

What would it take for Aotearoa to see 300,000 ha of indigenous forest established And who will pay?

Heidi Dungey

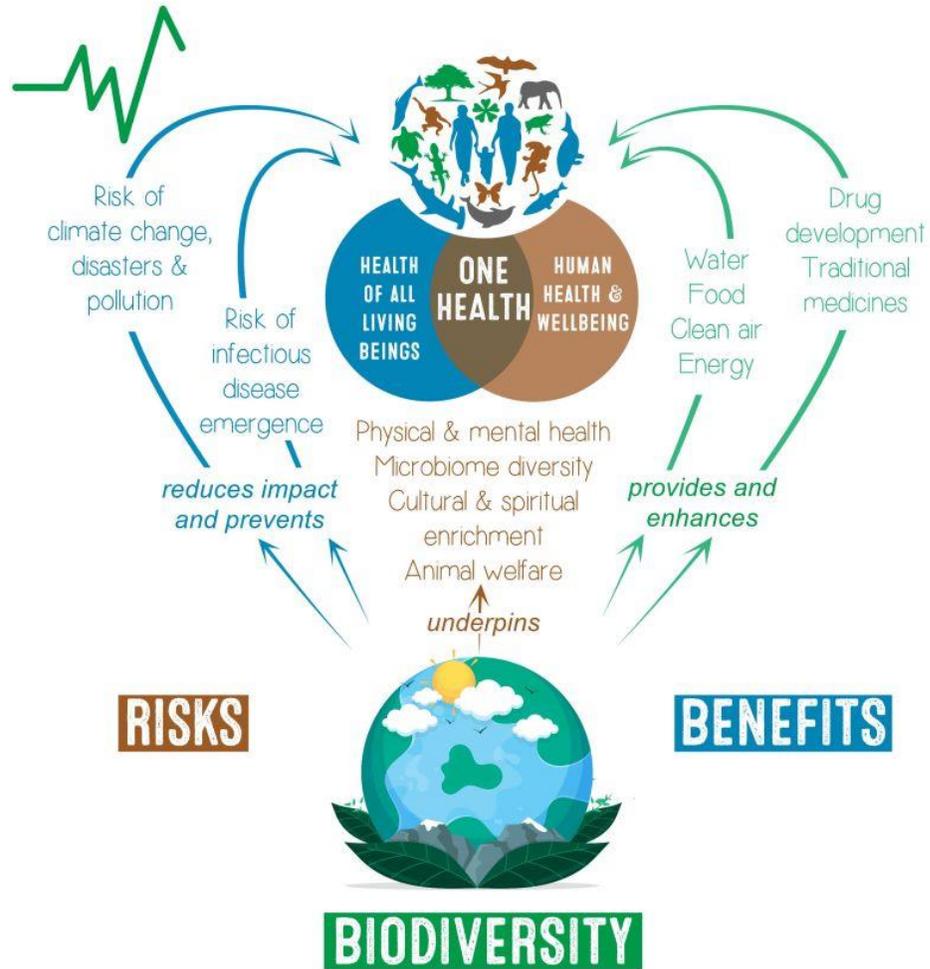
NZIF Conference, 12 September 2022 11:45-12:10

Establishing Indigenous Forests



Heidi Dungey

BIODIVERSITY'S CONTRIBUTION TO GOOD HEALTH AND WELLBEING



Genes, species, ecosystems Nature's contributions to people



Sustainable Development Goals

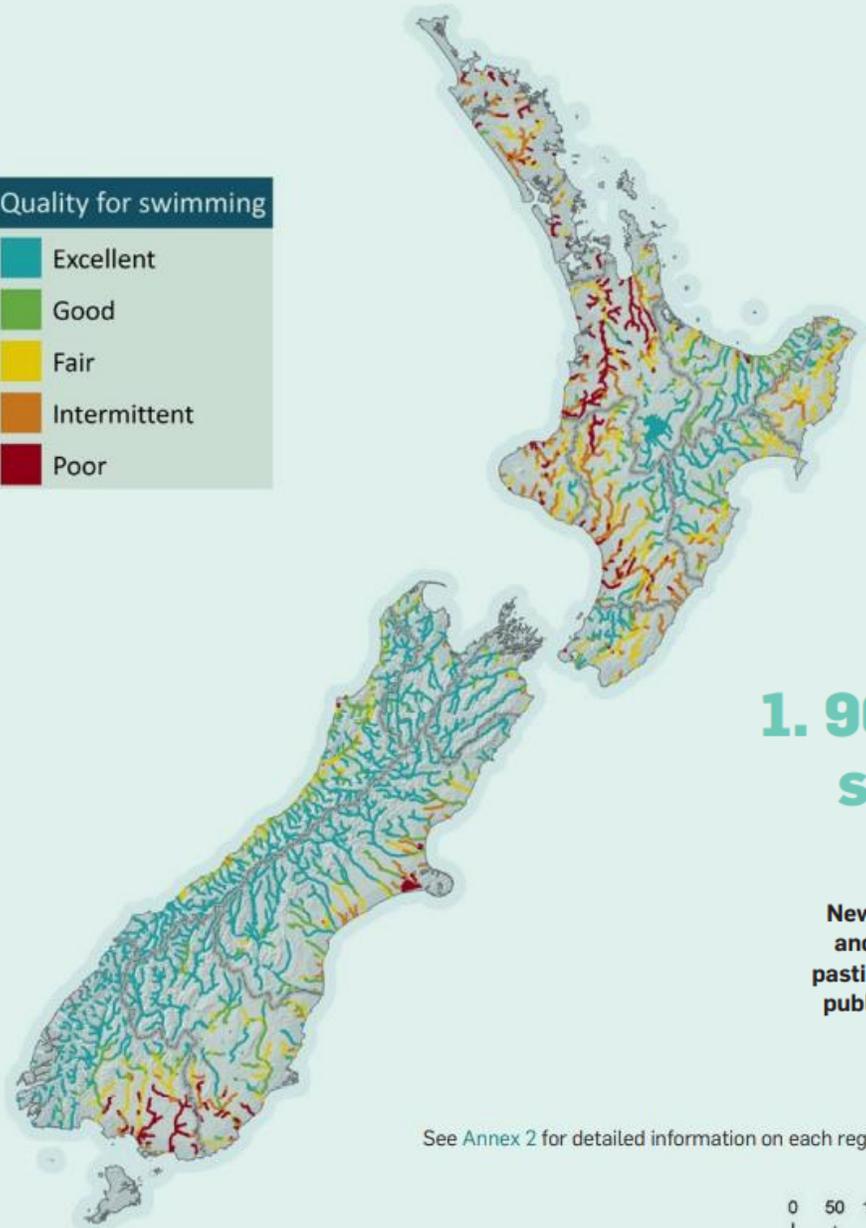


[Sustainable Development Goals | United Nations](https://www.cbd.int/health/)

<https://www.cbd.int/health/>

Quality for swimming

- Excellent
- Good
- Fair
- Intermittent
- Poor



See Annex 2 for detailed information on each region.

0 50 100 km

[clean-water.pdf](#)
([environment.govt.nz](#))

1. 90% of rivers and lakes swimmable by 2040

New Zealanders value swimming in our rivers and lakes and we want to know future generations will enjoy this pastime too. This message came through loud and clear at public meetings and in the thousands of submissions we received during consultation on *Next steps*.

