Manaaki Whenua Landcare Research

Recent spread of heather beetle in and around Tongariro National park

Paul Peterson & Simon Fowler - MWLR

+

+

Image by Jules Cox

=

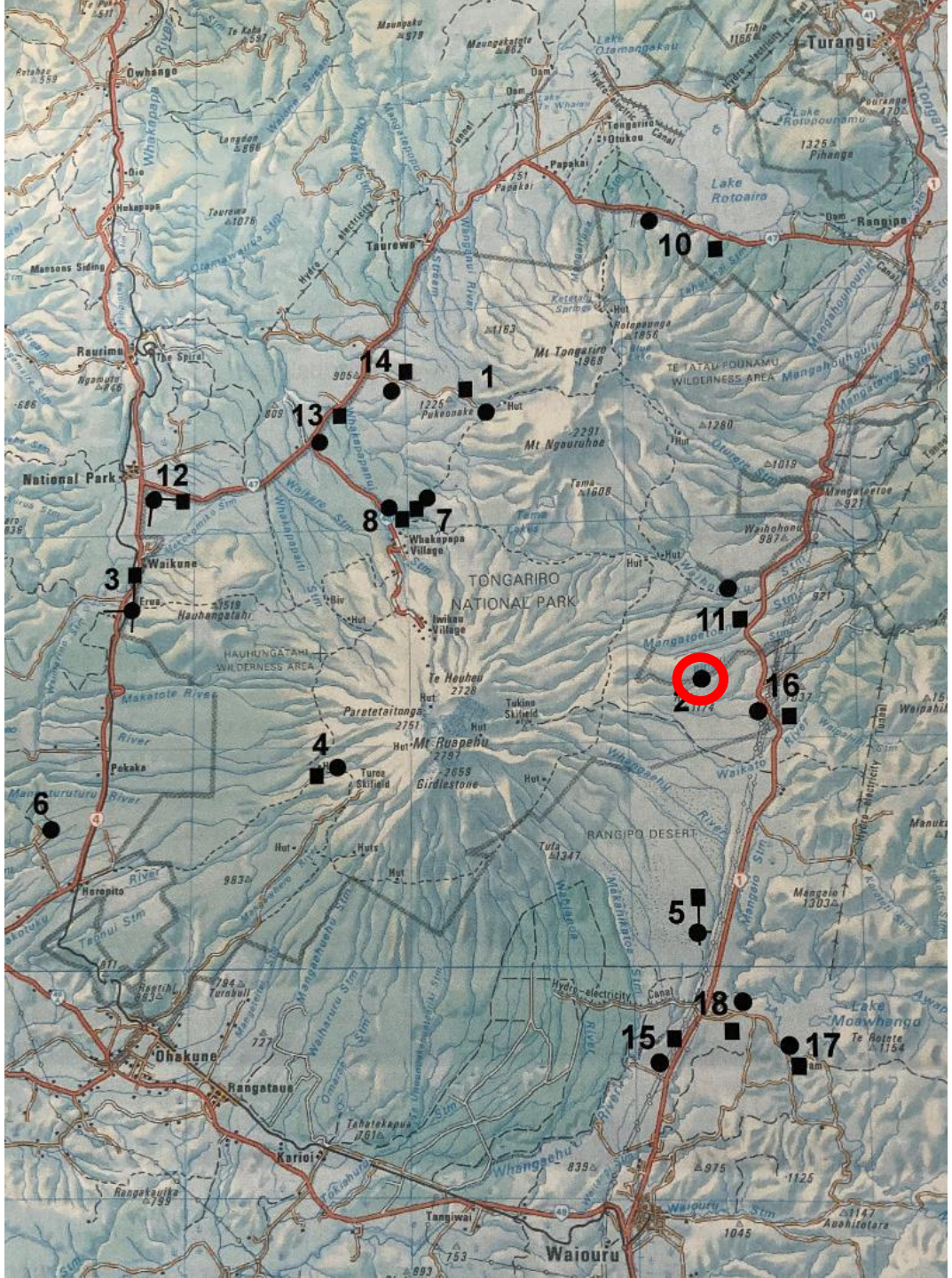
Image by Jeff J Mitchell

Heather (*Calluna vulgaris*) was deliberately introduced into New Zealand, on the Central Plateau of the North Island, from 1912-1923 to re-create Scottish grouse moors.

