includes the policy direction and approaches recommended by the Commission's previous advice - *Ināia tonu nei*, to increase the amount of permanent native forest as a long-term carbon sink.
- We agree that carbon sequestration should be focused on offsetting emissions from activities that are hard to decarbonise.
- We are concerned that the draft advice for the second ERP has been released when the Commission "... have not run a detailed ruler over the first emissions reduction plan to see how effectively it is working." And "there hasn't yet been enough time to assess the real world implications" (page 4).
- We understand that there is a lag between collection of data, analysis and reporting, but wonder if strategic planning would be easier once this data (from monitoring of the first ERP) are analysed.
- **Once more is understood about the effectiveness of the first ERP, will the second ERP be revisited and adjusted accordingly?**
- That said, we understand the need to work with urgency, and that an adaptive management process is needed.
- **We support the Commission's assertion that the Treaty of Waitangi is recognised and embedded in NZ's efforts to reach emissions reduction targets**, mātauranga Māori is recognised, and collaborations with Iwi/Hapū supported - leading to more locally relevant and enduring climate change solutions, and inter-generational perspectives (as opposed to short-term thinking). This is particularly important in decisions associated with forests, considering the huge stake that Maori have in the forestry industry, and their aspirations as mana whenua.
- We agree that **ensuring that the agricultural sector reduces emissions** will be an important factor in meeting the second emissions budget and the 2030 biogenic methane target.
- We agree that agricultural emissions pricing should not be delayed further and that farmers will need support to change practices. We discuss this further below.
- **Part 3: Enabling System Transformation** emphasises a "more circular economy and sustainable bioeconomy" (P.12). We strongly support this. However, we could not find any reference to the Forest and Wood Processing Industry Transformation Plan (ITP)<sup>1</sup>, which was launched in November 2022. We think the draft advice should refer to and link in with the ITP, which represents the collective government-industry vision for transforming the sector. This includes the sector's contribution to climate change mitigation and adaptation.
- **Chapter 15: Circular Economy and Bioeconomy** - We strongly agree that the plantation forestry industry has an important role in developing the bioeconomy.
- Finally, we applaud the Commission for striving to provide independent, expert, evidence-based advice to Government.

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<sup>1</sup> Forestry and Wood Processing Industry Transformation Plan - <https://www.mpi.govt.nz/forestry/forest-industry-and-workforce/forestry-and-wood-processing-industry-transformation-plan/>

## Tane's Tree Trust's feedback on Agriculture (Chapter 7)

- We concur with the Commission in that ensuring that the agricultural sector reduces emissions will be an important factor in meeting the second emissions budget and the 2030 biogenic methane target.
- We agree that agricultural emissions pricing should not be delayed further.
- We also agree with the Commission that farmers will need support to change practices.
- The agricultural lobbyists are powerful and have been successful in their delaying tactics, but they fail to acknowledge the heavy impact of the devastation caused by extreme weather events on landowners (and consumers), where climate change is a major contributing factor.
- We believe that stronger statements need to be made in the draft advice about action on agricultural emissions, and the agricultural lobbyists (and the major industry players who support them) need to be held to account as they are impeding progress on action desperately needed to counter an existential crisis.
- The lobbyists also fail to recognise the willingness of many farmers to do their bit to reduce emissions.
- **Manaaki Whenua Landcare Research's Survey of Rural Decision Makers<sup>2</sup>**, which is conducted every 2 years, shows that (i) there is a strong interest in planting trees, particularly native species (2019 survey), and (ii) the large majority of rural landowners believe that climate change is already affecting the frequency and intensity of weather-related events (2021 survey).
- Those of us who are regularly engaging with farmers are consistently hearing the same message across the motu - there is a strong appetite across the entire sector to establish native forest, but **farmers are crying out for incentives** to help them do so, which is warranted given that most of the benefits associated with native forest accrue off site, particularly downstream.
- The Trust has good connections with farming communities, and the consistent feedback we receive at field days and workshops is that farmers are keen to invest in native forest establishment and management - for all the benefits it provides - but they are crying out for financial assistance. We believe that even partial assistance with costs will help tip the balance.
- **Landowners need to be able to access enough support to establish natives** rather than invest in an unproven forestry land use, i.e., 'transitional' radiata-pine carbon plantations intended to be transformed into native forests - when there are no established management practices based on documented research trials in the public domain.
- The Trust would like to see native forestation play a bigger part in climate resilience and adaptation on farms, as described below.
- The problem is – **How do we value the extremely important non-market forest ecosystem services** within our current economic systems and frameworks, which fail to value natural capital in land-use decision-making, and in doing so, short change future generations?
- TTT believes that **a biodiversity credit system would help expedite farmers' involvement** in the planting, assisted natural regeneration, and restorative interventions in existing native forest, which will contribute to carbon sequestration, increased biodiversity values, climate resilience, improved water quality, and a myriad of other ecosystem services. This is discussed further below.
- We request that any policy around incentivising native forestation dovetails with other policies, particularly the ETS amendments, Freshwater Reforms (especially the 3 m setbacks), and the Biodiversity Strategy (Te Mana O Te Taiao Aotearoa New Zealand Biodiversity Strategy 2020).

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<sup>2</sup> <https://www.landcareresearch.co.nz/discover-our-research/environment/sustainable-society-and-policy/survey-of-rural-decision-makers/>



## Tane's Tree Trust's feedback on Forests (Chapter 10 & elsewhere)

The Trust would like to see native forests play a bigger part in climate mitigation and adaptation, and have focussed our feedback in this submission, accordingly. However, most of our trustees have experience with exotic species as well as natives, and we **advocate for a mix of different types of forestry with different species - as part of wise, sustainable land use.**

The following responses to information on forests in the draft ERP2 are largely focussed on the information in Chapter 10 – Forests. However, we found information on forests throughout the draft advice, which was a bit confusing. In this section, we have attempted to knit all the information on native forests in the draft ERP2 together with our responses.

We have made comments below, by order of the information appearing in the draft ERP2, for ease of reference, rather than in order of priority over what issues we thought were the most important. We include excerpts from the draft ERP2, which are in italics and quote marks. Some of the subsection titles are directly from the draft advice as we wanted to respond directly to the issues raised.

### **2030 Benchmarks for Action for Forestry Sector (page 38 of Draft ERP2)**

*(Changes expressed from 2020 unless stated otherwise)*

- 150,000 hectares of new native forest established
- 360,000 hectares of new exotic forest established
- Zero deforestation of pre-1990 forests and projected deforestation of post-1989 forests halved from 2026

The 2030 benchmark of 150,000 ha of new native forest established is ambitious. We are concerned whether this target can be achieved, particularly with the history of lack of investment in native forests. Below, we discuss the main barriers to achieving such an ambitious target, and potential solutions.

It is very difficult to find reliable data on the amount of new native forest being established and the amount of native deforestation happening. If the Commission is aware of reliable data, we would like to have access to it.

*“The Commission’s demonstration path to meeting the 2050 net zero target included establishing new native forests to build a long-term carbon sink to offset residual emissions from hard-to-abate sectors”.* **(Page 48 of the draft ERP2).**

We understand the importance of ramping up native afforestation rates, to help meet the 2050 net-zero targets.

### **Concerns over Transitional Forestry**

*“Not harvesting forests originally intended to be production forests has potential to cause other problems too. While exotic forests that are actively and appropriately managed can transition to native forests over time, exotic forests planted for production purposes may not be suitable for this and may cause negative environmental impacts if not managed well.”* **(Pages 59 - 60 of the draft ERP2).**

We have concerns regarding the above statement, particularly *“While exotic forests that are actively and appropriately managed can transition to native forests over time ...”* because this is an unproven, untested forestry land use, i.e., there are no established management practices based on



documented research trials in the public domain. We regard this as a perverse outcome of well-intended policy.

It is assumed by some that when radiata-pine stands disintegrate they will somehow be automatically replaced by naturally regenerating native forests. We believe that this is unlikely without active intervention, and even then, cannot be assured. Intensive management inputs may be necessary to ensure a successful transition on many sites, but this can be fraught as disintegrating radiata-pine stands are dangerous to work in.

Currently, carbon farming provides little incentive for the landowner to budget for, or invest in the work required to manage a long-term transition. Particularly, we are concerned that this practice is being inappropriately exploited for short-term commercial gain by parties who do not have a long-term vested interest in ensuring a legacy of permanent forest cover. This presents a significant social-license-to-practice problem, which undermines the ETS and New Zealand's efforts to combat climate change.

**We recommend that appropriate practices are required to manage a transition, there is some sort of bond or requirement for a suitable insurance policy, and monitoring processes are put in place - to help mitigate the risks associated with non-harvest carbon forests.** However, we also acknowledge that there is a lack of established management practices for transitioning exotic plantations to native forest.

**We recommend that incentives are created to transition clear-fell plantation regimes to permanent native forest in sensitive upland catchments,** particularly in places such as Tairāwhiti, where there have been significant issues with slash debris and erosion during extreme weather events, causing considerable damage to downstream communities and ecosystems.

### Addressing Knowledge Gaps in Transitional Forestry

While TTT has major concerns about 'plant and leave' radiata-pine carbon forests, such stands have already been established and we have responded to requests to undertake research on transitional forestry. TTT and collaborators recently started a research project **Transitioning exotic forest to natives**, which is a 5-year project, largely funded by the Sustainable Food and Fibre Futures Fund (SFFF). (See APPENDIX 6).