Clean Water

90% of rivers and lakes swimmable by 2040

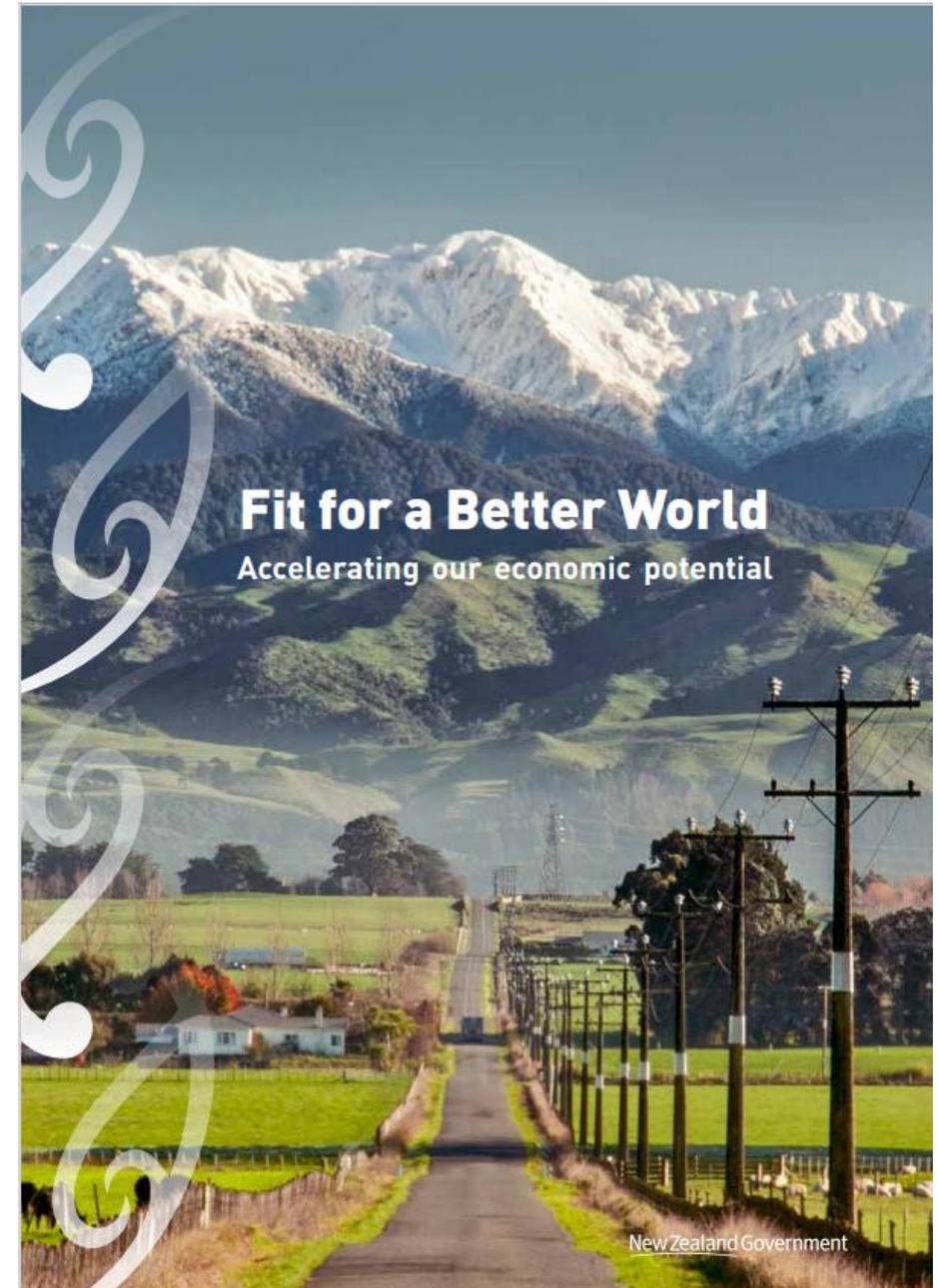


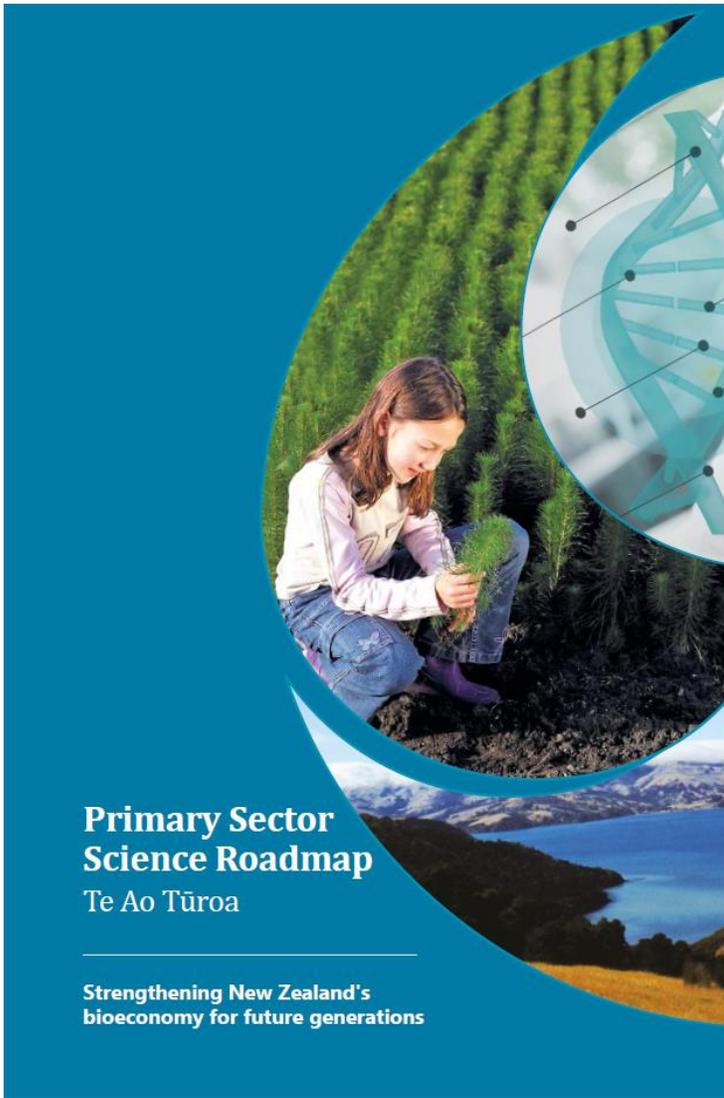
Rapidly moving to a low carbon emissions society

Restoring the health of our water, reversing the decline in biodiversity and at the same time, feeding our people

In partnership with Māori and across the community

Reverse the decline in biodiversity





**Primary Sector
Science Roadmap**
Te Ao Tūroa

Strengthening New Zealand's
bioeconomy for future generations

The themes are:



Adding value



Harnessing the value and power of data



Innovating with advanced technology



Innovating through genetics



Innovating through Kaupapa Māori



Protecting and sustaining resources



Deriving value from complex systems



Integrating people and values

Addressing the wider opportunities of the bioeconomy

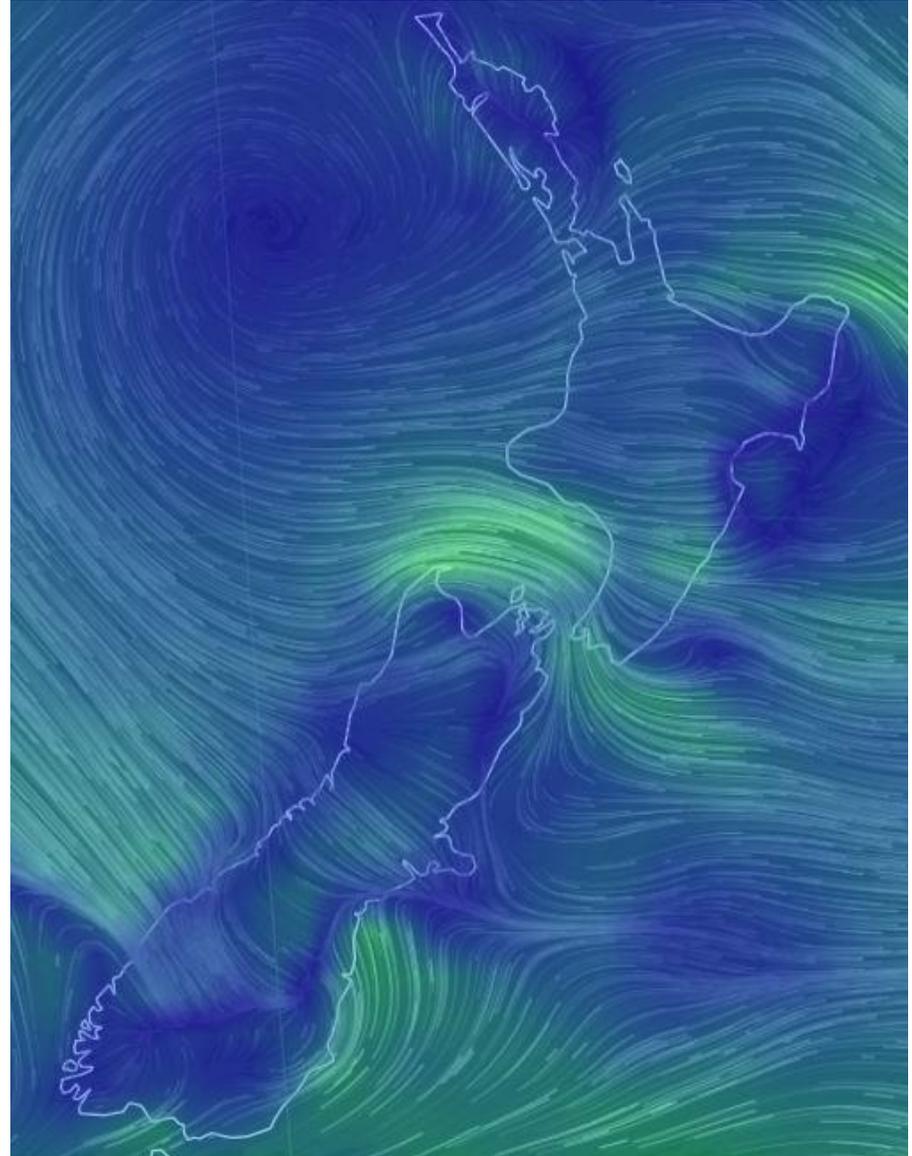
[Primary Sector Science Roadmap Te Ao Tūroa - Strengthening
New Zealand's bioeconomy for future generations
\(mpi.govt.nz\)](https://www.mpi.govt.nz)