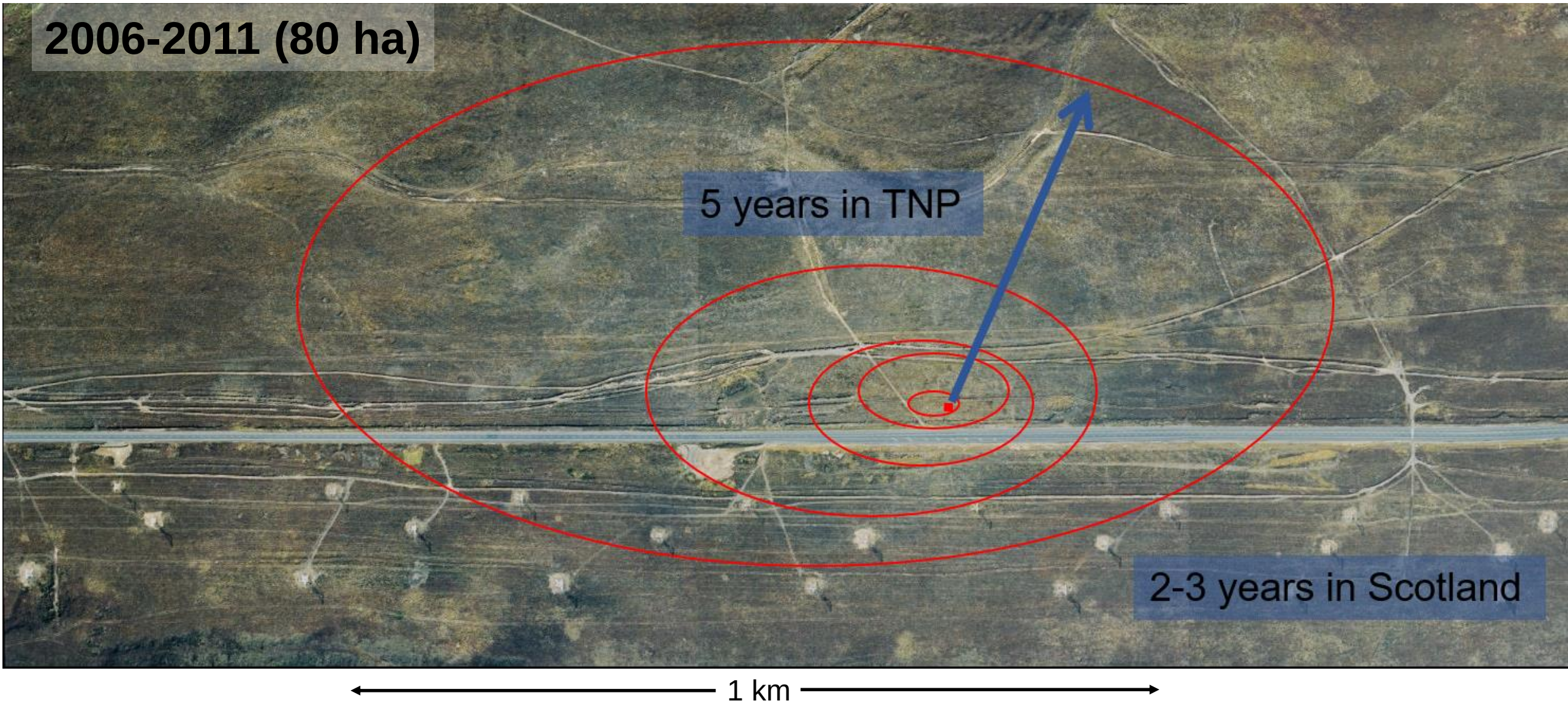
Heather beetle (*Lochmaea suturalis*): released in 1996

Photo: Shaun Forgie

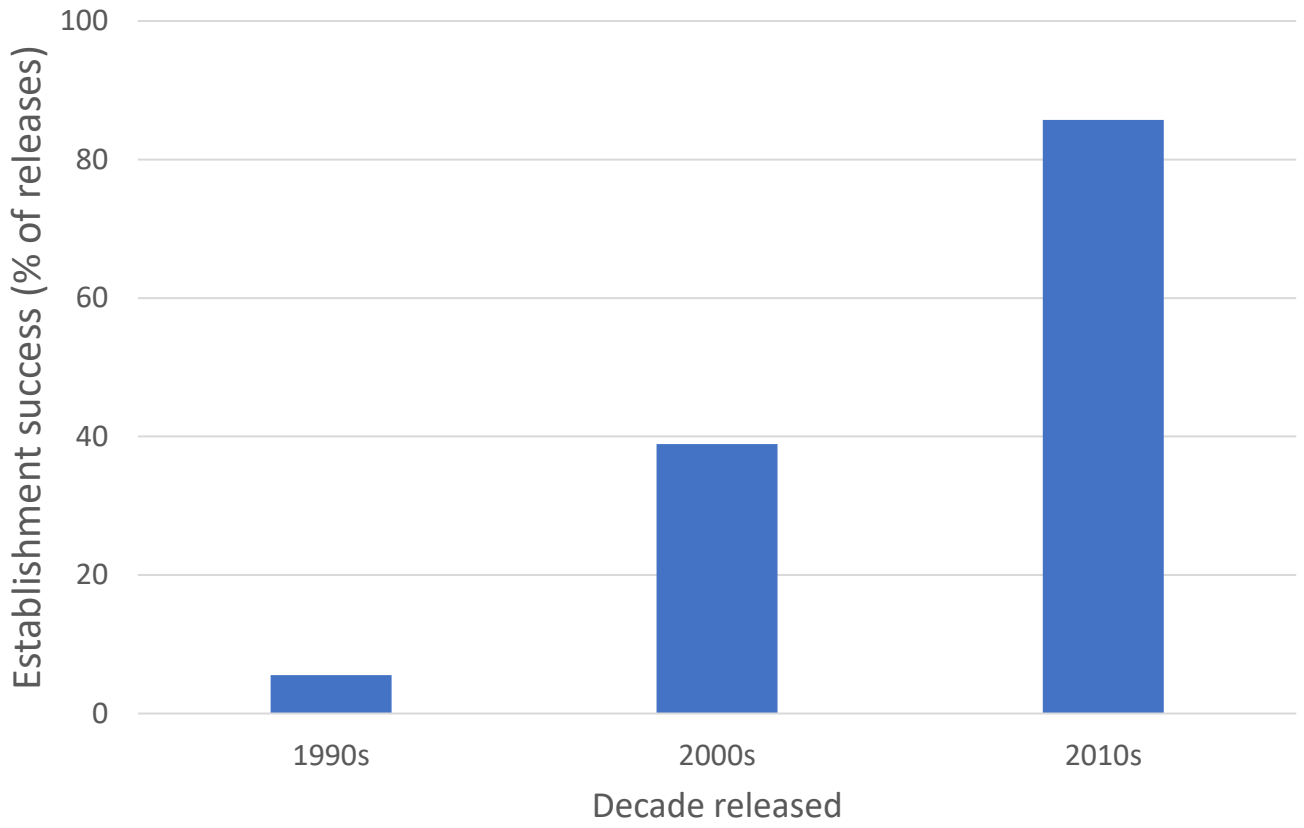
But early establishment success was poor (5.5%)…