An important driver for this research is the opportunity to transition directly from exotic to native forest, avoiding clear-felling on erodible land in regions such as Tairāwhiti where, with correct management, understory regeneration is quite probable. The commercial plantation forestry industry is looking for advice on how to retire radiata-pine stands safely and cost-effectively on remote, erodible steeplands, which are not economical to harvest and/or pose environmental risks and where the best option is a managed transition back to native forest.

Another driver is that many Maori landowners are currently actively seeking technical advice in transitioning radiata-pine forest back to native forest.

**Managing transitions from exotic forest to native is complex,** subject to many variables, and very site and context dependent. There is also a conflict between maximising income from carbon sequestration and effecting a transition to native forest. The research project will establish forestry trials to collect data in existing exotic stands of various ages, on a range of sites throughout New Zealand - to determine factors and interventions that are likely to allow a transition to native forest. It will look for drivers of natural regeneration such as levels of canopy cover (light ingress), seed

source proximity, climatic variables and site factors - to inform what types and levels of management are required, and identify situations where a transition is unlikely to be successful/unsuccessful, and subsequently provide guidelines and recommendations.

It will be a challenge managing and maintaining transitions to predominantly native forest through weed-infested vegetation. Active management will be essential for all forests in New Zealand.

### **Additionality**

*“In the context of carbon markets, additionality generally means that an emissions reduction or removal traded should be above and beyond what would happen under current policy and business-as-usual conditions.” (Additionality, as defined on page 63 of the draft ERP2).*

The following photos graphically demonstrate additionality, the ‘low hanging fruit’ for carbon sequestration. The photos demonstrate how slowly dying native forest stands on farms throughout NZ can be retrieved through intervention. Fencing, pest animal and weed control can quickly result in a flip from carbon loss to carbon gain, plus a myriad of other ecosystem services.



PHOTO 1: Degenerating kahikatea stand, north-west Waikato, which is fast losing carbon due to trees dying as a result of damage by livestock. These types of stands are typical throughout rural NZ.





PHOTO 2: In the middle distance is a young, healthy, fast-growing stand of kahikatea, which is fenced. This stand is close to the stand shown in PHOTO 1, but across a property boundary. A healthy stand like this will continue to sequester carbon for hundreds of years, and provide other ecosystem services such as protecting and maintaining water quality and biodiversity values (terrestrial and aquatic), flood protection, and shade and wind-breaks for livestock.

Note that in PHOTO 2 there are isolated trees outside the fenceline. These trees would once have been contiguous with the (now fenced) stand but have become outliers, as the edge trees are particularly vulnerable to damage by livestock. This shows how unfenced stands become fragmented, deteriorate and shrink over time. Fencing and stock exclusion arrest this process.

With fencing and pest control, native forest can quickly recover, particularly if there are nearby seed sources. PHOTOS 3a, b, & c (below) are from a recently fenced QEII stand on a Pamu farm, in the Far North. Edge trees were showing signs of recovery from livestock.



PHOTOS 3a, 3b & 3c: A selection of some of the native tree seedlings that were present 6 months after fencing a mixed podocarp forest. These seedlings were all found within a short distance.

PHOTO 4 (below) taken in a forest stand nearby, provides a timeline comparison. This stand of native forest was fenced 4 years earlier on the same Pamu Farm. The edge trees have recovered from livestock damage. The farm manager has a good pest control programme and nearby forest on DoC land provides plentiful seed sources. Fruit-feeding native birds deposit seeds and aid forest regeneration.

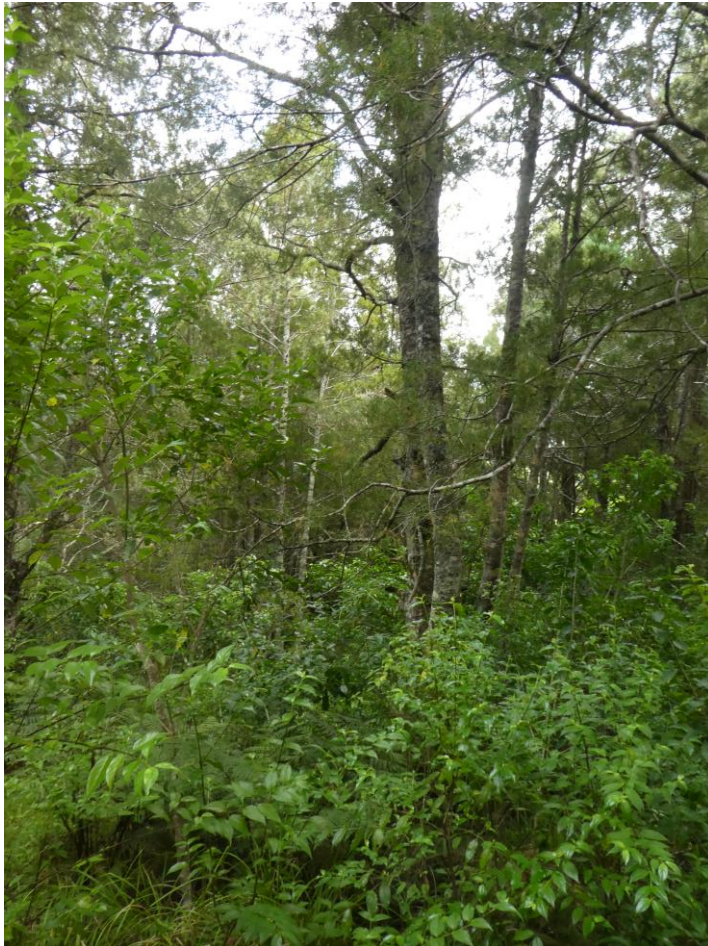


PHOTO 4: Interior of a mixed podocarp forest, dominated by kahikatea (our tallest native tree). The stand was fenced 4 years ago and now has well developed understories comprising of a rich diversity of plant species, providing habitat for indigenous wildlife, including at-risk species such as a giant kauri snail species.

TTT is currently searching for data on carbon sequestration via ‘additionality’ in our databases and seeking data from other organisations.

### **Need for clear policy direction for forestry**

*“There is currently a lack of clear direction and objectives for the amount and type of forestry required to achieve the 2050 target. In the development of objectives, climate change mitigation and adaptation must be considered as well as the broader social, cultural, environmental, and economic outcomes. Furthermore, there is an opportunity for the Government to articulate the role forests and other emissions removals will play in achieving budgets and targets.”*

*“This draft advice builds on previous advice we have provided to the Government; defining the role of forests is critical to the pathway to achieve the 2050 target and as forests take a long time to establish and grow, clear policy direction is needed quickly.” (Page 126 of the draft ERP2)*

We strongly endorse the message in the draft advice that it is essential to clearly define the role of forestry in achieving NZ’s targets and we agree that a “clear policy direction” for forestry is missing



and is needed urgently. We believe that **development of a clear policy on forestry is hampered** by the very limited number of policymakers with a forestry background in NZ.

**We are concerned about the current social licence to practice issues for the exotic plantation forestry industry** and the impact that this could have on forestry planting rates. This is something that urgently needs to be addressed.

A Forestry Ministerial Advisory Group was instrumental in developing the **Forestry and Wood Processing Industry Transformation Plan (ITP)**<sup>3</sup>, which was launched in November 2022. The Forestry Ministerial Advisory Group was subsequently wound up in May 2023. We could not find any reference in the Draft ERP2, to the Forestry and Wood Processing ITP. **We think the draft advice should refer to and link in with this ITP**, which represents the collective government-industry vision for transforming the sector. This includes the sector's contribution to climate change mitigation and adaptation.

**We believe that a forestry cross-sector working party would provide useful insight to policymakers**, particularly regarding sector-specific policies to reduce emissions and increase emissions removals. We believe that this would help reduce the risk of unintended perverse outcomes from policy initiatives.

Potentially this could be organised via the NZ Institute of Forestry, as this is a pan-forestry organisation that includes experts associated with different types of forests and forestry regimes ranging from permanent native forests, farm foresters and small woodlot owners, and carbon forestry interests, through to clear-fell, corporate forestry interests with exotic species.

### **Carbon sequestration rates in different types of forests**

*“Exotic forests generally sequester carbon from the atmosphere much faster than native forests, but the sequestration rate of some exotic species also declines sooner.” (Page 126 of the draft ERP2).*

*“Fast growth forests, which are usually exotic, can sequester carbon dioxide much faster than slow growth forests, usually natives.” (Page 126 of the draft ERP2).*

**We challenge the above statements**, which we believe are overly simplistic and inaccurate.

*“Natural forests may sequester lower quantities of carbon in the shorter term but ultimately they store far more than plantations, and they continue to store carbon over timescales of centuries. Protection of natural forests therefore needs to be a central component of approaches to mitigation of climate change” (Waring et al., 2020)<sup>4</sup>. This is certainly true of NZ's native forests<sup>5</sup>.*

Native species are not necessarily slow growing. While they do not have the initial very fast growth of radiata pine (which is exceptional for a temperate conifer species), once established, there are native tree species that grow at rates closer to that of a number of commercially planted exotic species, and will continue to do so for many decades<sup>6</sup>.