Ināia tonu nei: a low emissions future for Aotearoa

Advice to the New Zealand Government on its first
three emissions budgets and direction for its emissions
reduction plan 2022 - 2025

[Ināia tonu nei: a low emissions future for Aotearoa
\(amazonaws.com\)](https://amazonaws.com)



Climate Change Commission releases final report

Forestry

- Establishing a comprehensive plan for new native forests.
- These can be on steeper, less productive land.
- *Its plan assumes 300,000 hectares of new native forests and*
- 380,000 hectares of new exotic forests are to be established **between 2021 and 2035.**
 - Native reforestation will take some grazing land
 - Increase in the ambition around cutting waste
 - Deeper integration of Treaty of Waitangi principles

[Climate Change Commission releases final report, says nearly all cars imported by 2035 must be electric | RNZ News](#)

New rules proposed for carbon farming of exotic forests in future



HON STUART NASH



HON JAMES SHAW

“We are now proposing to exclude exotic species from the permanent forest category”

What would it take for Aotearoa to see 300,000 ha of indigenous forest established ?

Reforestation
or
Forestry

Permanent
forest
(Carbon)
or
Production
(timber)

What
Species?
Planting
regime?

What type
of plant

Ecosourcing

Pests?
Weeds?

OMG
What?

1



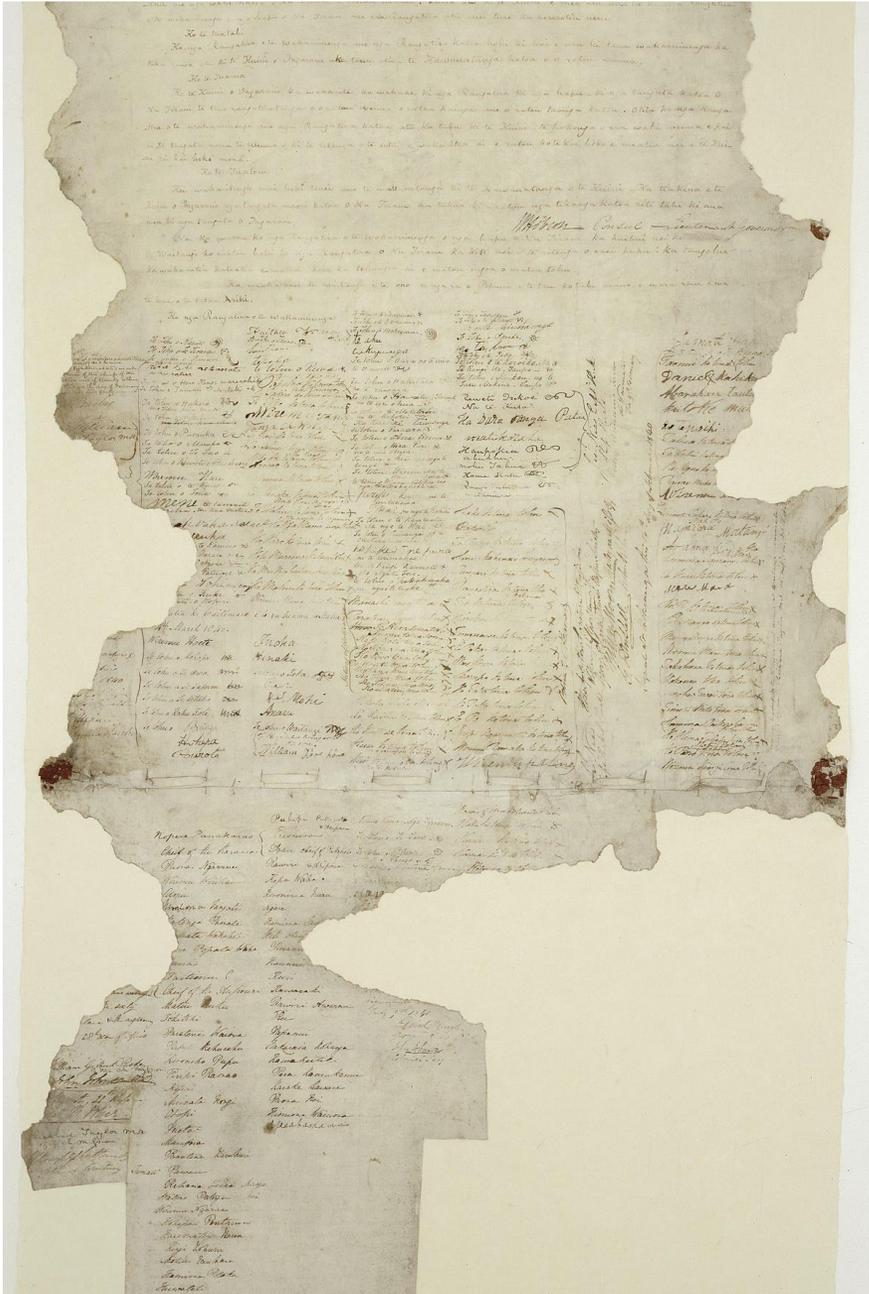
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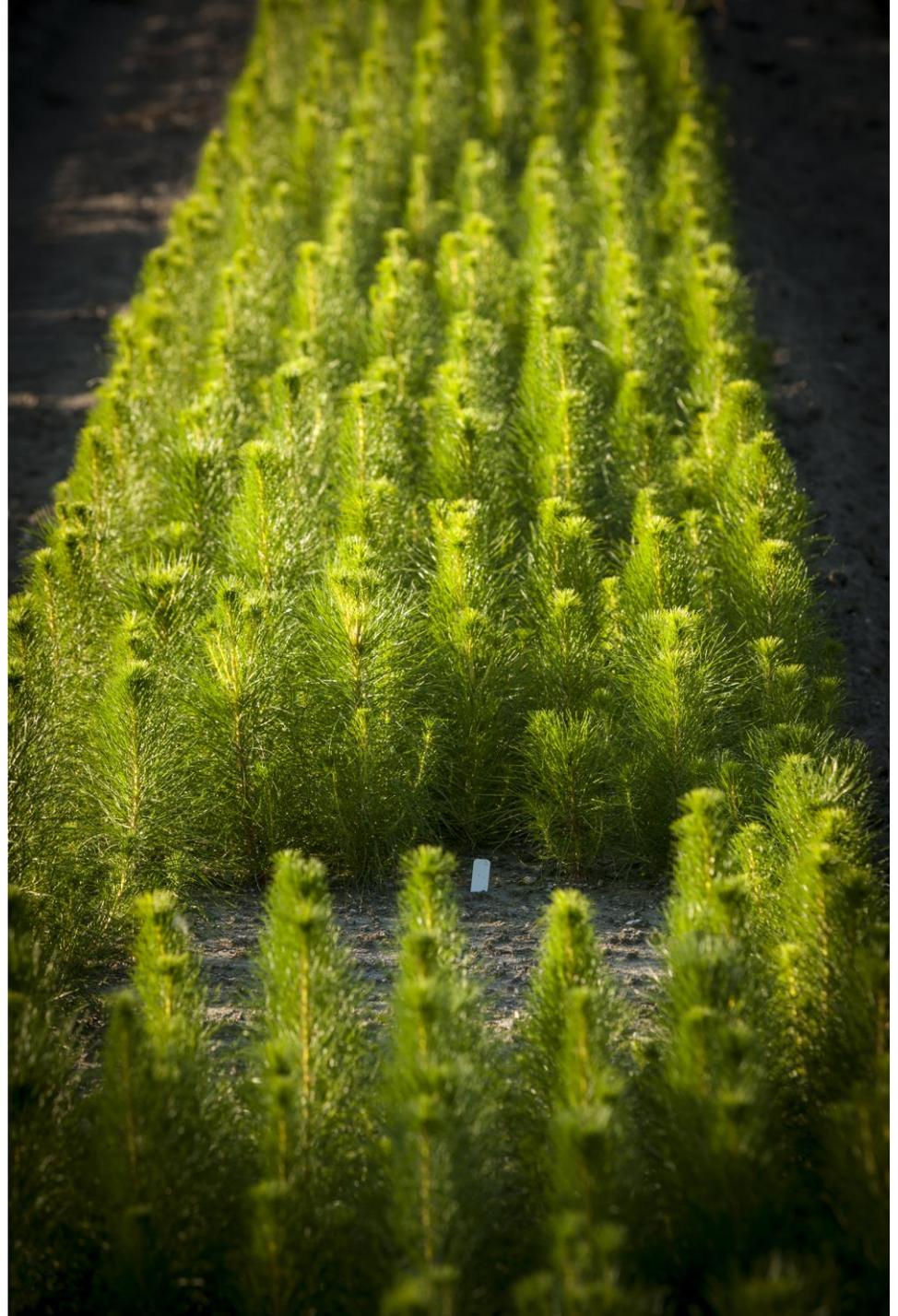
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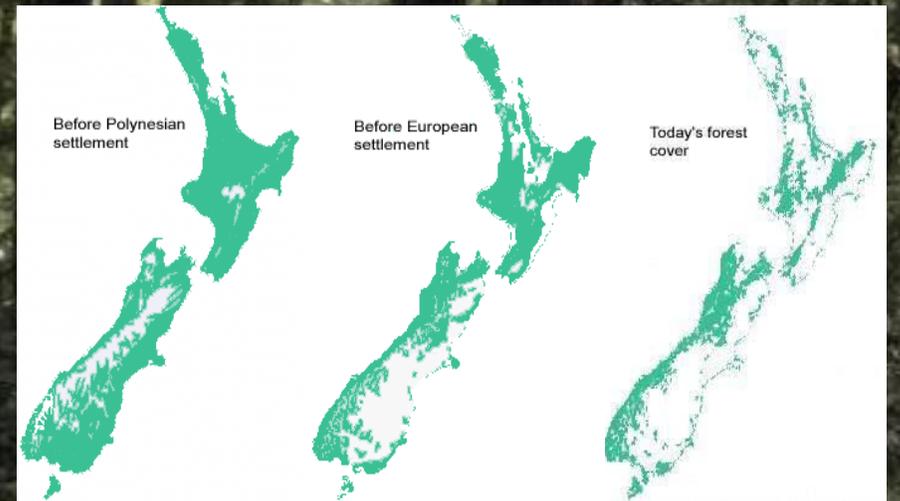
Treaty of Waitangi