…and spread slow…



…but over time things have improved….



…and new beetle populations have started to appear spontaneously several kms away from known release sites, and vast areas[1.] of heather have been damaged in the last 3 years….

[1.] 35 000 ha mapping estimate

Heather beetle damage mapping

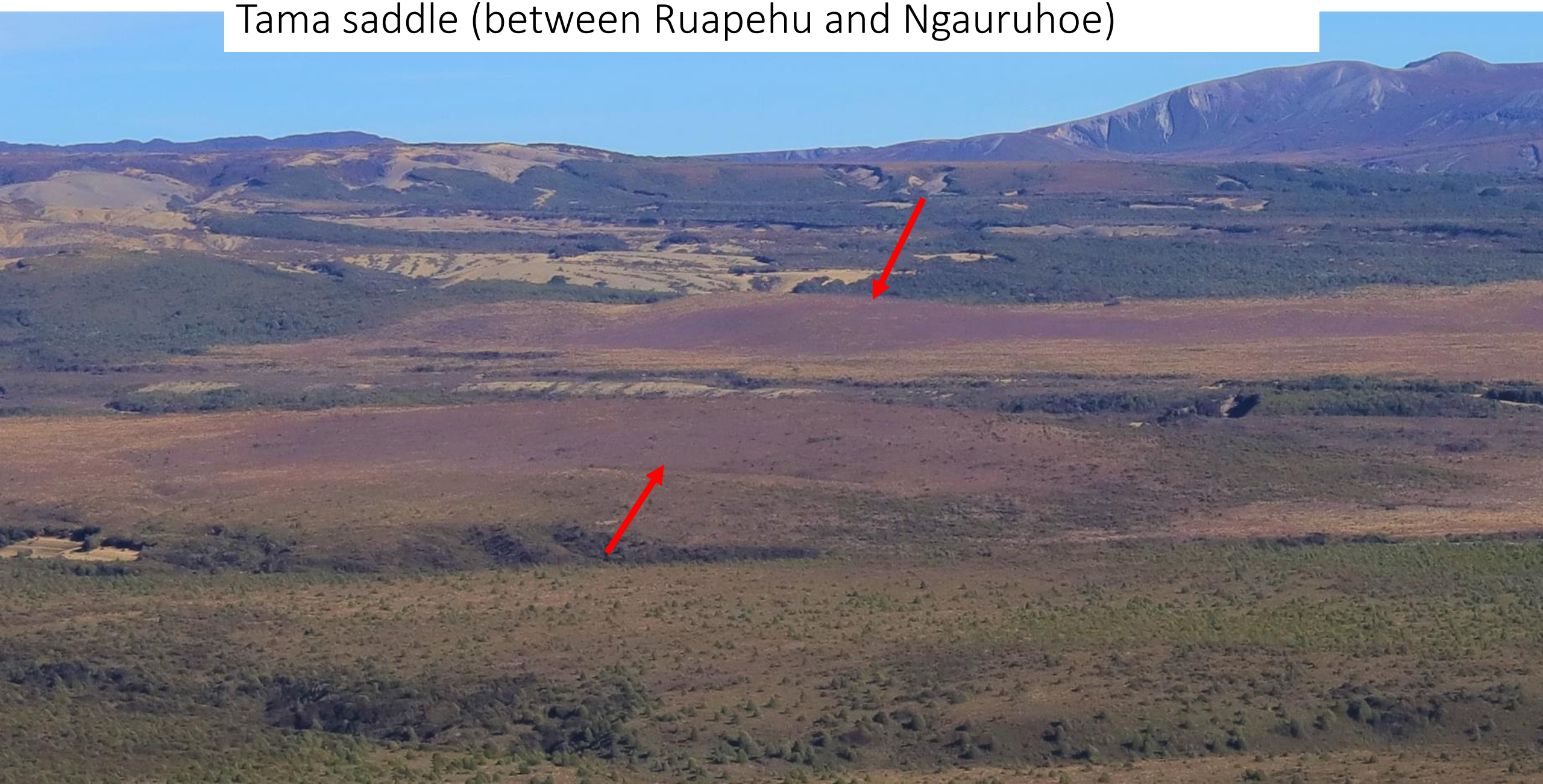
Ground and aerial mapping was completed in March 2021 when heather was flowering

Example of an invasion front

Large area of damaged heather in the Waiouru Military Training Area.