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<sup>3</sup> Forestry and Wood Processing Industry Transformation Plan - <https://www.mpi.govt.nz/forestry/forest-industry-and-workforce/forestry-and-wood-processing-industry-transformation-plan/>

<sup>4</sup> <https://www.frontiersin.org/articles/10.3389/ffgc.2020.00058/full>

<sup>5</sup> <https://pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/>

<sup>6</sup> <https://pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/>

Likewise, there are slow-growing exotic species in NZ forests. Forests are planted for many different reasons, including arboretum and amenity forests, which often include slower-growing species.

Unfortunately, the Look-up tables are often quoted by people wanting to dismiss the potential carbon sequestration by native trees and undermine the call for planting more indigenous forest. The current Look-up Table for natives is accurate only for naturally regenerating kanuka/manuka shrubland. This unmanaged, regenerating shrubland is on relatively unproductive land, and it is routinely compared with data from managed radiata-pine plantations. It is not an equitable comparison.

Recently published research on carbon sequestration, based on TTT's databases, demonstrates that well-managed planted indigenous forest is better at sequestering carbon and faster growing than commonly considered (APPENDIX 5). Our data support the position that radiata pine is initially faster growing and simpler to manage (compared with other exotic and native species), but the difference between carbon sequestration in radiata pine and sustainably-managed planted native forest is much less than is often suggested.

TTT's data is based on several decades of measurements from permanent sampling plots. The database represents the most comprehensive set of planted native tree and shrub measurements available. Data is collected across the full gamut of poorly managed through to well-managed stands. Most are on relatively unproductive land.

**Tane's Tree Trust's carbon calculator**<sup>7</sup>, based on our database of planted native forest, predicts that though a stand of native trees planted at 1,250 trees per hectare has an average CO<sub>2</sub> removal rate of only 6 tonnes over the first 30 years, this increases to 20 tonnes between ages 30 and 60 years, and further increases to 27 tonnes between ages 60 and 90.

The widely held myth that NZ's native forests are slower growing and accordingly slower to sequester carbon, as indicated by the MPI Look-up tables, may be discouraging landowners from planting native trees, even where it is their preference to do so. Worse, it may be leading to planting advice that is incorrect and not helpful at a time when any form of tree planting by landowners is a bonus.

We are grateful that the MPI Look-up tables are currently being updated to include planted, managed native forest.

*"Exotic production forests reach their long-term average carbon storage level within around 20 years depending on species and silvicultural regime."* **(Page 126 of the draft ERP2).**

This is overly simplistic and not accurate. It may be true for radiata-pine, which is a pioneer species that is 'very fast out of the blocks', but other exotic species have different carbon sequestration curves.

*"Native forests can continue to sequester carbon for hundreds of years, giving the opportunity to create long term carbon sinks."* **(Page 127 of the draft ERP2).**

This is generally true, unless the main canopy species are highly palatable to possums, such as kamahi, rata, and pohutukawa dominated forests, and possum numbers are not controlled. Forests dominated by highly palatable species will be compromised by high possum numbers, even potentially to the degree of canopy collapse.

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<sup>7</sup> <https://www.tanestrees.org.nz/resources/carbon-calculator/?highlight=carbon+calculator>

Possum control is one of the important things we can do to maintain healthy forests and ensure they continue to sequester carbon. Control of browsers (e.g., deer and goats) and exclusion of livestock is also important, as browsers and livestock can eat and destroy palatable understory species and cause damage to canopy trees. Note – not all native tree and shrub species are palatable. Some species, such as totara, are unpalatable.

## Permanent forests

*“Permanent forests are established with no intention of clear-fell harvest. These could be established through either reversion or planting and might be native or exotic species. Some permanent forests are established with the intention of selective harvest and/or to act as nurse crops transitioning to mature native forests”.* (Page 128 of the draft ERP2).

**TTT contends that for a forest to be permanent, it needs to be self-perpetuating**, i.e., capable of continuing or renewing itself indefinitely without any significant outside intervention.

**TTT recommends that the permanent forest category in the NZ ETS is limited primarily to native forests.** This will simultaneously help address the biodiversity and freshwater crises, and provide important cultural and socioeconomic benefits, as well as the climate crisis (mitigation and adaptation).

Regarding permanent carbon forests that are planted in exotic species that are not long-lived, such as radiata pine, what assurances are there that a transition to native forest will eventuate - and such a forest is indeed permanent?

Some of our trustees would like to see exotic species excluded from the permanent forest category, arguing that there is very strong, undeniable evidence that our native forests are, indeed, permanent forests. They argue that there is no evidence (yet) that there are exotic species that will form self-perpetuating permanent forests in the long term. We will not know the answer to this until hundreds of years from now.

Other trustees argue that there may be circumstances where long-lived exotics species could be appropriately managed as permanent forests, such as redwoods, giant sequoia, and some of the oak and eucalypt species. Regardless, there would need to be adequate planning and ongoing monitoring would be needed.

Finally, here is a comment from our Chair, Peter Berg, who has extensive experience (and leadership) in forestry with exotic and native species: *“I still have a problem with calling any non-natural forest “permanent” as it implies we are accepting it as near natural or agreeing that it should be part of the ongoing NZ/natural landscape”.*

## A mosaic approach for integration of native forest back into our landscapes

*“Small areas of forest can be interspersed with other land uses, such as farms, to create mosaic landscapes. Currently, the Government is working with the agriculture sector to develop a strategy for including on-farm sequestration in the upcoming farm-level emissions pricing system.”* (P.129-130, DRAFT ERP2).

TTT strongly supports this. We see an opportunity to integrate native forests back into our landscapes, as part of a more sophisticated approach to land-use design and planning – one that



results in a **mosaic-like landscape pattern of vegetation types and multi-purpose land management.**

**TTT advocates for promoting the integration of native forest back within our working lands in a way that will enhance existing productive land uses, not compete with them** and will result in environmental and cultural gains, and increase climate resilience.

We recommend land-use and land management plans that are multi-purpose, intergenerational, locally integrated and site-responsive – which also recognise the multivalent potential that native forests bring. There is ‘no one size fits all’, as there is a wide range of sites, stakeholder requirements, and management concepts involved, including native afforestation primarily through planting, natural regeneration, assisted natural regeneration, sustainable indigenous forestry, CCF, carbon farming, transitional forestry, and exotic/native mixes.

In some areas, soil conservation values and climate resilience will be the priority; in other areas, natural, ecological, archaeological, or cultural features and values may require special management; or sustainable timber production may be an appropriate land use (see below).

Realising locally appropriate and multi-functional forestry will require a range of forest management concepts (such as CCF), forests of exotic and native species, mixed species, and transitions; as well as skilled practitioners. It will also require long-term investors, the development of supportive industries and markets, conducive policy and regulatory frameworks, and probably financial incentives such as some form of payment for ecosystem services.

*Currently, the Government is working with the agriculture sector to develop a strategy for including on-farm sequestration in the upcoming farm-level emissions pricing system. (P.129-130, DRAFT ERP2).*

TTT is highly supportive of this! Trees on farms can not only assist with carbon sequestration, they can also help ameliorate the local climate and provide shade, which is beneficial for the well-being of livestock and farm workers. There are also a myriad of other benefits, including biodiversity values, pollination services, water quality, and land stability, to name a few.

TTT supports the recently proposed approach for recognising carbon sequestration from riparian plantings and management of indigenous vegetation.

A publication on non-timber values in native forest<sup>8</sup> concluded that **native forest in riparian areas is likely to have particularly high aggregated ecosystem services** because of:

- (i) often high fertility on these sites with the fastest growth and hence carbon sequestration for planted and regenerating native forest;
- (ii) buffering of the negative impacts of plantation forestry operations, intensive agriculture, and urban development through prevention of sediment loss, recycling of nutrients, and protection of water quality;
- (iii) increased climate resilience - decreased run-off and flood peaks, protecting downstream infrastructures and ecosystems;
- (iv) increased biodiversity and cultural values due to habitat provision, creation of wildlife corridors, protection of aquatic habitats and traditional food sources (mahinga kai);
- (v) creation of connections between ecosystems to enable seasonal migrations; and

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<sup>8</sup> Aimers, J., Bergin, D., Horgan, G. (2021). Review of non-timber values in sustainably managed native forest in New Zealand. Tāne’s Tree Trust bulletin, Hamilton, New Zealand. 119 pages.  
[https://www.tanestrees.org.nz/site/assets/files/1099/non\\_timber\\_values\\_in\\_native\\_forests\\_-\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1099/non_timber_values_in_native_forests_-_web.pdf)

(vi) support for apiculture, and pollination services for adjacent horticultural and agricultural industries.

**Riparian plantings are currently not recognised under the ETS** for their carbon sequestration, which cumulatively could be substantial, especially farm-wide plantings. This should be rectified as riparian zones are often highly fertile sites with the fastest growth and hence carbon sequestration for planted and regenerating native forest. Moreover, the collective cumulative effect and scale of riparian plantings and pockets of native bush on farms are potentially significant. (See article by Dr David Norton (2021), on ‘The importance of native trees in agroecosystems’<sup>9</sup>).