Giving effect to the treaty, and to Wai 262





Imagine



What would it take for Aotearoa to see 300,000 ha of indigenous forest established ?

And who will pay?

Current

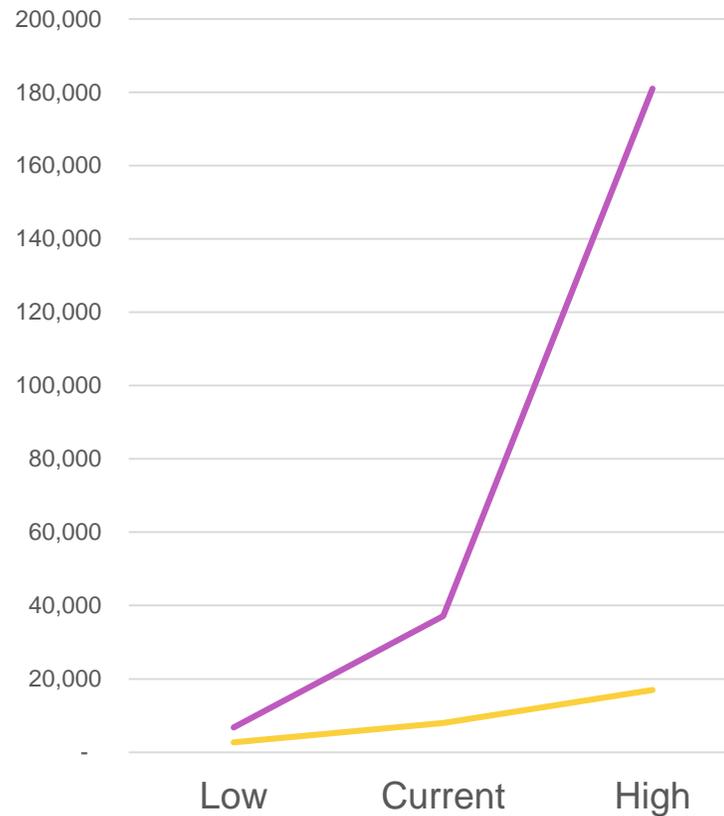
	Low	Current Average	High
Stems per ha	1,100	4,444	10,000
Cost per plant	0.6	3.77	10.23
Transport cost/plant	3.5	2.26	5
Planting cost/ha	1,250	7,044	21,717
Releasing	1,000	2,649	5,000
Blanking	0	667	2,000
Volunteers hours/ha	5	274	800
Total/ha	6,760	37,157	181,017

Establishment costs per ha for indigenous plantings

2022/2023 containerised exotic forestry seedling prices are approximately \$0.60 - \$1.20

Current

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Aspirational

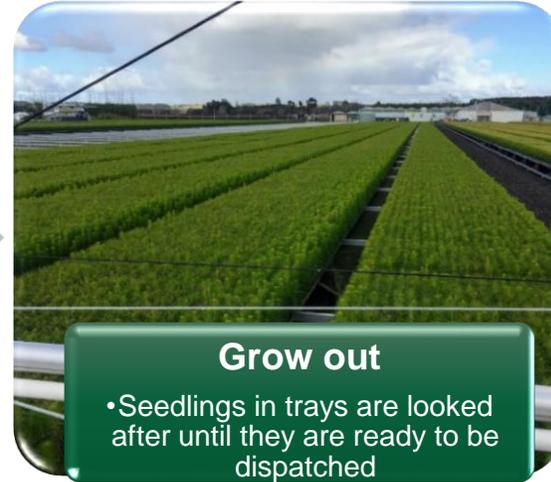
	Low	Current	High
Stems per ha	600	1,100	2000
Cost per plant	0.6	2.00	3.00
Transport cost/plant	0.5	1.00	1.50
Planting cost/ha	1,000	2,000	3,000
Releasing			
Blanking			
Volunteers hours/ha			
Total/ha	2,660	7,949	17,000

Establishment costs per ha for indigenous plantings

(plus pest control)



Common forestry practice



9 – 12 months



Transport



Planting

Common practice for indigenous plants



Seed Collection

- Cleaned and refrigerated
- Pre-treatment



Sowing

- Approx 1000 seed per germination tray



'Pricking out'

- Small seedlings transplanted into cells



Grow out

- Seedlings in trays are looked after until they are ready to be repotted



'Bagging on'

- Seedlings are transplanted from cells into larger polythene bags



Stand out

- Seedlings in bags are looked after until they are ready to be repotted



Dispatch

12 – 32 months (mostly 16-18months)



Transport



Planting



Maintenance

1-6 months + 2 years



Seed Collection

- Cleaned and refrigerated
- Pre-treatment



Sowing

- Approx 1000 seed per germination tray



'Pricking out'

- Small seedlings transplanted into cells

regular and culturally safe supply of seed at scale

Percentage germination success
Labour
Transplantation shock

12 – 32 months (mostly 16-18months)



Common native tree nursery practice

Forestry-grade

Transplantation shock



Grow out

- Seedlings in trays are looked after until they are ready to be repotted



'Bagging on'