Large area of damaged heather in the Waiouru Military Training Area.

Areas of damaged and partially damaged heather below Tama saddle (between Ruapehu and Ngauruhoe)

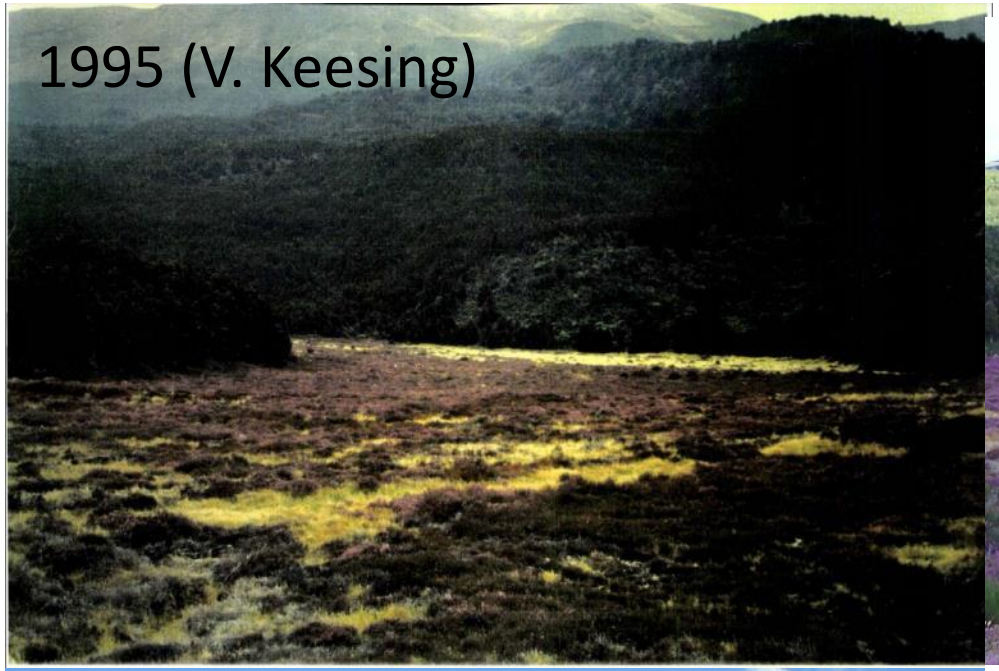


SH1 Escarpment1

SH1 Escarpment2

SH1 Escarpment3

Rotoaira frost flat