For instance, restoration of kahikatea forest in riparian areas throughout our lowlands would significantly contribute to carbon sequestration and a myriad of other ecosystem services including climate adaptation. Kahikatea is our tallest native tree species, it is a long-lived pioneer species (a rare thing) and is a relatively fast-growing native tree species, therefore, ideal for carbon sequestration.



PHOTO 5a and 5b: 32-year-old kahikatea trees in a fenced riparian area, in farmland near Rotorua.

We are concerned that the Commission’s advice to Government regarding the first Emissions Reduction Plan was focused too much on native afforestation in marginal hill country, which though very important, underestimates the appetite of landowners to plant or manage natural regeneration of native forest on other land classes. This includes dairy farmers.

Our concern is that focusing forestation efforts on marginal hill country will result in the preclusion of funding for restoration forest in lowland and midland areas. **Weaving native forest back into our intensively farmed lowlands and midlands should also be a priority** – this is where carbon sequestration is highest, and climate adaptation is very important.

<sup>9</sup> <https://pureadvantage.org/the-conservation-estate-copy/>

**The greatest carbon sequestration in our native species is in our lowland and midland areas** and there is strong interest from landowner groups to restore forest throughout our rural working lands, particularly in riparian areas and in erodible and flood-prone land, i.e., not just marginal land. For example, we have landowners in the Waikato region who are crying out for help with restoration of their kahikatea forests, particularly in riparian zones and flood-prone areas.

Much of NZ's remaining native forest is restricted to upland regions, with intact lowland podocarp-hardwood forest, wetland-forest complexes, and natural coastal ecosystems now scarce in most regions, and largely confined to private land. There is a recognised need to increase indigenous biodiversity conservation on our productive rural lands.

There is also increased awareness of water quality issues in waterways in intensively developed urban and agricultural land. NZ has a sharply declining water quality, with most of our regularly monitored lowland lakes and rivers now rated as poor or very poor water quality<sup>10</sup>.

### **Risks associated with Forests**

*Storing carbon on land creates risks (Draft ERP2, p. 47)*

*Risks around rapid and unmanaged exotic afforestation (Draft ERP2, p. 130)*

We acknowledge the Commission's recognition of risks associated with storing carbon in forests; however, there are risks associated with any strategy to reduce gross emissions. We assert that there are multiple means of risk mitigation regarding our forests.

As stated in the draft ERP2 "*Climate change will exacerbate forest fires, strong winds, storms, droughts, pests, and pathogens*". (Draft ERP2, p. 47). As the carbon stored in forests can be easily released, we need our forests to be well managed and resilient. It is important to identify potential risks, and risk mitigation strategies for exotic and native forests - including forests within the DoC estate, exotic plantation forests, small woodlots on farms, and native forest on private and iwi land managed for multiple purposes. There will be different risk profiles for different types of forests in different regions.

**Multi-age, multi-species forests are more likely to be resilient** to the impacts of climate change than monocultures<sup>11</sup>.

TTT is currently finalising a **Resilient Forests factsheet**, as part of a factsheet series on forest establishment (planting and assisted natural regeneration) funded by Te Uru Rākau, which will soon be launched on TTT's website. This factsheet looks at the predicted changes for our climate and how this is likely to impact existing forest and the establishment of new native forest. Then it considers measures required to make our native forest more resilient.

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<sup>10</sup> <https://www.lawa.org.nz/get-involved/news-and-stories/national-news/2022/september/scientists-release-monitoring-results-for-1-727-river-and-lake-sites-across-new-zealand/>

<sup>11</sup> Aimers, J. (2021). Future-proofing our Ngahere. O Tātou Ngahere (Our Forest) - <https://pureadvantage.org/future-proofing-our-ngahere/>

## Forests have a vital role to play in risk management and climate resilience

The role of forests in catchment protection is well documented. As well as carbon sequestration, TTT contends that sustainable forestry options must be geared to improve climate resilience and **protect communities, livelihoods, and natural ecosystems**.

**Strategically-established native forest provides climate resilience** via soil stabilisation and catchment protection; green firebreaks reduce the risk of wildfire spread; trees provide shade, shelter, and trap moisture, ameliorating local climate in urban areas and farmland; and green infrastructure and coastal buffers protect urban and rural landscapes by moderating extreme weather events, including flood events and storm surges (Aimers et al 2021)<sup>12</sup>.

**Green fire-breaks**, made up of a mix of low-flammability species, can be a good tool for helping slow or even stop the spread of wildfires.<sup>13</sup> These green firebreaks can also have co-benefits of providing ecological corridors and enhancing biodiversity values, particularly if natives species are part of the mix. Green firebreaks can help protect urban-rural interfaces and can be interlaced into plantations of flammable species to help prevent wildfire spread.

**The most effective measures for maintaining soil cover (and protecting catchments) are to retain existing forest and shrub cover, or encourage reforestation** of erosion-prone areas and riparian zones<sup>14,15</sup>. There is a wealth of data showing that the area of soil eroded by storms is consistently less (in the range of 50% to 90% less) where native forest is retained, or marginal land is allowed to revert to native vegetation, or forest is planted – as compared with pastureland<sup>16,17</sup>.

Collective research shows that **on highly erodible hill country soils, a better land use is permanent native forest cover**, rather than timber plantations grown on a clear-fell regime. Many parts of NZ, notably Tairāwhiti, have highly erodible soils, and the erosion has been made much worse by changes in land use – the past destruction of the original forest cover and its replacement with grass. Added to this, there is the increasing frequency and severity of major storm events due to climate change. Also, attempts at amelioration of some of the erosion (by planting commercial forests) have themselves caused problems, particularly with the mobilization of forestry slash.

**Clear-fell regimes of radiata-pine leave a vulnerable period of approximately 6 years**, during which time there is a risk of erosion and mobilization of slash in high-intensity rain events, on erodible steeplands.

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<sup>12</sup> [https://www.tanestrees.org.nz/site/assets/files/1099/non\\_timber\\_values\\_in\\_native\\_forests\\_-\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1099/non_timber_values_in_native_forests_-_web.pdf)

<sup>13</sup> [https://www.tanestrees.org.nz/site/assets/files/1321/green\\_fire-breaks-\\_june\\_2020-\\_ja.pdf](https://www.tanestrees.org.nz/site/assets/files/1321/green_fire-breaks-_june_2020-_ja.pdf)

<sup>14</sup> MPI (2015). *Sustainable management of New Zealand's forests*. New Zealand's third country report on the Montreal process criteria and indicators: <https://www.teururakau.govt.nz/te-uru-rakau-forestry-new-zealand/about-te-uru-rakau/our-work-and-partnerships/montreal-process/>

<sup>15</sup> Gluckman, P. (2017). *New Zealand's fresh waters: Values, state, trends and human impacts*. Office of the PM's Chief Science Advisor. <http://www.pmcsa.org.nz/wp-content/uploads/PMCSA-Freshwater-Report.pdf>

<sup>16</sup> Blaschke, P., Hicks, D., & Meister, A. (2008). *Quantification of the flood and erosion reduction benefits, and costs, of climate change mitigation measures in New Zealand*. Blaschke and Rutherford Environmental Consultants for the Ministry for the Environment. Wellington.

<https://environment.govt.nz/publications/quantification-of-the-flood-and-erosion-reduction-benefits-and-costs-of-climate-change-mitigation-measures-in-new-zealand/>

<sup>17</sup> Ausseil, A.G.E., Dymond, J.R., Kirschbaum, M.U.F., et al. (2013). Assessment of multiple ecosystem services in New Zealand at the catchment scale. *Environmental Modelling and Software*, 43: 37 – 48. <http://dx.doi.org/10.1016/j.envsoft.2013.01.006>



However, even if permanent native forest was restored on all the erodible soils, it would not provide a complete solution. There would still be some woody debris washed down in extreme weather events, as is evident in south Westland where there are no clear-fell plantations, just native forest in the hinterlands. But the risk and extent of this would be considerably lower.

### Challenges related to native afforestation

*“Native planting has a high establishment cost. Native forests lack a clear financial return, which makes it hard to justify commercial planting. Native planting is also more susceptible to pests and diseases during their establishment phase than other exotic forests, such as pine. There is opportunity for the establishment of native forest to occur naturally through natural regeneration, but without incentives this will be slow and small-scale.” (Draft ERP2, p. 131)*

We contend that there are exotic and native species that are susceptible to pests and diseases during their establishment phase, and vice versa. Manuka, kanuka, and totara are hardy native species, and radiata pine and Douglas-fir are hardy exotic species – all of which are relatively easy to establish. Some exotic species such as redwoods, and native species such as kahikatea, are harder to establish. So best to avoid generalisations.

There has been far greater R&D investment into establishment of exotic species, as compared to native species.

We agree that **currently, there are barriers to rapidly upscaling native forest cover** due to the high cost of planting stock, lack of infrastructure and expertise, the complexity and diversity of our native forests, and knowledge gaps around indigenous forest restoration and management - due to decades of divestment. This is in contrast with the massive investment in R&D and infrastructure around exotic species, particularly one species – *Pinus radiata*.

**Addressing these issues is a major focus of Tane’s Tree Trust’s R&D work programme**, as described in our recent Annual Reports<sup>18,19</sup> and summarised in APPENDIX 1. There is considerable potential to expand our native forest resources at landscape scale on private land in cost-effective ways as summarised in APPENDIX 2.