- Seedlings are transplanted from cells into larger polythene bags



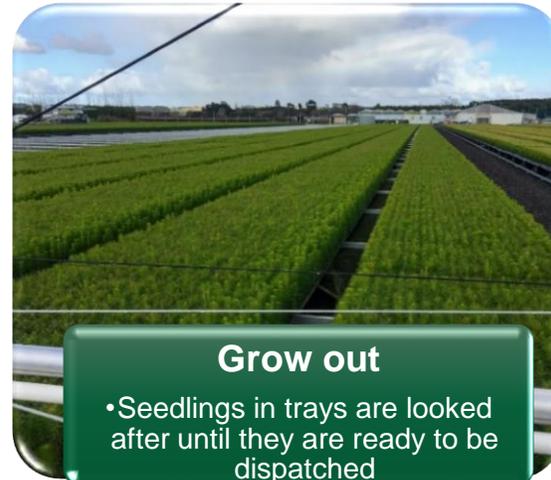
Stand out

- Seedlings in bags are looked after until they are ready to be repotted



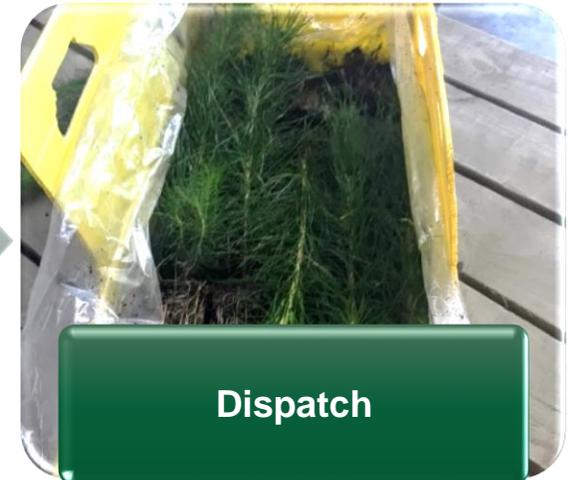
Dispatch

12 – 32 months (mostly 16-18months)



Grow out

- Seedlings in trays are looked after until they are ready to be dispatched



Dispatch



Transport



Planting



Maintenance



1-6 months + 2 years



Transport



Planting



1 billion trees – accelerating indigenous plant propagation

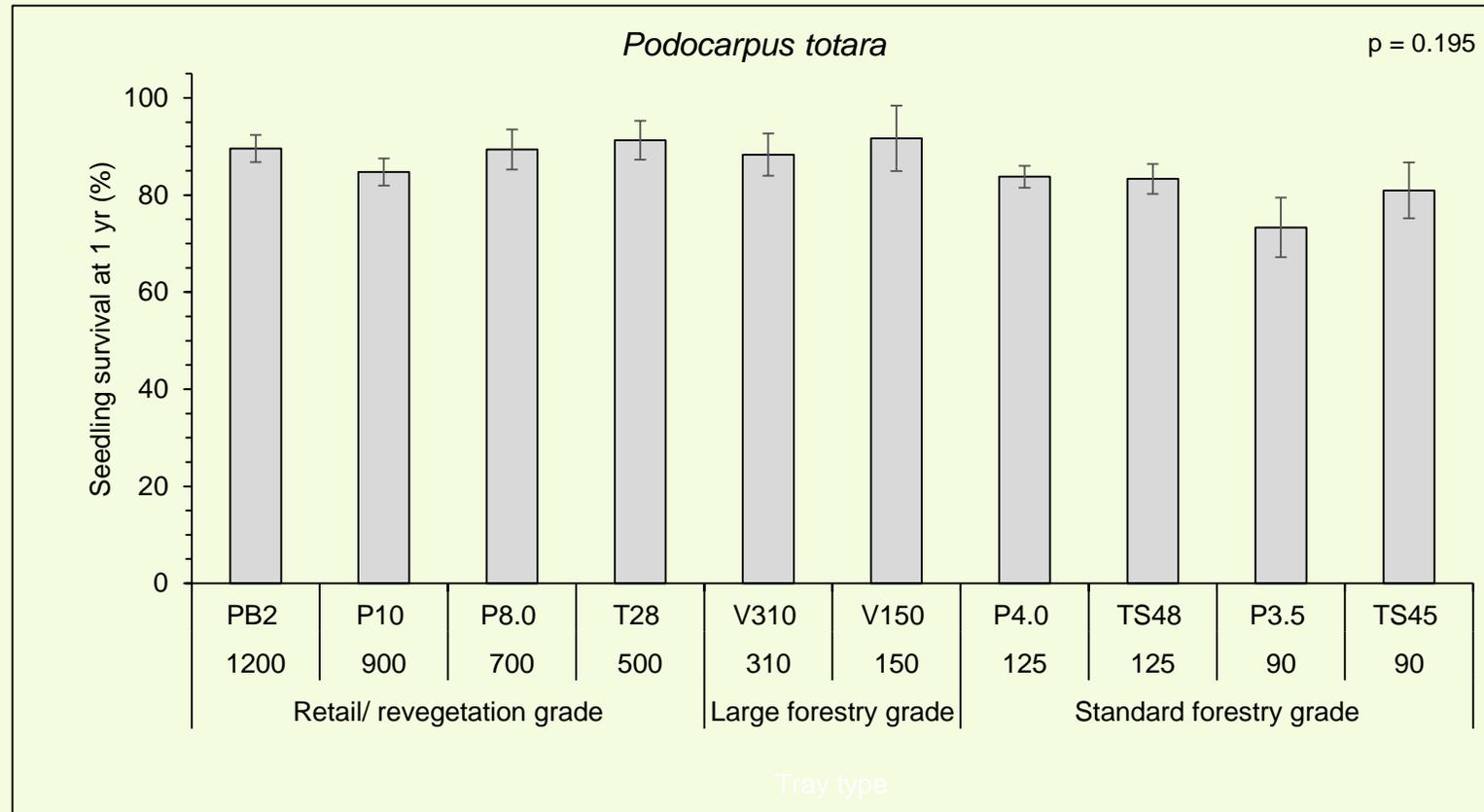
Craig Ford

Te Uru Rakau – New Zealand Forestry Service

Forestry container systems to establish our native trees



Totara plant production at scale



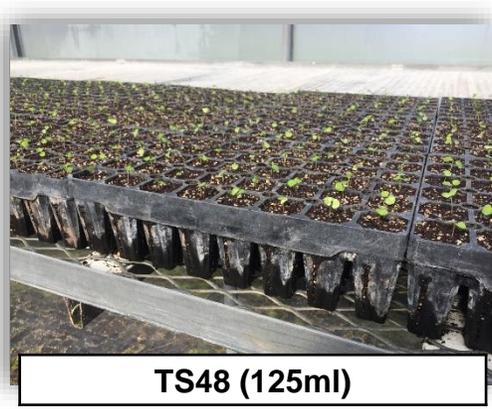
Forestry container systems to establish our native trees

Nursery survival and plant heights (for 17 species and 11 container types)

Container type	Container volume (cm ³)	Survival %	Average height at 9 months (cm)
PB2	1200	93.3*	54.3
10cm growbag	900	91.9*	51.1
8cm growbag	700	95.7	52.6
T28	500	94.8	64.8
Hiko v310	310	98.0	55.0
Hiko v150	150	95.2	43.9
TS48 - 125ml	125	95.7	46.9
4.0cm Paper pots - 125ml	125	95.5	44.0
TS45 - 90ml	90	93.9	44.0
Hiko V90 - 90ml	90	94.8	46.3
3.5cm paper pots - 90ml	90	98.3	43.6
		96.1	50.3

- Nursery survival was good across all container types, ranging between 95 and 98%.
- Heights at 9 months were affected by media volume, media type, and seedling spacing, but none of the differences were of concern for successful field establishment.

* Includes losses in the smaller transplanted grades before potting up.



Forestry container systems to establish our native trees

Field survival and growth on the two best trial sites (with professional planters) and the 6 best performing species (*Coprosma robusta*, *Leptospermum scoparium*, *Dodonaea viscosa*, *Plagianthus regius*, *Kunzea ericoides*, *Podocarpus totara*).

Container type	Volume (cm ³)	Field survival at 1 year (%)	Field height at 1 year (cm)	New shoot biomass index at 1 year (m/ha)
PB2	1200	97.6	133.3	578.2
10cm Paper pot	900	97.0	127.9	551.1
8cm Paper pot	700	98.4	147.1	643.3
T28	500	92.8	127.7	526.3
V310	310	98.2	118.6	517.6
V150	150	96.0	108.6	463.1
4cm Paper pot	125	96.4	91.8	393.4
TS48	125	90.8	95.7	386.1
3.5cm Paper pot	90	90.8	102.9	415.4
TS45	90	92.2	100.6	412.5
		95.5	119.0	505.1

- By selecting the right species and planting them on well prepared sites (with an experienced planting team), forestry grade containers performed very well at 91 – 98% survival.
- Cost effective blanking could be performed with smaller seedlings if required.
- Replacing PB2 bags with forestry grade containers would provide a 90-100% reduction in plastic waste!

Forestry container systems to establish our native trees

Field survival and growth on the two worst trial sites (with inexperienced planters) and the 5 worst performing species (*Hoheria angustifolia*, *Aristotelia serrata*, *Melicytus ramiflorus*, *Coprosma grandifolia*, *Sophora microphylla*).