IMG_7999.JPG (6240 x 4160 = 25.96 MP , 13,893 KB) [188 / 766] 26%

Ngauruhoe & Tongariro

2000 vs 2021

Ngauruhoe

2000 vs 2021

Ngauruhoe close up

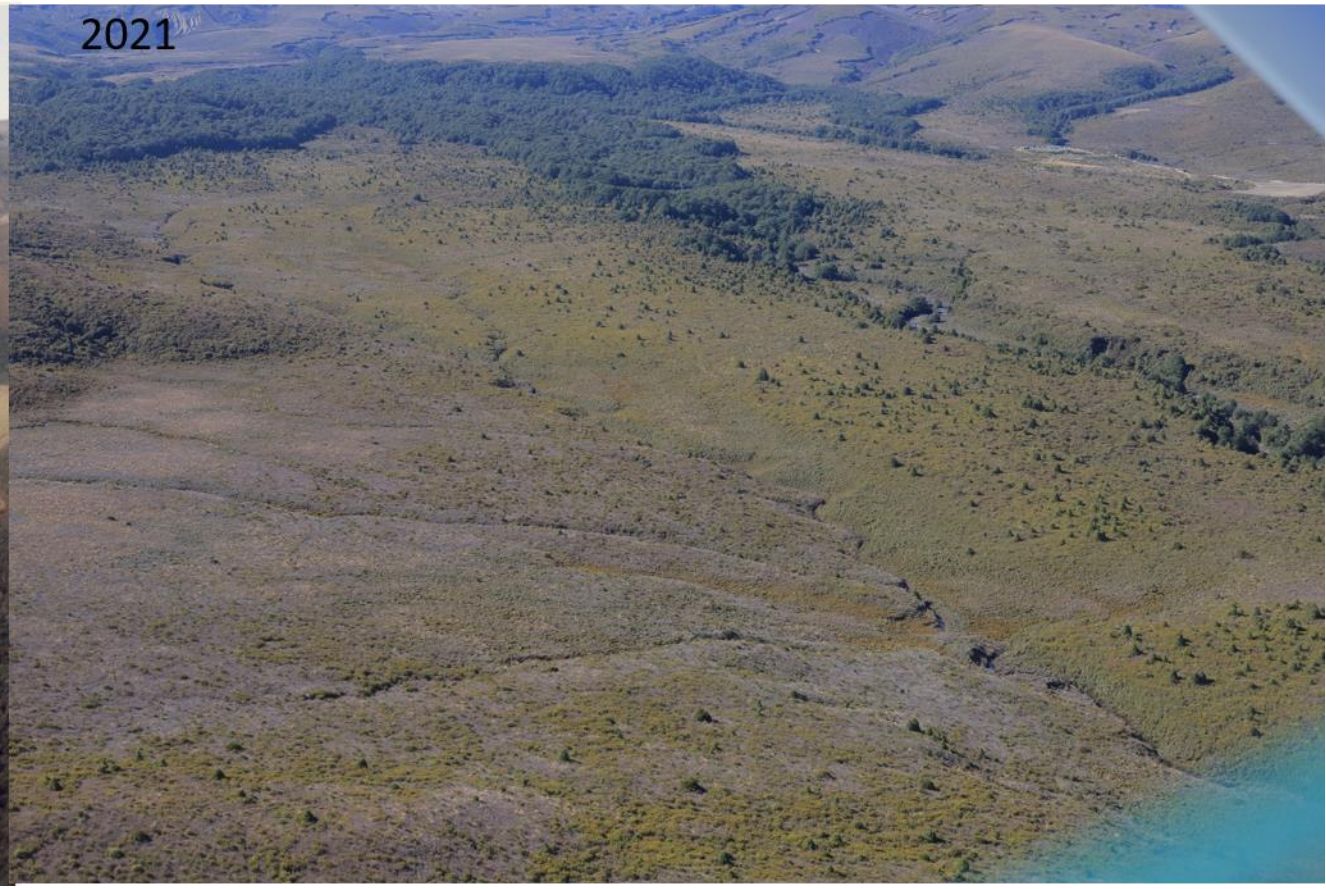
2000 vs 2021

Ruapehu

2009 vs 2021

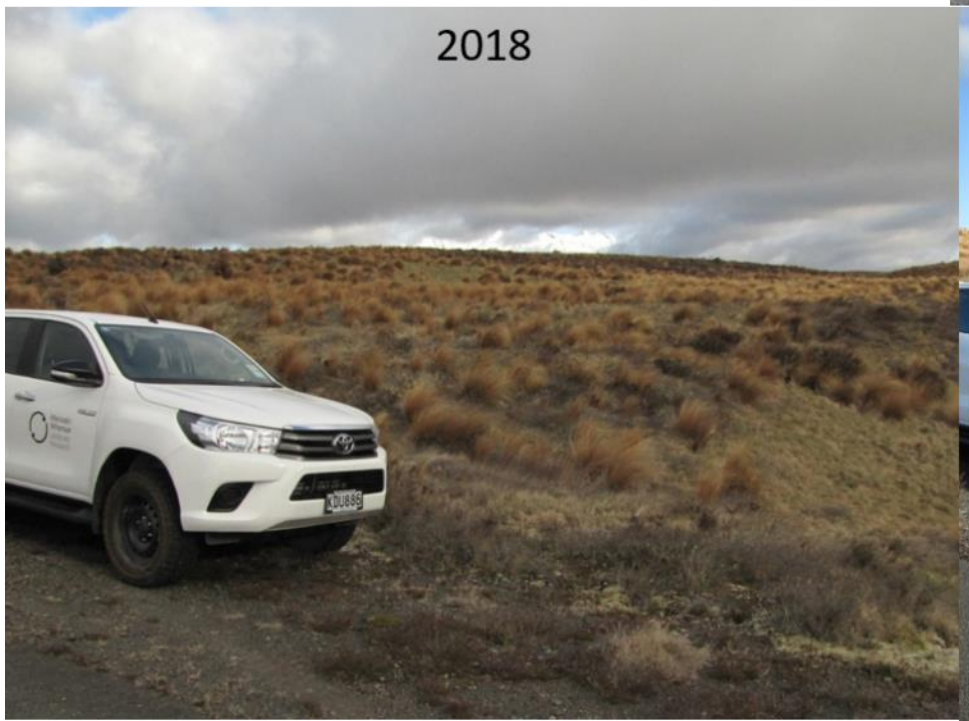
Whakapapanui Stream below the Chateau before and after heather beetle attack