In our experience, establishment costs via standard planting methods range from \$5k to \$40k per ha. The \$5k relates to what the manuka honey industry indicates are costs to establish manuka at 3m spacing (1100 spha) and the \$40k relates to the cost of planting natives on difficult sites and/or planting PB2 or equivalent stock at high density (e.g., 4444 spha equivalent to 1.5m spacing) with multiple species, often used for riparian planting.

For many situations, we often recommend a medium density of 3:1 or 4:1 mixed shrubs to trees to achieve a total stocking of 2500 spha. This brings the cost down to around \$20,000 per ha on most sites.

We believe that to be successful, cost-effective, large-scale establishment of native forest will depend on working with nature, i.e., **assisted natural regeneration, plus complementary planting where**

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<sup>18</sup> Tane’s Tree Trust Annual Report 2021 -

[https://www.tanestrees.org.nz/site/assets/files/1037/ttt\\_annual\\_report\\_2021.pdf](https://www.tanestrees.org.nz/site/assets/files/1037/ttt_annual_report_2021.pdf)

<sup>19</sup> Tane’s Tree Trust Annual Report 2022 -

[https://www.tanestrees.org.nz/site/assets/files/1037/ttt\\_annual\\_report\\_2022.pdf](https://www.tanestrees.org.nz/site/assets/files/1037/ttt_annual_report_2022.pdf)

**needed** (e.g., seed islands) (see APPENDIX 2). However, it takes longer to establish forest this way and, therefore, this is unlikely to maximise carbon sequestration, in many cases.

Please note that **any native afforestation project must include a long-term animal pest control programme to be successful**. There are native species that are relatively browse resistant, including manuka, kanuka, and totara, but a diverse and complex (therefore, resilient) native forest is not likely to occur until there is fencing out of domestic stock and control of pest browsers and predators.

TTT is helping to address knowledge gaps through the development of fact sheets, videos, creation of field demonstration sites, and undertaking workshops throughout NZ. We have also recently launched **Tane's Tree Trust Native Forest Toolkit**<sup>20</sup> which includes the following:

- A carbon calculator for native trees and shrubs;
- A Planting and budgeting calculator;
- Growth & yield calculator for commonly planted native tree species; and
- An economics calculator to estimate the Net Present Value of a planted native forest.

Most importantly, **native forest cover needs to become an economically viable land-use option** for landowners - otherwise, native reforestation will not occur with significant scale, nor will those forests be managed as well as they could be. This is a repeated message in many of the articles posted on the O Tatou Ngahere platform<sup>21</sup>.

**We believe that a comprehensive and effective package of ETS and non-ETS incentives is required to encourage native forest cover and ensure their ongoing management.** This is discussed below.

However, TTT is concerned that the NZ ETS is already a difficult scheme to negotiate for small growers and farmers, and the complexity and costs associated with the ETS are a barrier to participation<sup>22</sup>.

It is likely that multiple potential markets and income streams are likely required to sufficiently incentivise and support native forestry as a viable land use option (e.g., a combination of timber, carbon, and payment for ecosystem services, etc.). A comprehensive suite of policies and mechanisms to facilitate this outcome is required. Integration with other planning and regulatory systems will be important (e.g., RMA, District Plans, ETS, taxation, etc.).

### **TTT recommends the following options to incentivise native afforestation**

- Creating a credit/payment system for environmental services, such as biodiversity, erosion prevention and water quality - to incentivise establishment of native forest - the flipside of the 'polluter-pays' principle.
- We are not sure whether this could be achieved via new policy, or through amending existing ETS provisions by, e.g., adding a 'premium' credit that returns more value per credit to the owner and enables buyers to meet their emissions goals and also contribute to a better environment.
- **There is strong support for a biodiversity credit system** – which is discussed below.

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<sup>20</sup> <https://toolkit.tanestrees.org.nz/>

<sup>21</sup> For example, see <https://pureadvantage.org/valuing-native-forest-on-private-land/> ; <https://pureadvantage.org/interwoven-land-use-values-and-principles/> ; <https://pureadvantage.org/native-trees-and-professional-foresters/>

<sup>22</sup> Hughes, R., & Molloy, P. (2017). Is the ETS worth the carbon it is written on for small-scale forest owners? *New Zealand Journal of Forestry* 61(4): 33-36.

- **Harnessing the power of markets** is suggested as an effective way to bring about a shift in land use towards more natural models of forest management<sup>23</sup>.
- NZ imports approximately \$100 million in specialty timber a year (MPI data<sup>24</sup>), some of which comes from non-sustainable sources, e.g., kwila. These imports could at least partly be substituted with local, sustainably-grown timbers from permanent forests of native and mixed species forests, managed under close-to-nature forestry principles (see APPENDIX 3). This would help boost regional economies, and support our local furniture industry.
- **The multiple benefits of continuous cover forestry (CCF)<sup>25</sup> could be promoted**, as demonstrated by the Totara Industry Project on Northland farmland<sup>26</sup>. This involves the limited careful harvest of high-value timber in 'near to nature' forestry regimes. Permanent forest cover is maintained, along with all the high-forest ecosystem services, and there is a future revenue stream for landowners in addition to carbon.
- **Funding could be provided by central government for exploring and developing markets and infrastructure in support of the production of high-value native timber** from continuous cover forestry regimes (CCF) regimes.
- We request that any policy around incentivising native forestation dovetails with other policies, particularly the recent Freshwater Reforms (especially the 3 m setbacks), and the Biodiversity Strategy (Te Mana O Te Taiao Aotearoa New Zealand Biodiversity Strategy 2020).
- **We are aware of exceptional efforts** of farmers, Maori organisations, and eNGOs throughout NZ, in restoring, establishing, and sustainably managing native forest, which we believe should be showcased to encourage wider participation. There are catchment groups that are excellent exemplars of what can be achieved with collaborative work between landowners and supporting local council staff and eNGOs.

### Forests have wider co-benefits

*“Native forests have environmental, social, and cultural uses. However, some native timber is sustainably commercially harvested.” (Page 126 of the Draft ERP2 Advice).*

*“It is important that other outcomes besides carbon removals are considered when defining the role of forests. There are significant benefits to the reversion and planting of native forests, including enhancing native biodiversity, and better social and cultural outcomes.” (Page 129 of the Draft ERP2 Advice).*

*“There are many cultural, economic, social, and environmental co-benefits associated with forests. From an environmental viewpoint, forests can help regulate waterflow through watersheds, support and increase biodiversity, and help stabilise land, which in turn can decrease rates of erosion. However, differing management practices, for example, clear-fell harvesting can greatly restrict these benefits and result in negative outcomes.” (Page 131 of Draft ERP2 Advice).*

**Forests need to be socially and culturally beneficial, and have community acceptance.**

<sup>23</sup> <https://pureadvantage.org/nature-based-forestry-regenerative-forestry-models-for-aotearoa/>

<sup>24</sup> Ministry for Primary Industries (MPI) (2021). Wood product markets. Data on forestry imports and exports and indicative log prices: <https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/forestry/wood-product-markets/>

<sup>25</sup> Barton, I.L. (2008). Continuous cover forestry: A handbook for the management of New Zealand forests. Tāne’s Tree Trust, Pukekohe. 104p.

[https://www.tanestrees.org.nz/site/assets/files/1069/continuous\\_cover\\_forestry\\_-\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1069/continuous_cover_forestry_-_web.pdf)

<sup>26</sup> <https://www.totaraindustry.co.nz/>



We gratefully acknowledge the Commission’s recognition of the wider benefits associated with native forest, not just carbon sequestration and climate adaptation. And yes, this could include sustainable harvest of timber under CCF regimes. The **Totara Industry Project**<sup>27</sup> demonstrated the practical feasibility and potential business case for sustainable forest management, with naturally regenerating totara on marginal Northland hill country (as per Part 3A of the Forests Act). (See APPENDIX 3).

A viable native timber industry is required to encourage sustainable native forestry. Government investment can help expedite this, providing funding for developing industry, markets and infrastructure to support production of high-value timber from CCF regimes. This is reflected in the Government’s Forestry and Wood Processing Industry Transformation Plan (ITP)<sup>28</sup> which identified accelerating the uptake of CCF, in its various forms, as a priority under action 7.2.

Currently, there is limited data on carbon sequestration in CCF regimes. Totara PSP (permanent sampling plots) remeasurement results showed greater mean annual stem volume and carbon sequestration in the thinned pole stands than in the unthinned PSP controls<sup>29,30</sup>. There were also gains in understory development and biodiversity. This suggests that silvicultural management for future timber production and CCF longer term, could also be considered as additionality.

In PHOTO 6 below, the considerable increase in width of growth rings shows the rapid growth response after a totara tree was released (from nearby competition) under a CCF regime.



