Manaaki Whenua
Landcare Research

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# Pretty Powerful – the weed invasion in a park near you

Angela J Brandt, Duane A. Peltzer


# Assessment Report on Invasive Alien Species and their Control

**www.ipbes.net**

The Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services

**#InvasiveAlienSpecies Assessment**

UN environment programme

unesco

Food and Agriculture Organization of the United Nations

UNDP

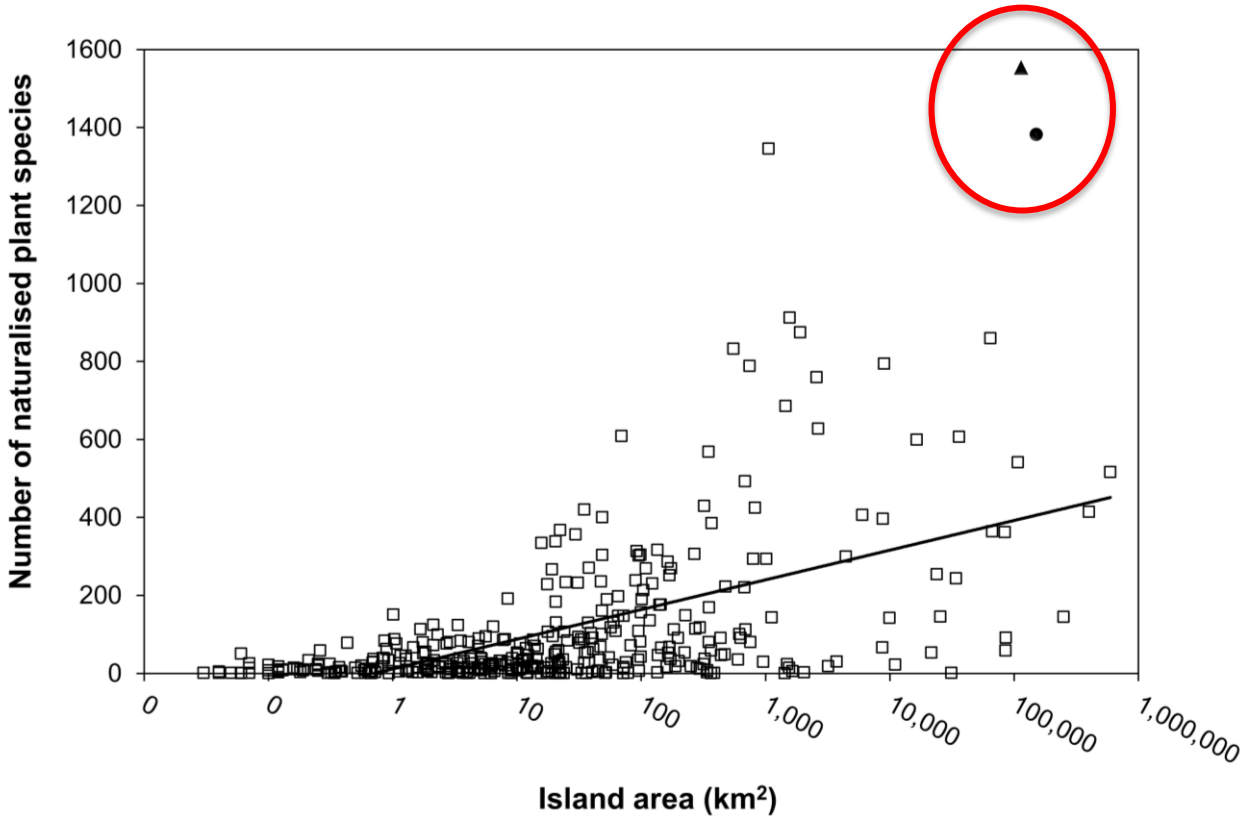
# Invasive alien species are one of the 5 major drivers of biodiversity loss

Alien species are animals, plants, and other organisms that have been introduced by human activities to new regions