Below Whakapapa golf course before and after heather beetle attack

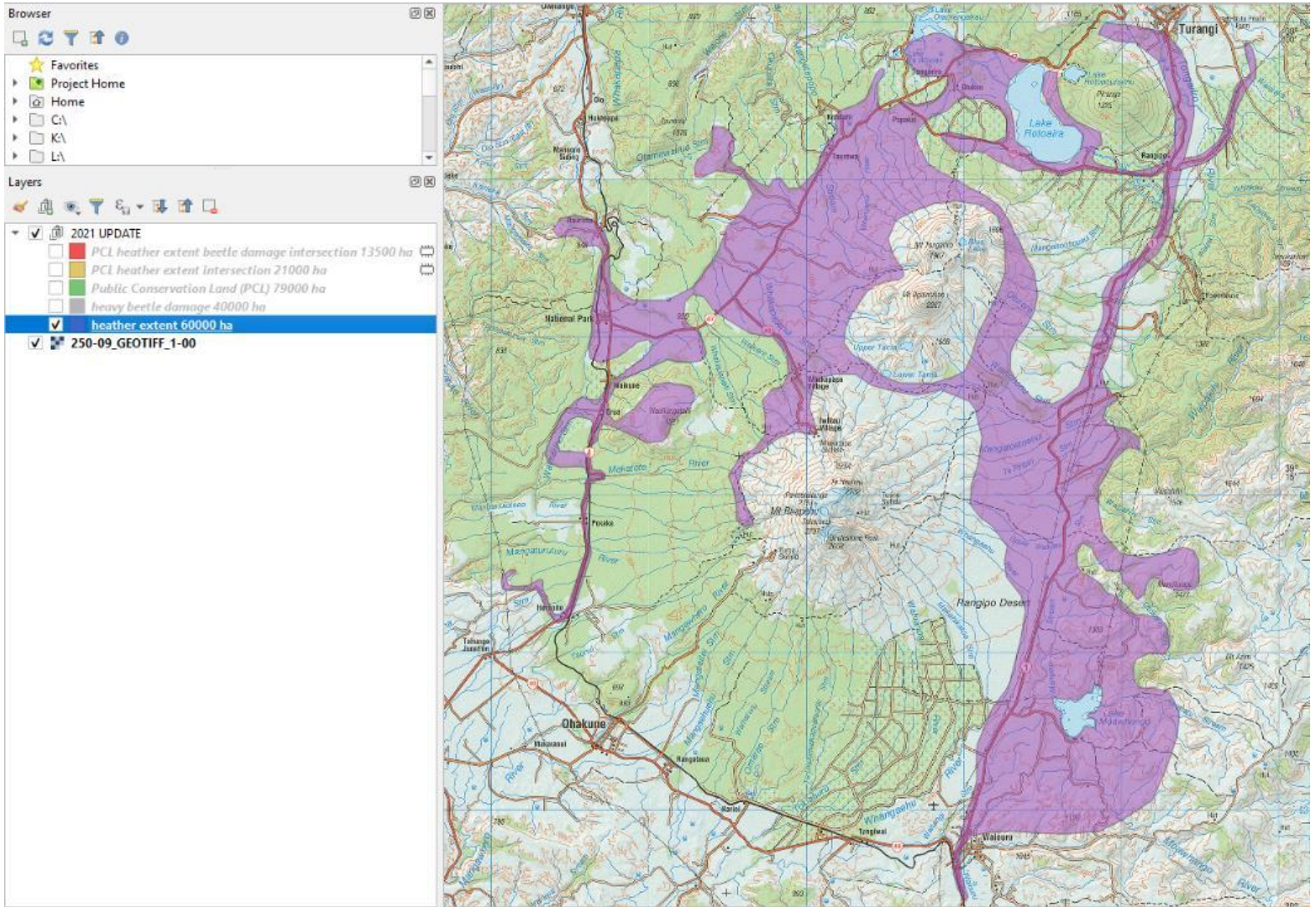


Heather before and after beetle attack on army land – knockdown followed by re-bound