PHOTO 6: Totara log showing increased growth rates after releasing 4 years earlier

<sup>27</sup> Totara Industry Project – see <https://www.totaraindustry.co.nz/>

<sup>28</sup> Forestry and Wood Processing Industry Transformation Plan (2022)  
<https://www.mpi.govt.nz/forestry/forest-industry-and-workforce/forestry-and-wood-processing-industry-transformation-plan/>

<sup>29</sup> 2020 Re-Measurement of Regenerating Farm Tōtara Permanent Sample Plots. Ref. TUR 2020 -048:  
[https://www.tanestrees.org.nz/site/assets/files/1234/results\\_of\\_the\\_2020\\_remeasurement\\_of\\_totara\\_psp.pdf](https://www.tanestrees.org.nz/site/assets/files/1234/results_of_the_2020_remeasurement_of_totara_psp.pdf)

<sup>30</sup> NTWG Newsletter 2022: [https://www.tanestrees.org.nz/site/assets/files/1984/ntwg\\_newsletter\\_2022.pdf](https://www.tanestrees.org.nz/site/assets/files/1984/ntwg_newsletter_2022.pdf)

The approved harvest rates are usually so low for Sustainable Forest Management (SFM) Plans that forests are likely to be still be accruing annual increments. Typically SFM Plans for totara allow harvests equivalent to less than 1m<sup>3</sup>/ha/yr of merchantable volume (and the merch volume is usually most of the tree's volume) and include requirements to protect the forest and its values and ensure regeneration. Northland totara plots show much higher annual growth increments. So, MPI's allowable harvest levels would likely have little effect on the forest's overall carbon sequestration.

**Examples of successful CCF in NZ include:**

- The Totara Industry Project in Northland – <https://www.totaraindustry.co.nz/>  
<https://www.tanestrees.org.nz/about-us/northland-totara-working-group-ntwg/>
- Forever Beech in Westland – <https://www.healthbasedbuilding.com/foreverbeech>
- Woodside Forest in Canterbury – John Wardle's operation with radiata-pine and black beech, near Oxford - [https://www.tanestrees.org.nz/site/assets/files/1067/newsletter\\_39.pdf](https://www.tanestrees.org.nz/site/assets/files/1067/newsletter_39.pdf)  
<https://pureadvantage.org/quantifying-multi-purpose-indigenous-forest-management-in-nz/>

However, it is important not to 'throw the baby out with the bathwater'. **Alternative forestry regimes** – permanent forests, either unharvested or CCF regimes with native or exotic species, need to be geared as being **complementary to traditional clear-fell systems**.

Clear-fell radiata-pine regimes are problematic only on a subset of the current forestry estate, and they are economically the 'bread & butter' of the forestry industry, employing a large percentage of NZers, particularly in rural areas and are a major contributor to GDP.

**In the context of carbon markets and high carbon prices, there are risks of bio-perversity<sup>31</sup>**, which needs to be considered by policymakers. This is where negative biodiversity and environmental outcomes arise due to a narrow focus on single environmental problems without consideration of the broader context, i.e., a narrow focus on carbon sequestration can potentially create negative outcomes if protection and enhancement of other values such as biodiversity are not considered.

**The problem is - How do we value the extremely important non-market forest ecosystem services** within our current economic systems and frameworks, which fail to value natural capital in land-use decision-making, and in doing so, short changes future generations?

**Landowners need revenue for forest cover on their land** (whether exotic or native), and presently, apart from carbon, there are few opportunities for them to realise any ecosystem service benefits that permanent native forest cover would provide. It is also important to note that **most benefits of establishing or restoring permanent forest accrue to the wider community** – locally, regionally, and nationally, particularly those downstream.

At our recent O Tatou Ngahere conference (October 2022) many speakers highlighted the need to urgently recalibrate our policy settings to incentivise the protection of existing native forests, and the establishment of new indigenous forests. Over 1000 people attended, breaking records for a forestry conference in NZ.

It was clear from the conference and other engagements, that we have the commitment of landowners, iwi, and community groups, but **funding is a critical issue**. Te Kapunga Dewes spoke for many, not just Iwi, when he stated - "*we want natives but we need finance*".

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<sup>31</sup> Lindenmayer, D. B.; Hulvey, K.; Hobbs, R.; Colyvan, M.; Felton, A.; Possingham, H.; Steffen, W.; Wilson, K.; Youngentob, K.; & Gibbons, P. (2012). Avoiding bio-perversity from carbon sequestration solutions. Conservation Letters 5: 28 - 36. <https://doi.org/10.1111/j.1755-263X.2011.00213.x>

We ran a poll to rank the top ‘where to next’ themes that came up at the conference (APPENDIX 4). **The top theme by a strong margin was “Encourage urgent action by Govt to establish a Biodiversity credit - ‘standard’”.**

The models urgently need to be developed to incentivise native afforestation and reward landowners for provision of environmental and cultural services, for the benefit of all. Financially viable models are needed to incentivise indigenous afforestation. Incentive schemes need to be developed that are not overly complex but are also fair and equitable. We are not sure whether this could be achieved via new policy, or through amending the existing ETS provisions, or a combination of both.

Published research (including research undertaken by TTT on non-timber values in sustainably managed native forests<sup>32</sup>), recommends that government and corporate grants are linked to the broader range of ecosystem services, rather than a single ecosystem service such as carbon sequestration.

Nevertheless, **biodiversity was identified as pivotal**, i.e., actions to increase biodiversity values are likely to concurrently improve most (or possibly all) other non-timber values, in most situations.

### **A biodiversity credit system as an incentive for native forestation**

*“Once the objectives are clearly articulated, broader policies could be introduced that support outcomes for the wider roles forests could play for freshwater and biodiversity. Examples include tools such as biodiversity credits or grants that could also make native forestry more financially appealing.” (Page 130 of Draft ERP2 Advice).*

**TTT strongly supports the introduction of a biodiversity credit system** as an incentive for native forest establishment and restoration. **We are aware of strong support** from many other groups for a biodiversity credit system, as mentioned above.

This would be a tradable commodity that represents a return on investment from restoration of native forest, either via (i) afforestation, or (ii) additionality in existing native forest (e.g., via fencing and excluding browsers, pest animal and weed control, and enrichment planting).

This would encourage (i) native afforestation by bridging the gap between native trees becoming established and increasing their growth rate to earn enough carbon credits to reward landowners; and (ii) good management of existing native forests, much of which is currently threatened by browsers, predators, and weeds - compromising ecosystem services including carbon storage<sup>33</sup>.

Two TTT trustees were recently involved in workshops led by a DoC/MfE team – exploring a potential biodiversity credit system. A discussion document will soon be released for public consultation.

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<sup>32</sup> Aimers, J., Bergin, D., Horgan, G. (2021). Review of non-timber values in sustainably managed native forest in New Zealand. Tāne’s Tree Trust bulletin, Hamilton, New Zealand. 119 pages.

[https://www.tanestrees.org.nz/site/assets/files/1099/non\\_timber\\_values\\_in\\_native\\_forests\\_-\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1099/non_timber_values_in_native_forests_-_web.pdf)

<sup>33</sup> Hackwell & Robinson (2021). Protecting Our Natural Ecosystems’ Carbon Sinks

<https://www.forestandbird.org.nz/resources/climate-change-and-introduced-browsers>

## APPENDIX 1 - Tane's Tree Trust's Research & Development programme

TTT undertakes applied research to deliver practical science-based technical information. Projects are based around forest establishment (planting and assisted natural regeneration) through to supporting long-term sustainable management of permanent native forest.

A summary is provided below. More information is available in the TTT Annual Report<sup>34</sup>.

### Normalising Native Forestry (core research programme)

This is funded by The Tindall Foundation, with support leveraged from other funders. It includes six workstreams:

1. Working with nature to establish native forests at scale through planting and encouraging natural regeneration.
2. Promoting continuous-cover native forestry for sustainable harvesting.
3. Making the most of TTT's growth and reference databases.
4. Incentivising landowners by developing an economic case for native forestry and supporting incentive schemes.
5. Evaluating novel, transitional ecosystems – transitioning of exotic species to native forest.
6. Collaboratively building capability by working with others involved in, for example, pest animal, bird predator and selective weed control.

### Other ongoing and recently completed work

- Native Forest Toolkit – calculators developed for: (i) planting and budgeting; (ii) productivity; (iii) carbon sequestration; and (iv) economics (returns and benefits). Largely funded by the Sustainable Farming Fund (SFF) and based on the Trust's Indigenous Plantation Database. These web-based tools are free to access via our website - <https://toolkit.tanestrees.org.nz/>
- Adaptive Management of Coastal Forestry Buffers, with the Coastal Restoration Trust. Preliminary guidelines are available for this recently completed SFF-funded project.
- Fact sheets on forest establishment (planting and assisted natural regeneration) funded by Te Uru Rākau. These will soon be freely available on our website.
- Re-measurement of farm-tōtara trials established by the Northland Tōtara Working Group.
- A practical guide to the management of tōtara on private land, co-funded by Te Uru Rākau.
- Videos and workshops on best practice restoration and management of native forests – a collaborative project, co-funded by the Department of Conservation.
- Demonstrating the establishment of seed islands to bring back natives and encourage natural regeneration in collaboration with Trees That Count; Waikereru Ecosanctuary, Tairāwhiti; Pāmu Farms; and other partners.
- Monitoring system for early survival and growth of plantings, in collaboration with Trees That Count, Tasman Environment Trust, Auckland Council and Pāmu Farms.
- Transitioning exotic forest to natives – a recently initiated 5-year project, largely funded by the Sustainable Food and Fibre Futures Fund (SFFF).
- Valuing ecosystem services – a recently initiated multi-agency collaboration with Pāmu Farms, largely funded by SFFF. This involves creating a web-based tool for landowners to use to assess the ecosystem quality of degraded natural vegetation on farms, before and after intervention.
- Ongoing work on submissions and consultation with the Government, advocating for all aspects of native forestry, and incentives for landowners.