Invasive alien species are a subset of alien species, known to have established and spread with negative impacts on nature. Many invasive alien species also have impacts on people

#InvasiveAlienSpecies Assessment

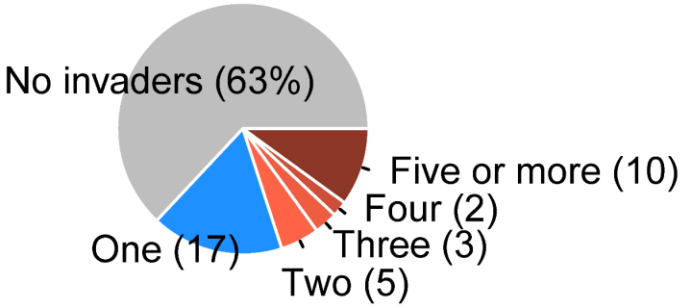
# Unfortunately, weeds do really well in Aotearoa NZ




Hulme 2020. *Biological Invasions* 22:1539-1562.


Brandt et al. 2021. *Biological Invasions* 23:351-366.

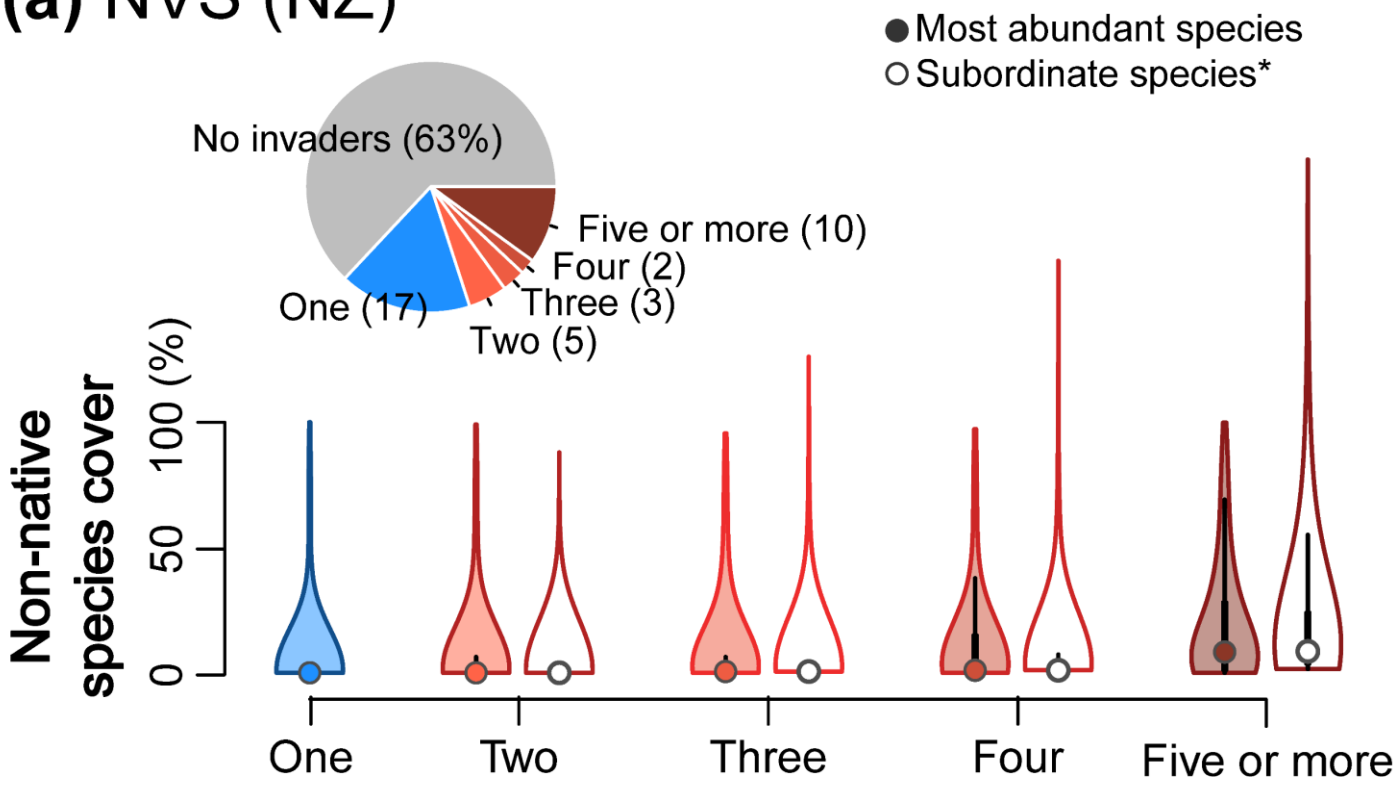
## (a) NVS (NZ)