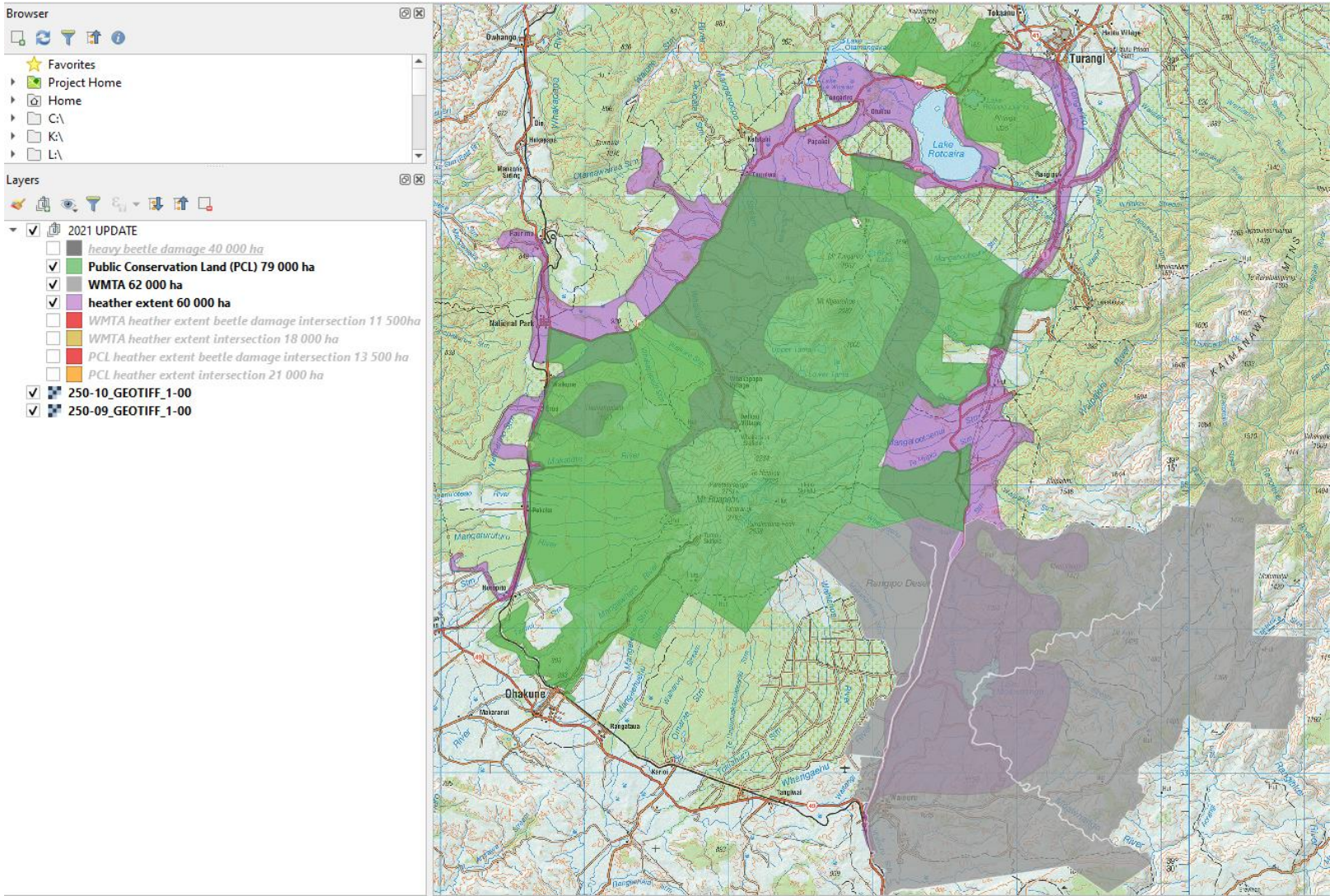
Heather before and after beetle attack near lake Moawhango – knockdown followed by re-bound