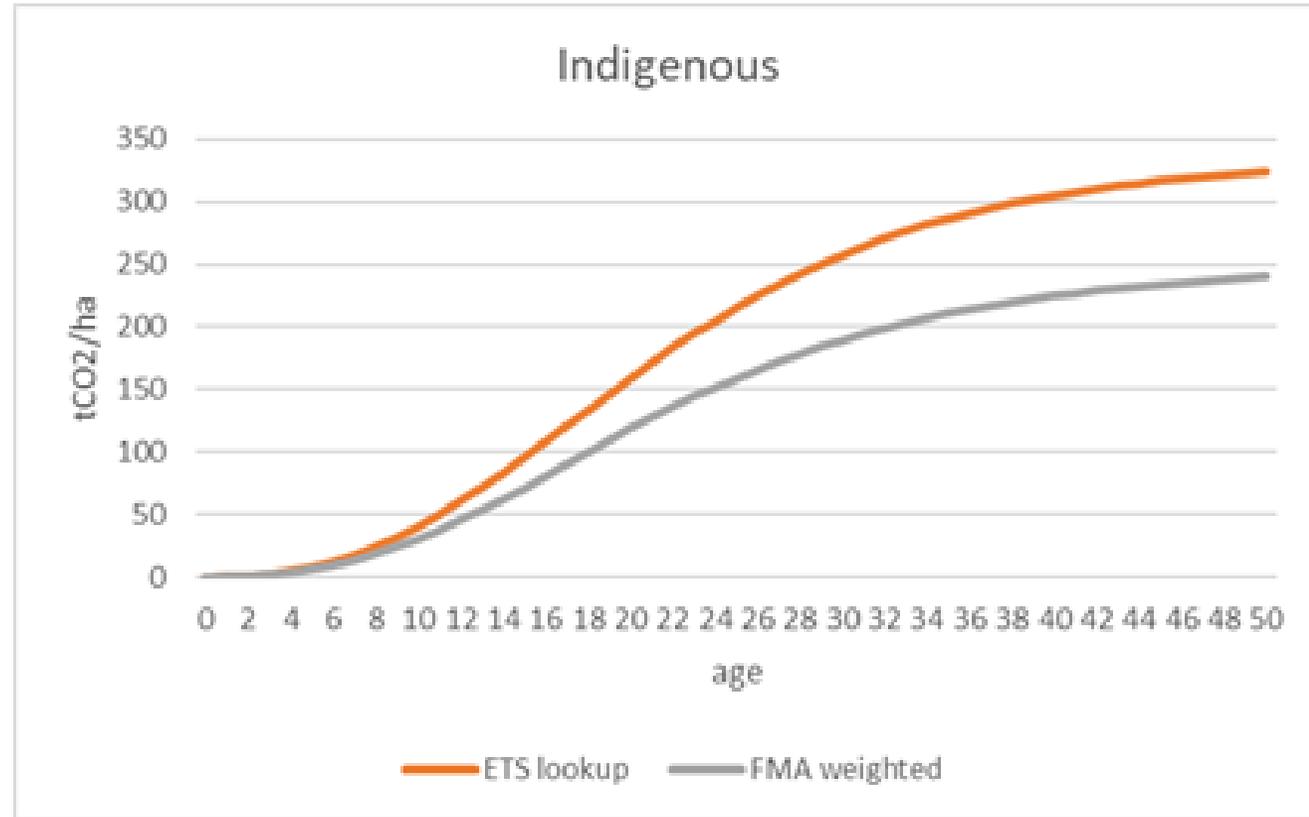
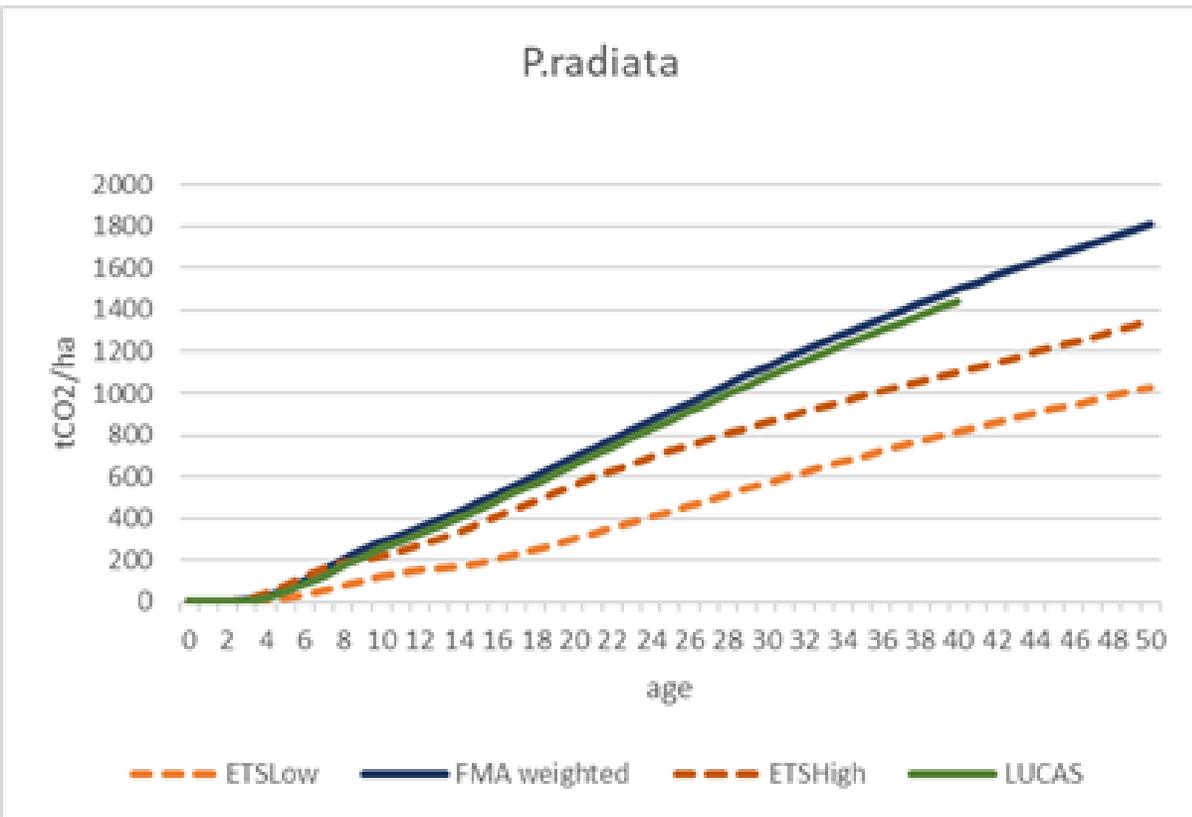
Container type	Volume (cm ³)	Field survival at 1 year (%)	Field height at 1 year (cm)	New shoot biomass index at 1 year (m/ha)
PB2	1200	65.5	110.0	319.9
10cm Paper pot	900	58.6	106.8	278.1
8cm Paper pot	700	69.5	112.0	346.1
T28	500	44.6	113.1	224.1
V310	310	54.7	80.1	194.7
V150	150	45.3	73.3	147.4
4cm Paper pot	125	25.6	75.1	85.4
TS48	125	28.6	74.3	94.4
3.5cm Paper pot	90	27.6	59.6	73.2
TS45	90	26.6	58.4	68.9
Grand Total		47.2	96.7	202.9

- **Selecting the wrong species and planting them on poorly prepared sites (with an inexperienced planting team), forestry grade containers performed poorly with 27 – 55% survival and low new biomass.**
- **For these species, and conditions, the Ellebag (700cm³) appears to be the best option for now.**
(noting that some were likely rootbound in the smaller containers and should have been planted earlier for a positive outcome)