*Zantedeschia aethiopica* and *Paraserianthes lophantha.*

Photo credit: Margaret Stanley

Brandt et al. 2023. *Frontiers in Ecology & the Environment* 21:370-379.



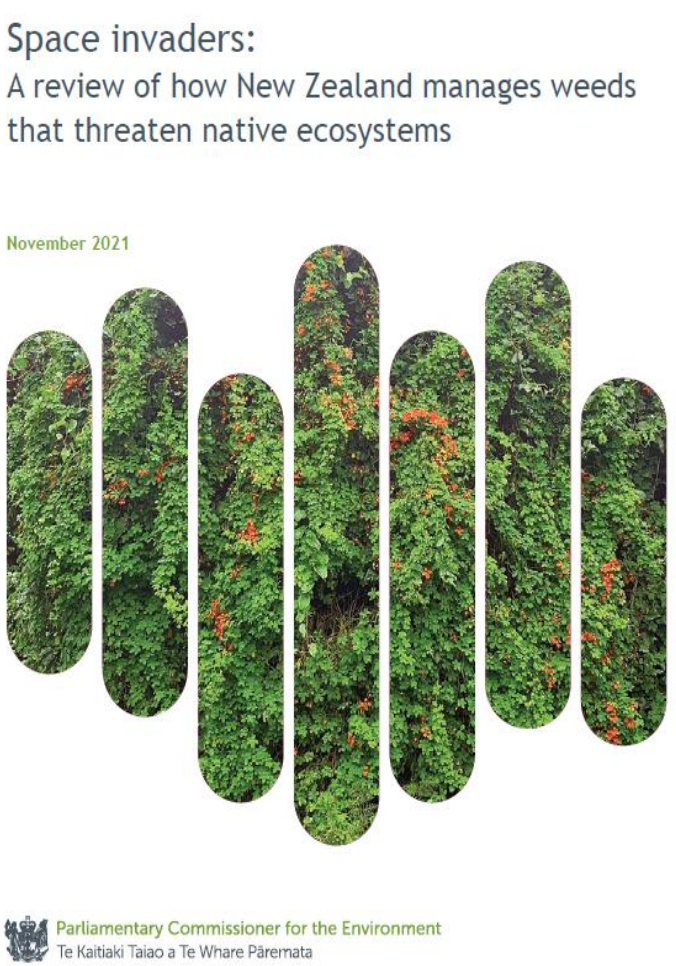

*Cover is cumulative of all subordinate species and can be >100%

# Recommendations

- Leadership, including in policy
- Data integration & accessibility
- Emerging weeds

5. Policy requires iwi & hapū engagement and minimum content
    - National priority weeds – expert input, coordinated management & surveillance
    - Manage emerging weeds – surveillance
    - Coordinate national & regional efforts