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<sup>34</sup> Tane's Tree Trust Annual Report 2022 -

[https://www.tanestrees.org.nz/site/assets/files/1037/ttt\\_annual\\_report\\_2022.pdf](https://www.tanestrees.org.nz/site/assets/files/1037/ttt_annual_report_2022.pdf)

## APPENDIX 2 – Cost-effective methods for landscape-scale establishment of native forest

### We propose assisted natural regeneration augmented by targeted planting:

- **We advise a shift in focus from reliance on mostly planted forests to assisted natural regeneration** – where planting is part of the mix, along with management to limit factors that inhibit natural regeneration of natives, i.e., control of the most aggressive weeds, elimination of pests including predators of bird populations essential for seed spread.
- We support direct planting, but recommend that it is deployed strategically (to complement leverage natural processes), starts on a modest scale, and expands as quickly as capacity permits.
- Concurrent with this is the need to monitor the success or otherwise of planting programmes so that management changes can be made early on to improve performance with subsequent plantings.
- Fixed annual targets should be used with caution, although we understand there is a need to reach carbon sequestration targets.
- Management of natural regeneration coupled with targeted planting must be well planned, adapted to the site, supervised, and the outcome monitored and the management input sustained.
- Start with a survey to identify potential sites for natural regeneration.
- Identify any existing native forest within bird range that will encourage the spread of seeds of key native tree species.
- Our birds have a good track record, having established forests in Aotearoa for millions of years. Strategic planting of berry-producing shrub species provides an incentive for birds to visit sites. Implement control of bird and seed predators such as rodents, mustelids and possums – to protect and boost natural regenerative processes.
- There will likely be a need for enrichment planting of species no longer locally present. In addition to native forest species that are bird dispersed, this will include species with wind-dispersed seed.
- Let the birds and the wind be our natural drones in spreading seed across vast landscapes of marginal pastoral steep hill country that are a priority for native afforestation. Where there are no native forests within bird range, we can prepare a seed source for them by employing a strategy that has been developed and is being evaluated by TTT, i.e., establishing a network of seed islands comprising a diverse range of bird- and wind-dispersed seeding species.
- TTT has produced fact sheets on assisted natural regeneration and the seed island approach. These will soon be published on our website.
- Assisted natural regeneration could be done at a large scale as resources permit, and there should be no need for delay in getting this underway.
- Monitoring systems are vital as practitioners can act promptly to protect their ngahere, and also learn what does, and doesn't work, and adapt accordingly. This is particularly important in an era of climate change.
- This need not be delayed. Some of the human and financial resources available for direct planting should be diverted towards establishing a framework that supports natural regeneration – including sustainable management of the large area of existing natural regeneration, some of which is being routinely sprayed, cut back or burnt to keep marginal farmland in pasture.

Much of this is described in more detail in an article by Dr David Bergin – *The ten golden rules for establishing native forest at scale*, published as part of the O Tatou Ngāhere campaign <https://pureadvantage.org/ten-golden-rules-for-large-scale-establishment-of-native-forest/>.

## Pros and cons of assisted natural regeneration

### Advantages

- Scale - significant areas already exist (hundreds of thousands of hectares), that are in the process of regeneration to forest cover, and much more could be encouraged to regenerate.
- Low cost. Nature and time, assisted by the wind and birds, do the greatest share of the work.
- Less pressure. There are no fixed annual targets to be met.
- Flexibility. It is suited to a range of sites, large and small; and a range of different scenarios can be employed. There is scope here for site-specific and creative solutions.
- Plants that germinate naturally have been, by definition, ecosourced, and are therefore adapted to the site.
- Planting can be leveraged for maximum cost/benefit.
- Lower risk of dramatic failure.

### Disadvantages

- Forest establishment will take longer. On the other hand, as it is low cost, it can start sooner and at a larger scale (and is already happening over large areas).
- We cannot assume that available open space will be colonised by native species alone. Over time we have introduced too many impediments for that to occur.
- We have introduced a range of weeds, some of which will be better adapted to the changing conditions of a warming climate – these can preclude natural regeneration on some sites, if there is no intervention. And then there are the introduced pests that must be controlled.
- Our remaining forests have been degraded and fragmented, and natural pathways for colonisation have been intercepted by cities, farms, and roads.
- Natural regeneration will need our assistance - weed and pest control is vital.
- All forests require ongoing and active management. There is presently insufficient financial incentive or income potential to encourage and support native forest management on private land – especially regarding regenerating native forest cover.

## **In summary – working with Nature for landscape-scale establishment**

Successful large-scale establishment of native forest will depend on working with nature and integration with supportive economic drivers (i.e., investment, markets, industries, and incentives).

Encouraging natural regeneration should be done in tandem with pest animal control to prevent damage to the naturally established seedlings, working with Predator Free NZ, neighbouring landowners, iwi and local communities to boost bird populations and seed production for diverse forest ecosystems, selective weed control to remove or reduce the most aggressive and persistent exotic species, and undertaking strategic supplementary planting to bring back once abundant species now locally extinct or scarce.

### **Our recommendations:**

- Enable naturally regenerated native cover that predates 1990, but that still has significant potential to sequester more carbon, to be eligible for financial returns from carbon through the ETS.
- For afforestation by planting alone, start with modest targets and build infrastructure, capability and confidence, and ‘iron out problems’, i.e., start with a smaller yearly target, upscaling gradually as capacity and competence improve.
- Look at the easiest options first - ‘nature-based solutions’ - assisted regeneration, building on the natural regeneration that is already happening in many hill country sites.

- Establishing seed islands amongst shrub pioneers, to help the natural succession to high-forest – let the birds do the work of spreading the seed.
- Ensure that nursery plant quality standards and infrastructure are in place to deliver quality, fit-for-purpose planting stock.
- Monitoring systems are vital and need to be a requirement of any funding for afforestation.
- Planters – are there sufficient well-trained planting gangs who know how to plant native species (as opposed to radiata-pine, which is quite different to plant)?



## APPENDIX 3 – Creating industry around sustainable production of native timbers

New Zealand currently imports large amounts of specialty timbers each year - e.g., NZ\$99.6 million worth in 2016 and NZ\$107 million worth in 2017 (MPI 2021<sup>35</sup>). Some of this is from non-sustainable sources, e.g., kwila. There are multiple published discussions on why we are not producing more of our own specialty timbers, including timber from native species, e.g., sustainably grown tōtara would be an excellent substitute for imported western red cedar in many applications, as well as being a culturally important resource highly valued by Maori.

New Zealand is fortunate in having a spectacular range of world-class native timbers. They are part of our heritage, and we should have an opportunity to make use of them for decorative and practical purposes. By applying the principles of continuous cover forestry (CCF), selected trees can be harvested without compromising the integrity of the forest and the myriad of ecosystem services it provides<sup>36</sup>.

A good example is the management of totara, which has proliferated in most regions due to clearance of the original forest cover and is recolonising on our less productive land. This is occurring even in the presence of grazing, despite repeated attempts by landowners to control it. Our Northland Totara Working Group (NTWG) is continuing to demonstrate that farmers have a valuable resource of native timber establishing before their eyes.

The NTWG has established over 60 Permanent Sample Plots in Northland demonstrating the benefits of thinning and pruning this resource as a future high-value specialty species that can be managed under CCF harvesting methods to retain high forest values and benefits. The Totara Industry Project<sup>37</sup> demonstrates the viability of CCF with naturally regenerating totara on marginal hill country. However, a viable native timber industry is required to encourage sustainable native forestry. Government investment could help expedite this.

Native forests require ongoing management and that requires ongoing income streams. These could come from carbon, timber, and payments for ecosystem services. However, effective mechanisms, industries and incentives need to be created to support this.