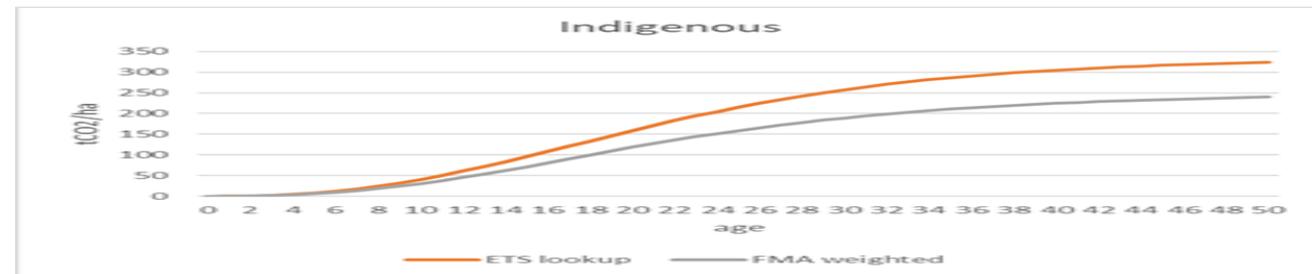
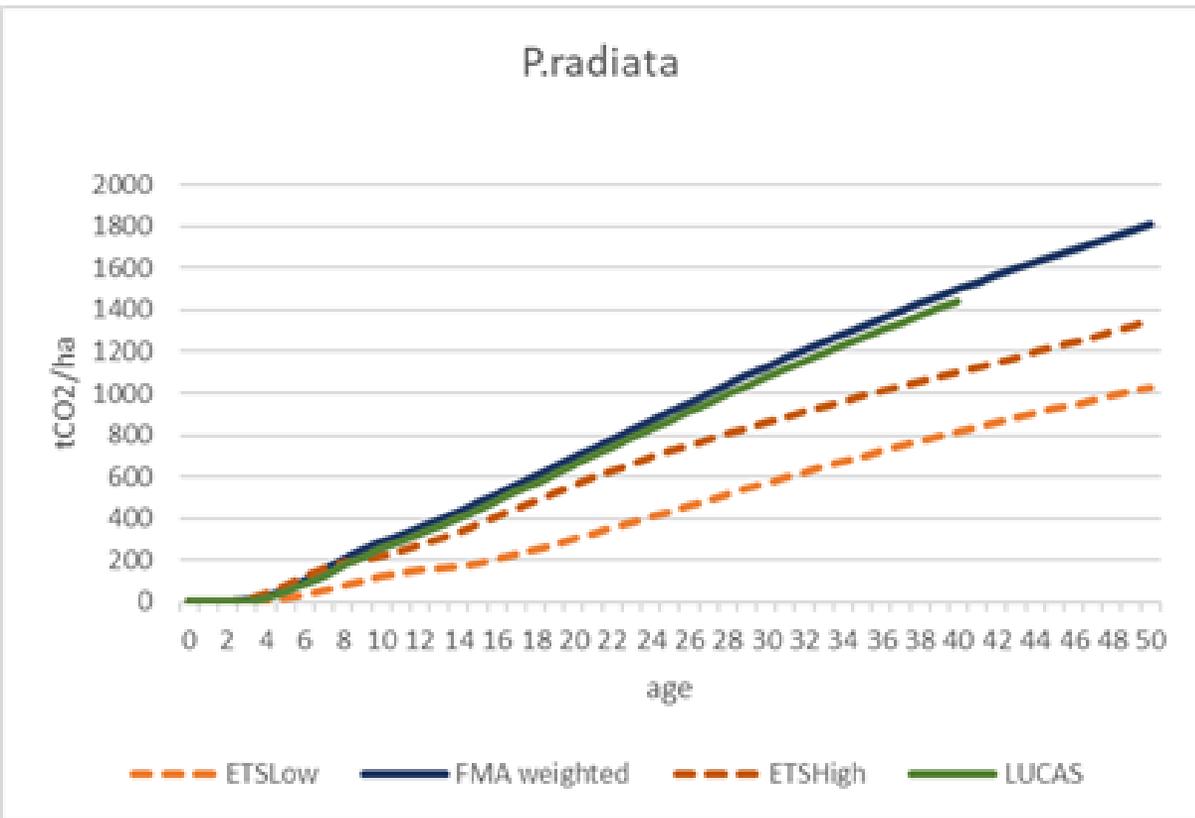
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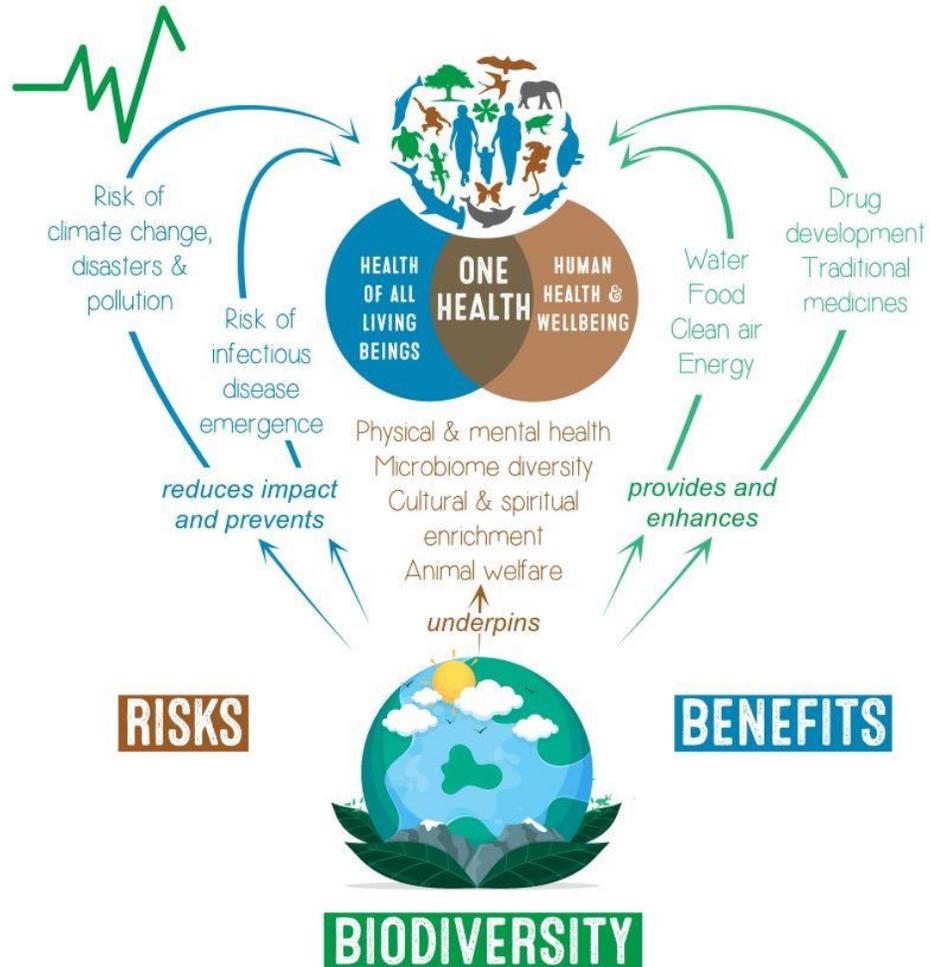
<https://pureadvantage.org/carbon-sequestration-by-native-forest-setting-the-record-straight/>