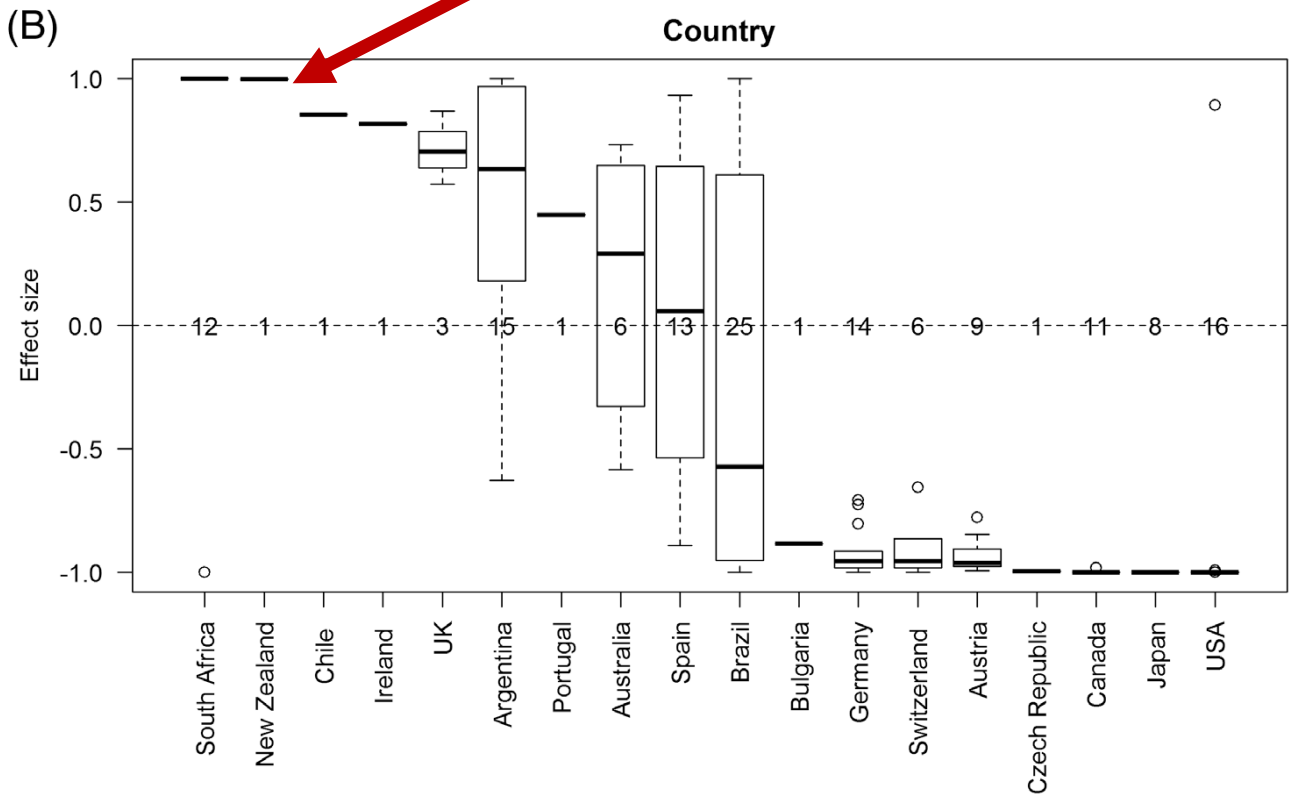
7. 'Emerging risks' team to scan for & coordinate management of new weeds




https://www.pce.parliament.nz/publications/space-invaders-managing-weeds-that-threaten-native-ecosystems

# Non-native tree species can provide benefits…

Timber production almost entirely driven by Pinaceae




Castro-Diez et al. 2019
*Biological Reviews* 94: 1477

# … but can also create weed problems like wilding conifers



Photos credit: Sherman Smith

PCE 2021. *Space invaders: A review of how New Zealand manages weeds that threaten native ecosystems.* PCE, Wellington.