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<sup>35</sup> Ministry for Primary Industries (MPI) (2021a). Wood product markets. Data on forestry imports and exports and indicative log prices:

<https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/forestry/wood-product-markets/>

<sup>36</sup> See ([https://www.tanestrees.org.nz/site/assets/files/1069/continuous\\_cover\\_forestry\\_web.pdf](https://www.tanestrees.org.nz/site/assets/files/1069/continuous_cover_forestry_web.pdf); and <https://pureadvantage.org/nature-based-forestry-regenerative-forestry-models-for-aotearoa/>)

<sup>37</sup> Totara Industry Project – see <https://www.totaraindustry.co.nz/>

## APPENDIX 4 – Conference poll results



# O Tātou Ngahere: Regenerating Our Landscape With Native Forest


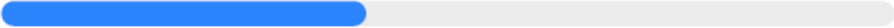
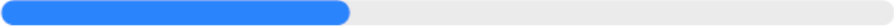
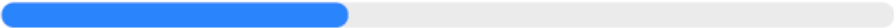
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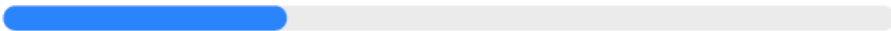
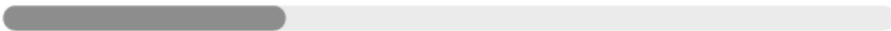
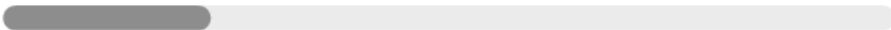
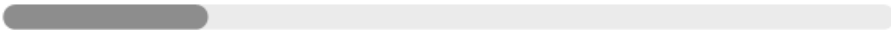


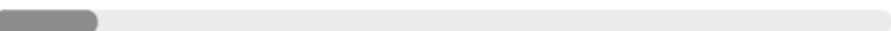
Poll results

slido

### Where to next? Rank your top 5. (1/3)

1 4 6

1. Encourage urgent action by Govt to establish a Biodiversity credit - 'standard'  
 2.58
2. Urgent action and funding to sustain native species planting, protection and management including farm catchment groups and iwi  
 1.95
3. Increase significant lift in investment into predator eradication [PF2050] including deer, goats, pigs etc especially in biodiversity hotspots (e.g. Chathams, Fiordland)  
 1.86
4. Recognise land owners for regenerating understory in native fragments/bush (fencing, pest & weed control)  
 1.85

5. Put in place a system to enable Nature Based Solutions such as 'biodiversity' impact investment (e.g. Toha) to access new capital  
 1.49
6. Accelerate forest regeneration through 'better' information, co-funding  
 1.47
7. Invest in R&D to lower seedling and establishment costs & scale nurseries  
 1.04
8. Measurement data, verification data – integrated data sharing to help monetise your native species/biodiversity  
 1.03
9. Collate, collect, publish and adopt C sequestration information [ETS/voluntary]  
 0.75
10. Review Forest Act controls to support sustainable native timber products  
 0.56
11. Advocate to establish private markets to heal, not further divide us... government to help initiate  
 0.44

## APPENDIX 5 – Carbon sequestration in sustainably managed native forest

Research demonstrates that planted and managed indigenous forest is better at sequestering carbon and faster growing than commonly considered - <https://pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/> A paper is currently being prepared for submission to an academic journal.

Analysis of Tāne’s Tree Trust data from planted native trees still supports the position that radiata pine is initially faster growing and simpler to manage, but the difference between carbon sequestration in radiata pine and well-managed planted native forest is much less than is often suggested.

### Data from Tāne’s Tree Trust Indigenous Plantation Database show that:

- carbon sequestration for planted forests of totara, kauri, kahikatea, rimu, other conifers, puriri, beech, and other broadleaves is in the range:
  - **10.0 to 16.4** tCO<sub>2</sub> ha<sup>-1</sup> yr<sup>-1</sup> (mean annual increment over 50 years) and
  - **18.2 to 29.9** tCO<sub>2</sub> ha<sup>-1</sup> yr<sup>-1</sup> (current annual increment at age 50 years)
- growth rates of these native tree species increase steadily over the first 50 years achieving higher productivity as well as carbon sequestration with age.

This research is a first for planted native forest using a methodology comparable to that used for planted radiata-pine forest in New Zealand (mean annual increment is 21 to 27 tCO<sub>2</sub> ha<sup>-1</sup> yr<sup>-1</sup> for radiata pine at age 50 years).

Investment in research and development would benefit native forestry as it has the radiata-pine industry, i.e., result in increased growth rates and more knowledge around forest management.

New Zealand’s Carbon Look-up Tables for the Emission Trading Scheme should include the option for planted native forest as well as regenerating native forest. The current Look-up Tables for native forest are accurate when applied to naturally regenerating shrubland. However, to achieve good levels of sequestration over a long timeframe, regenerating forest needs to include climax tree species such as totara.

Properly sited and managed planted native tree species are a good alternative where landowners wish to sequester carbon over long time periods, as well as enhancing natural landscapes, indigenous biodiversity and cultural values.

## APPENDIX 6 – Exotic to Native Transitions

Carbon farming with exotic species, as incentivised by the Emissions Trading Scheme, has become a contentious issue. There has been considerable backlash, particularly from rural communities and the agricultural sector. Regardless, there are potential opportunities in exotic-to-native forest transitions that could provide multiple benefits to the environment, economy, and society. However, research and guidance on what can or should be done are currently lacking and urgently needed.

Radiata pine is not a long-lived species, and it is assumed by many in the forestry industry that when radiata-pine stands disintegrate they will somehow be automatically replaced by naturally regenerating native forests. We believe that this is unlikely without active intervention, and even then, cannot be assured. Intensive management inputs may be necessary to ensure a successful transition on many sites, but this can be fraught as disintegrating radiata-pine stands are dangerous to work in.

Carbon farming provides no incentive for the landowner to budget for, or invest in the work required to manage a long-term transition. While TTT does not advocate for 'plant and leave' radiata pine, we are aware that such stands are already being established and have responded to requests to undertake research on transitional forestry.

TTT and collaborators recently started a research project **Transitioning exotic forest to natives**, which is a 5-year project, largely funded by the Sustainable Food and Fibre Futures Fund (SFFF).

One of the drivers for this research is the significant concern about the use of radiata pine for permanent carbon forestry, based on the unrealistic and false premise that those forests will transition to native forest. We regard this as a perverse outcome of well-intended policy. Particularly, we are concerned that this practice is being inappropriately exploited for short-term commercial gain by parties who do not have a long-term vested interest in ensuring a legacy of permanent forest cover. This presents a significant social-license-to-practice problem, which undermines the ETS and New Zealand's efforts to combat climate change.

Another driver is the opportunity to transition directly from exotic to native forest, avoiding clear-felling on erodible land in regions such as Tairāwhiti where, with correct management, understory regeneration is quite probable. The commercial plantation forestry industry is looking for advice on how to retire radiata-pine stands safely and cost-effectively on remote, erodible steepplands, which are not economical to harvest and/or pose environmental risks and where the best option is a managed transition back to native forest. This is highly pertinent to a requirement of the updated NZ FSC Standards.

We recommend that incentives be created to transition clear-fell regimes of exotic species such as radiata-pine, to permanent native forest in sensitive upland catchments. In many of these areas, radiata-pine forestry operations are economically marginal due to logistical issues. Some of these forests, particularly in Tairāwhiti, were planted primarily for catchment protection after Cyclone Bola. However, while the East Coast was still in post-Bola recovery mode, the Forestry Corporation was sold off and catchment protection became subservient to timber production and market forces.

Another positive driver for transitional forestry research is that many Maori landowners are currently actively seeking technical advice in transitioning radiata-pine forest back to native forest.

However, a recent [State of Knowledge review prepared for MPI](#), by Dr Adam Forbes and Dr David Norton, determined significant knowledge gaps and research needs for transitional forestry before it

is attempted at scale. In particular, there is a need to establish permanent forestry trials that investigate growth rates, the effect of landscape context, silvicultural interventions, management thresholds, best practice operations and documentation.

With carbon forestry, we think that the 'horse has bolted' concerning the scale at which permanent radiata-pine forests have been established. Therefore, the proposed research is critical and already well overdue.

This research needs to be objective and independent from any commercial or political objectives, and the results made publicly available.

Please note that we consider radiata pine to be a good plantation species when it is well sited and utilised for timber production. However, it is not long-lived and adequate regeneration of other species is required for permanent carbon forestry. Assertions that radiata pine will transition to natives are not backed up by research, as there has been only limited research into management practices to facilitate a transition. The existing research has focused on the management of mature stands for biodiversity restoration. There has been no research into how to establish exotic tree stands to support a transition to native forest.

The proposed research project will establish permanent forestry trials to collect data in existing exotic stands of various ages, on a range of sites representing a gradation of climate zones throughout New Zealand - to determine factors and interventions that are likely to allow a transition to native forest. We will investigate whether this transition can happen without incurring significant carbon liabilities. We will review existing plot data to provide an early indication of the status of regeneration in conventionally managed exotic plantations. We will also look for drivers of regeneration such as levels of canopy cover (light ingress), seed source proximity, climatic variables and site factors - to inform what types and levels of management are required. Importantly, we will examine both the existing and proposed new empirical data to identify situations where a transition is unlikely to be successful/unsuccessful, and provide guidelines and recommendations.

We have a strong team of scientists and foresters within TTT plus two associates who have the most experience in New Zealand in exotics-to-native transitions, i.e., Dr Adam Forbes and Megan Graeme. We are well placed to provide unbiased scientific research.

Tane's Tree Trust and the Coastal Restoration Trust are already involved in a Sustainable Farming Fund research project exploring practical options to transition failing exotic duneland forest buffers to resilient permanent indigenous buffers. Indigenous coastal forest buffers will provide more sustainable and effective protection to the production forests landward, with application to other productive land uses on our coasts and in the face of expected impacts of climate change. This project is led by Megan Graeme and Dr David Bergin.

Dr Adam Forbes is a leading forest ecologist who completed a PhD on the management of non-harvest pine stands and has published much of the research on this topic. Adam is a self-employed, independent scientist.

**Reference:**

Forbes, A., & Norton, D. (2021). Transitioning Exotic Plantations to Native Forest: A Report on the State of Knowledge. Contract report prepared by Forbes Ecology Limited for the Ministry of Primary Industries. <https://www.mpi.govt.nz/dmsdocument/47521-Transitioning-Exotic-Plantations-to-Native-Forest-A-Report-on-the-State-of-Knowledge-2021-22->