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BIODIVERSITY'S CONTRIBUTION TO GOOD HEALTH AND WELLBEING



Sustainable Development Goals



Sustainable Development Goals | United Nations

<https://www.cbd.int/health/>



Erosion is costing NZ up to \$300m a year

9:03 pm on 19 April 2019

Share this

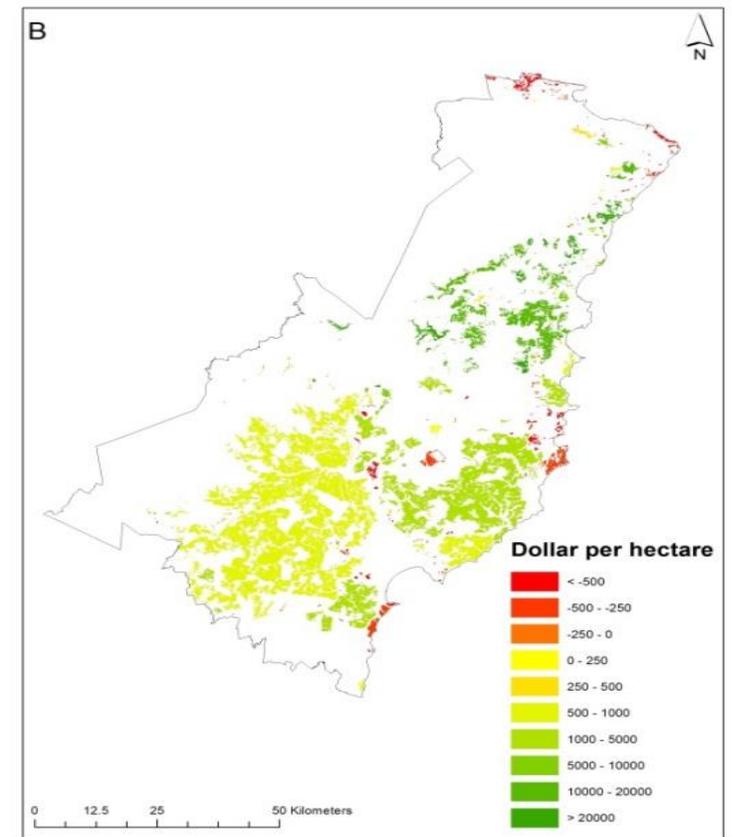
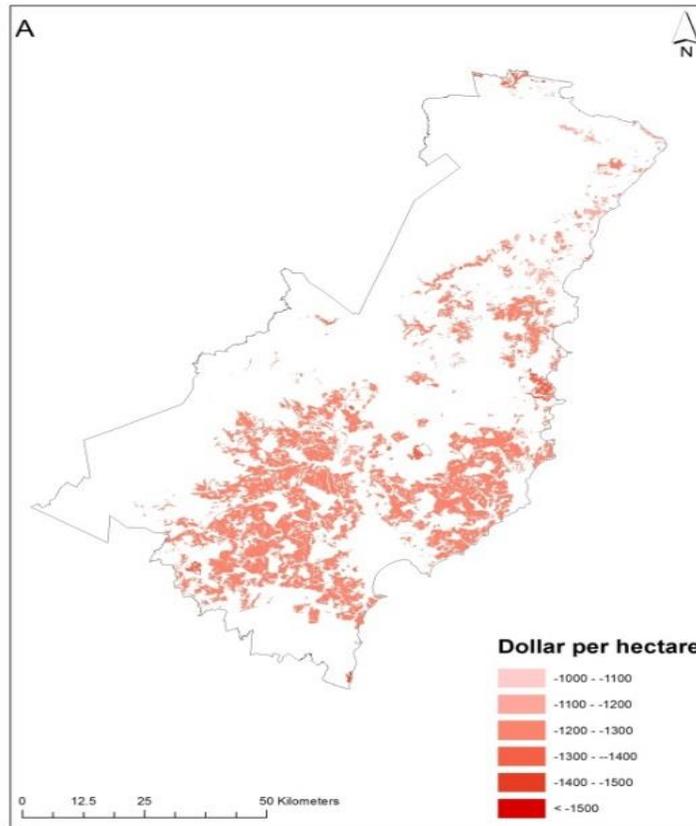
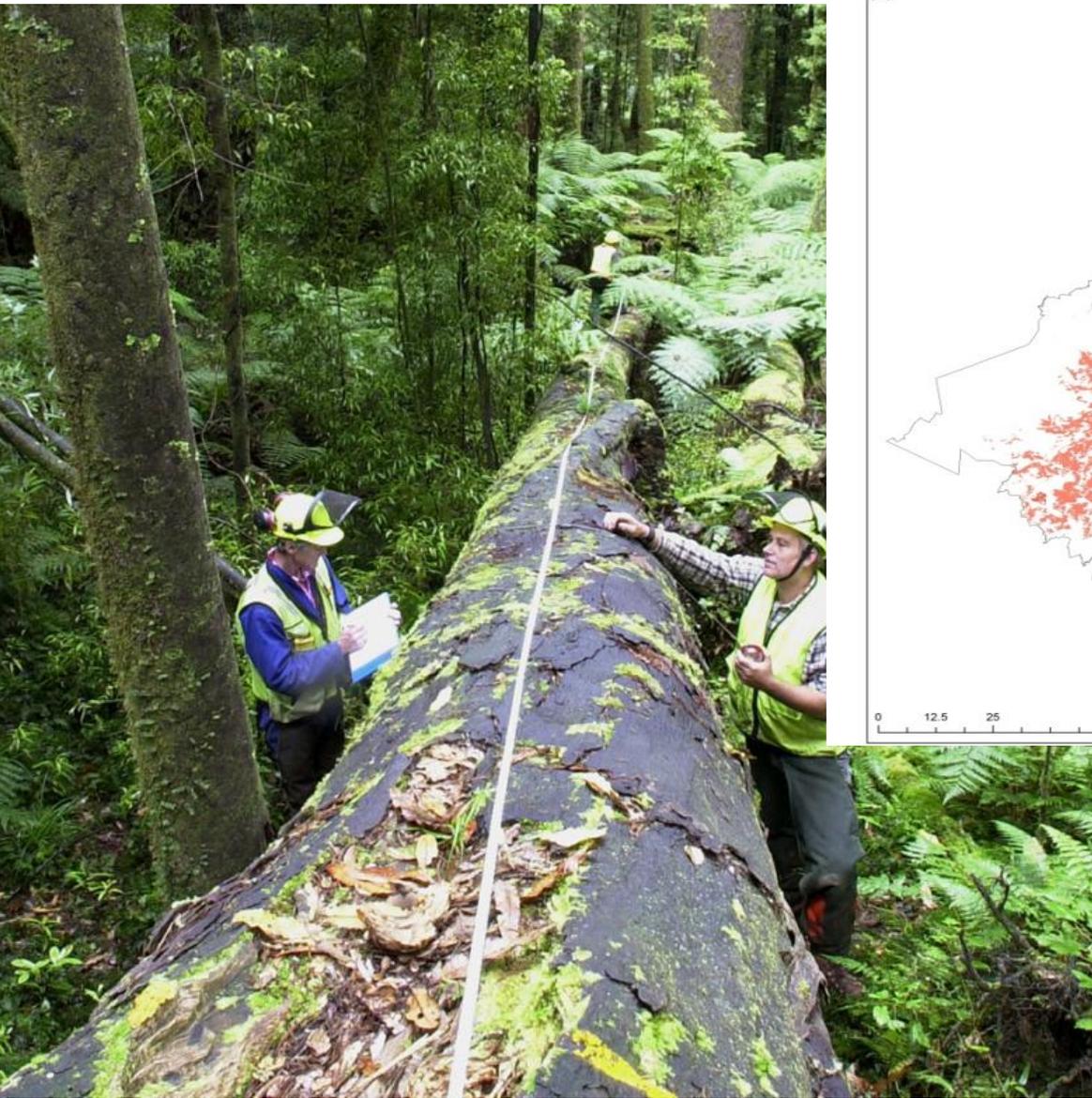


Kate Gudsell, Environment Reporter

[@kategudsell](#) kate.gudsell@rnz.co.nz

The government's report on the state of the environment estimates the economic losses associated with soil erosion and landslides is at least \$250 to \$300 million a year.





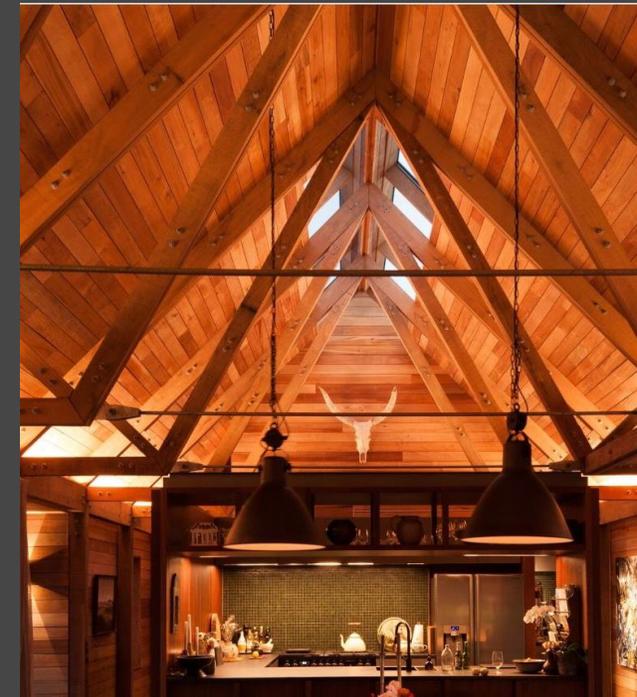
Estimated economic returns (\$/ha) for manuka.
(A): shows private benefits only; (B) shows private and public benefits

M. Heaphy, D. Harrison, L. Holt, G. Steward, R. Yao

Imagine...



- Distinct Wood Products
- Image: Pt Wells Gables, NZ Natural Timbers
- Image: Tōtara Industry Pilot
- Permissions obtained





HON DAMIEN O'CONNOR



HON STUART NASH



HON MEKA WHAITIRI

“New funding will scale up native seedling production to increase native forest planting and create long term carbon sinks. It will also fund targeted research and development, and stimulate private sector investment to help transform our forestry and wood processing into a high-value, high-wage sector,” Stuart Nash said.





Prosperity from trees *Mai i te ngahere oranga*

Scion is the trading name of the New Zealand Forest Research Institute Limited