# We've tackled the wilding conifer problem collaboratively



**"Winning against wildings" (2016-2021) and**
**"Vivé la Resistance" (2021-2026)**

- 5 yr (MBIE) endeavour research programmes
- **Integrates** ecology, management and modelling
- Seek to improve management across all stages of invasion
- Tightly linked to national management efforts

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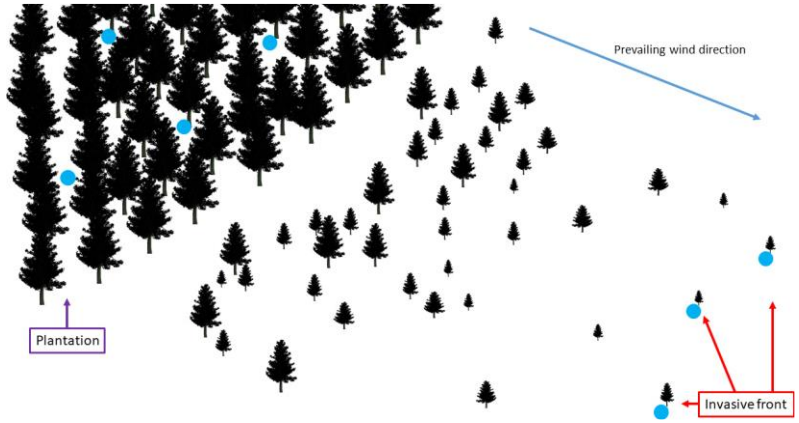
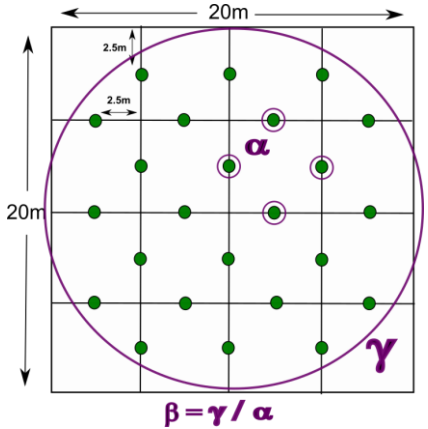
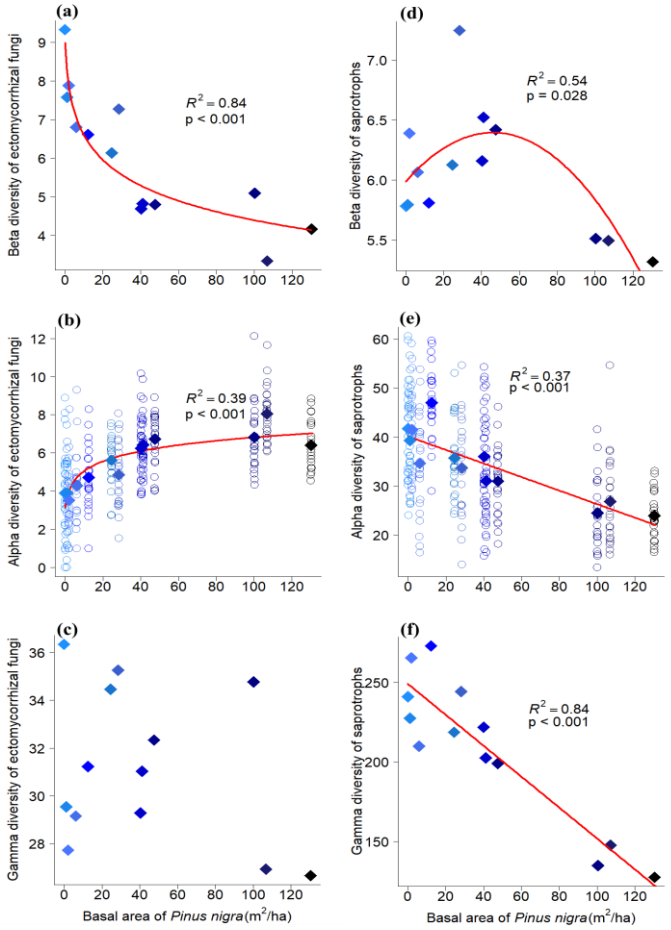
# Wilding conifers have major impacts on diversity and ecosystems




Sapsford et al. 2020, 2021; Peralta et al. 2019; 2020; Nuske et al. 2021.

# Large-scale management of established wilding conifers is expensive, requires long-term control, and creates legacies

New Zealand Journal of Ecology (2022) 46(2): 3475 © 2022 New Zealand Ecological Society.

NEW ZEALAND JOURNAL OF ECOLOGY

REVIEW

Applying ecological research to improve long-term outcomes of wilding conifer management

Ian A. Dickie[1*], Rowan Sprague[2], Joanna Green[1], Duane A. Peltzer[3], Kate Orwin[3] and Sarah Sapsford[1]

# Understanding people and potential conflicts in the use and value of non-native species is crucial



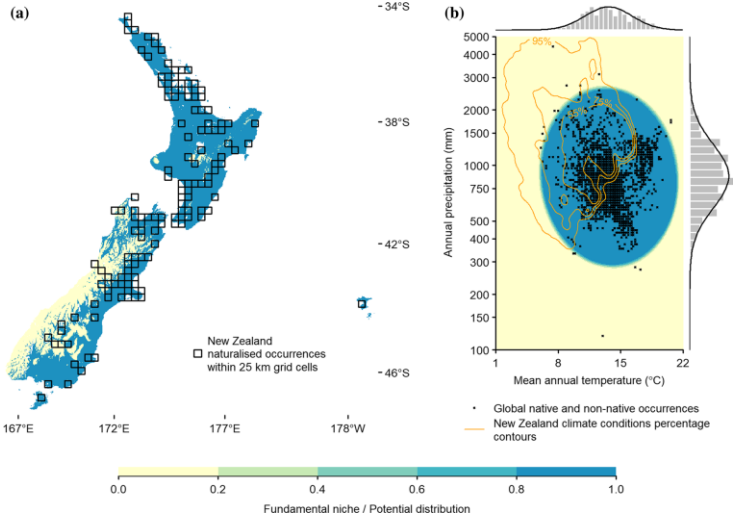
Biol Invasions
https://doi.org/10.1007/s10530-022-02892-6

ORIGINAL PAPER

Check for updates

## The right tree in the right place? A major economic tree species poses major ecological threats

P. J. Bellingham · E. A. Arnst · B. D. Clarkson · T. R. Etherington · L. J. Forester · W. B. Shaw · R. Sprague · S. K. Wiser · D. A. Peltzer




Forest & Kim Starr CC BY 3.0

### A "pervasive and ongoing invasion" of radiata pine – Expert Reaction

Expert Reactions | Published: 26 August 2022

New research says invasive radiata pine is spread more widely across NZ than was previously appreciated, with modelling showing that up to 76% of the country's land is climatically capable of supporting populations of the trees.

# Meanwhile new conifer species continue to naturalise… how do we better anticipate and prevent future weed problems?



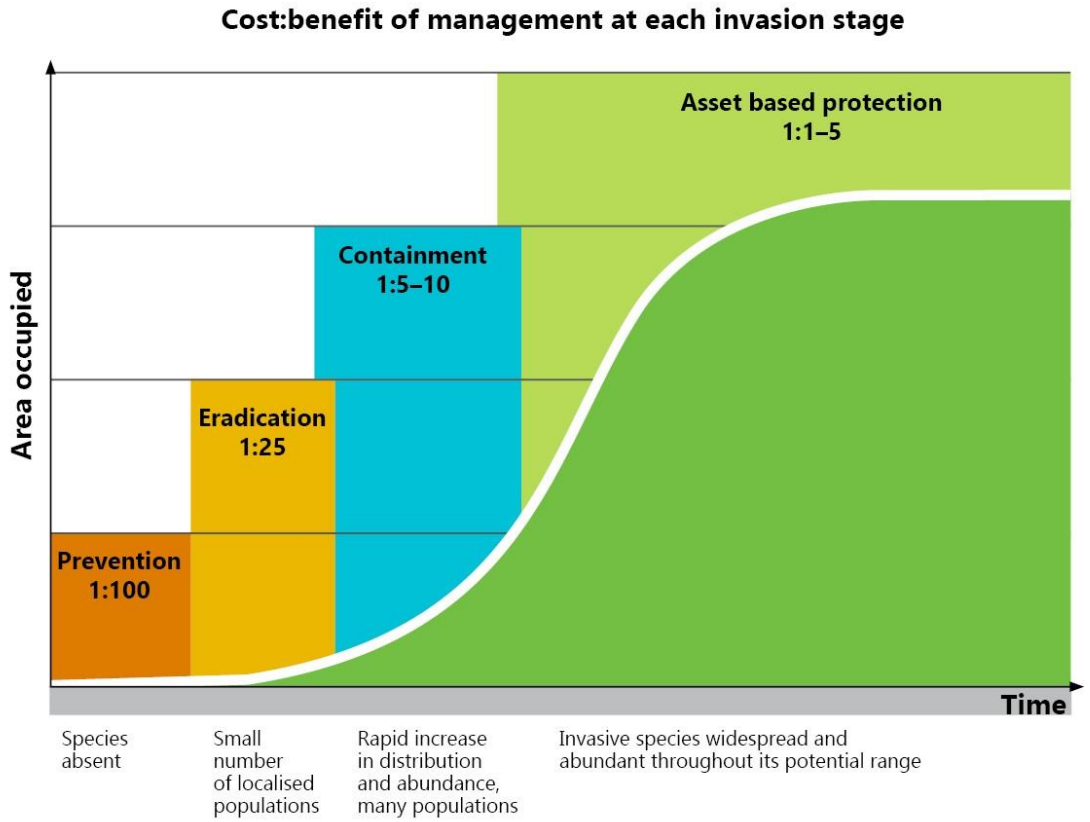
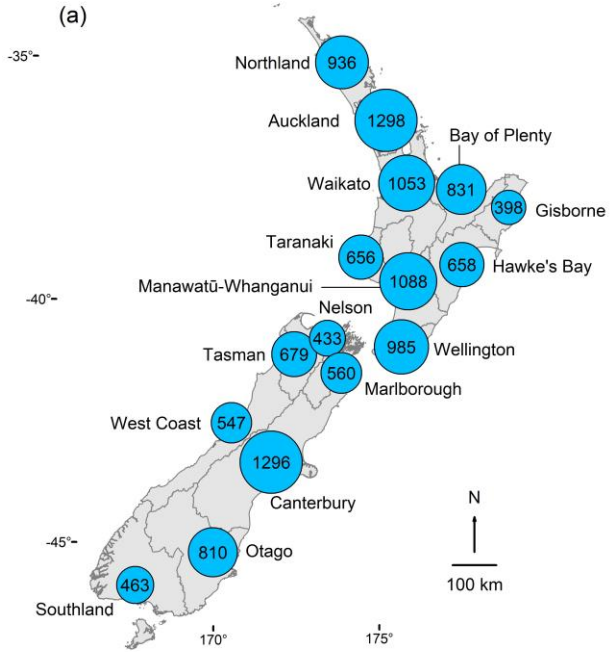



*Figure adaptated from Invasive Plants and Animals. The Department of Primary Industries, Victoria,*

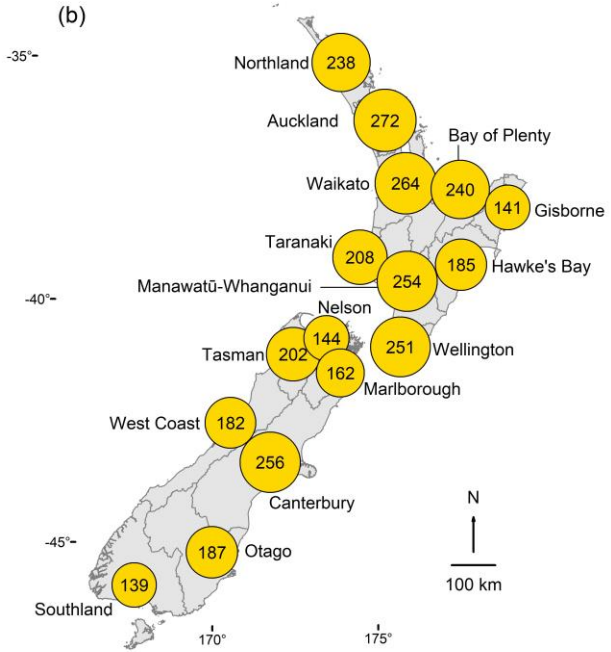
# How do we apply what we know to the hundreds of other weeds?

Much less the potential weeds of the future…

Naturalised plants




Environmental weeds




GBIF data for 1759 of 1798 naturalised species and 311 of 314 DOC environmental weeds

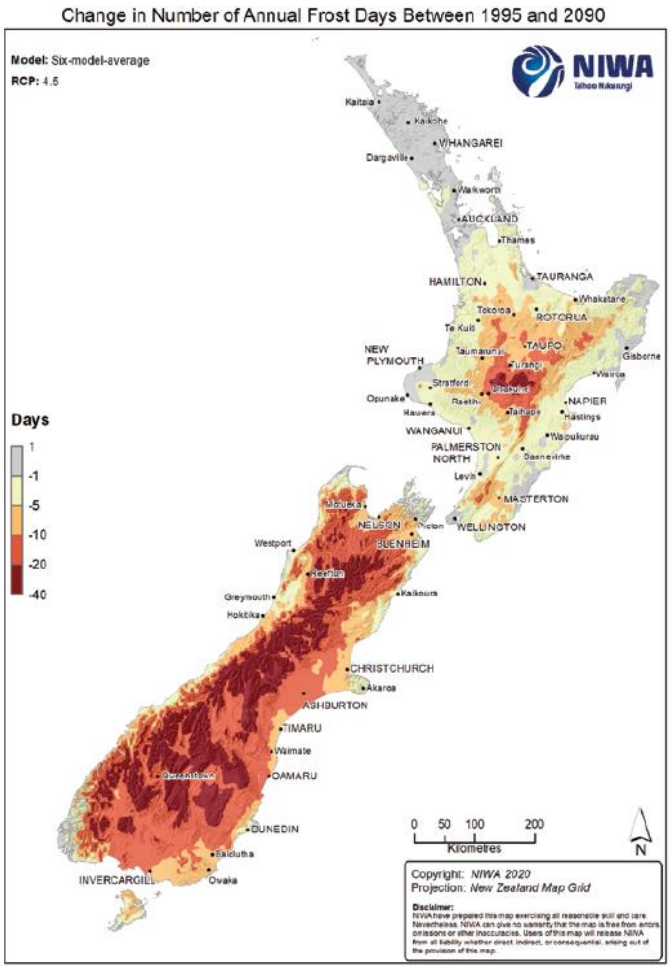
Brandt et al. 2021. *Biological Invasions* 23:351-366.

# "What might the future hold?"

- More escapes & spread
- Land use change
- Climate change aiding spread
- Stress on native ecosystems


Source: adapted from Climate Change Commission, 2021

**Figure 3.3: The historical and projected annual net change in forest area (exotic and native combined) under different scenarios modelled by He Pou a Rangi – Climate Change Commission. Tailwinds and headwinds represent optimistic and pessimistic future scenarios in terms of barriers to technology and behaviour changes.**




PCE 2021

# Filling research gaps to help manage future weeds

*Archontophoenix cunninghamiana*
Peter J. de Lange,
CC BY-NC

*Lomatia fraseri*
Leon Perrie **(CC-BY)**

Source: Peter de Lange, iNaturalist

**Figure 4.6: Listed on the Plants Biosecurity Index (PBI), ipil-ipil (*Leucaena leucocephala*) was first documented growing in the wild in New Zealand in 2015 and is listed as one of the 'world's worst invasive alien species' in the Global Invasive Species Database.[67]**

PCE 2021

*Maytenus boaria*
Murray Dawson
**(CC-BY)**

*Luma apiculata*
Melissa Hutchison,
CC BY-NC