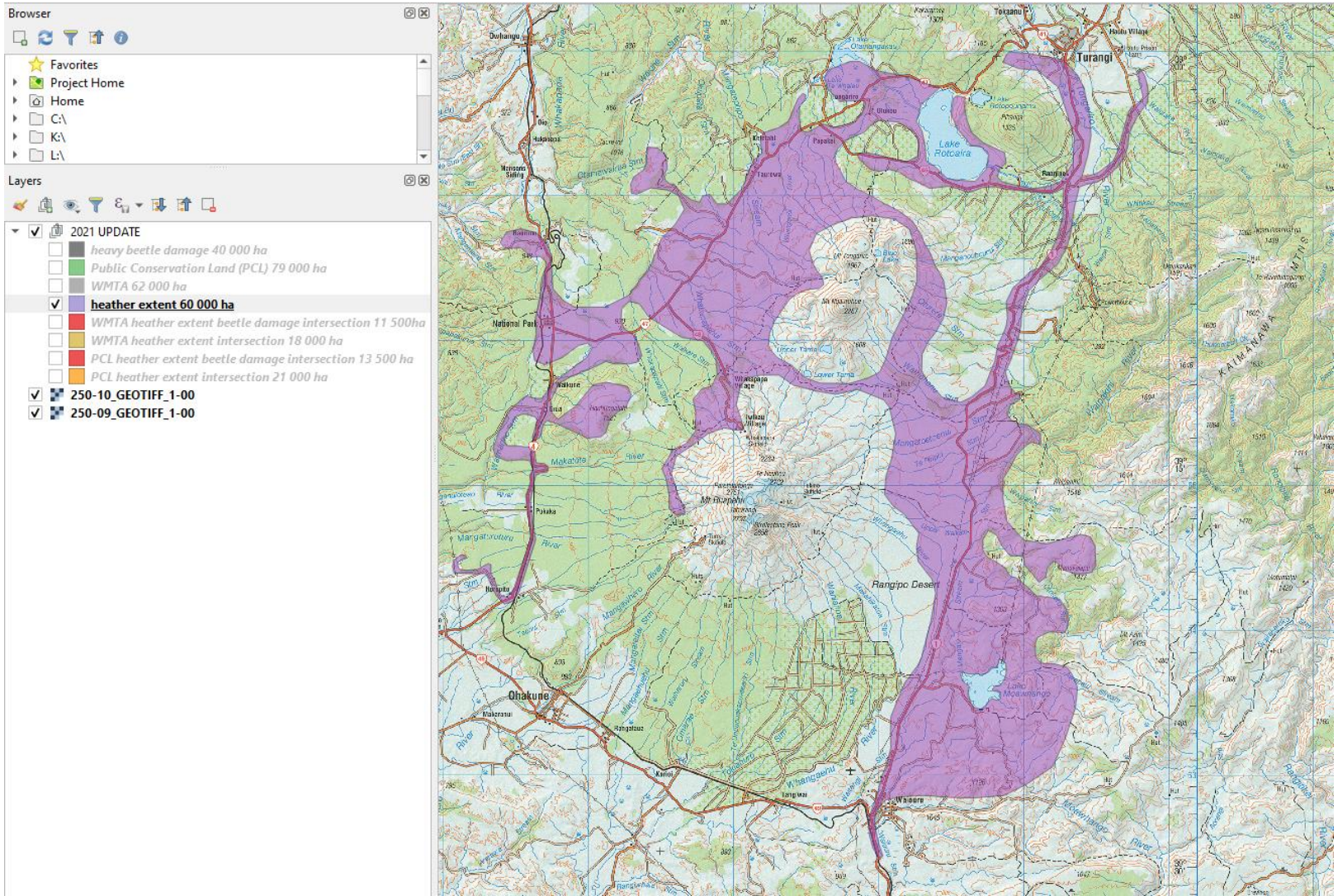


Total area of heather infestation since introduction in 1912 is approx. 60 000 ha



21 000 ha on DOC land and 18 000 ha on NZDF land




Browser
Favorites
Project Home
Home
C:\
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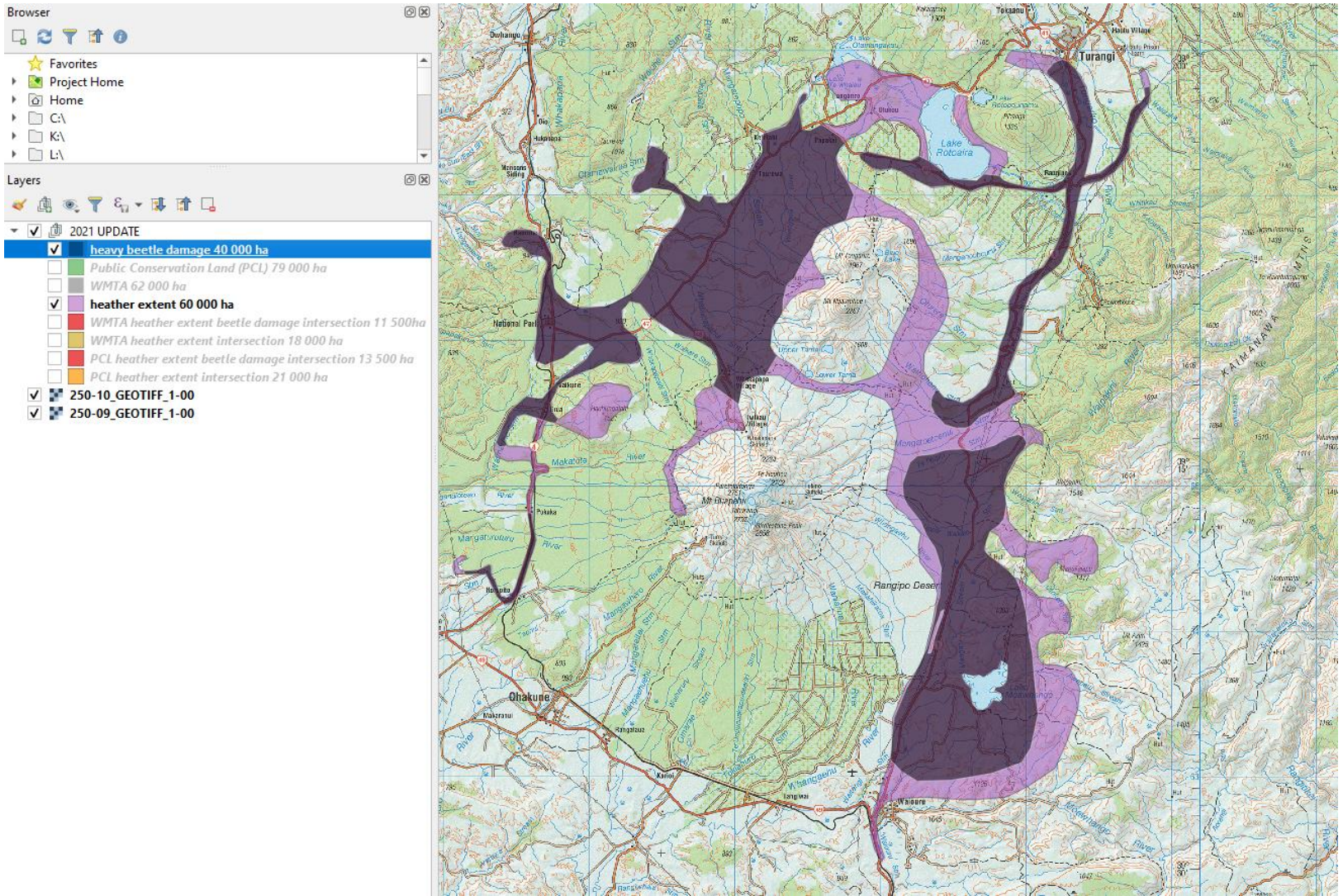
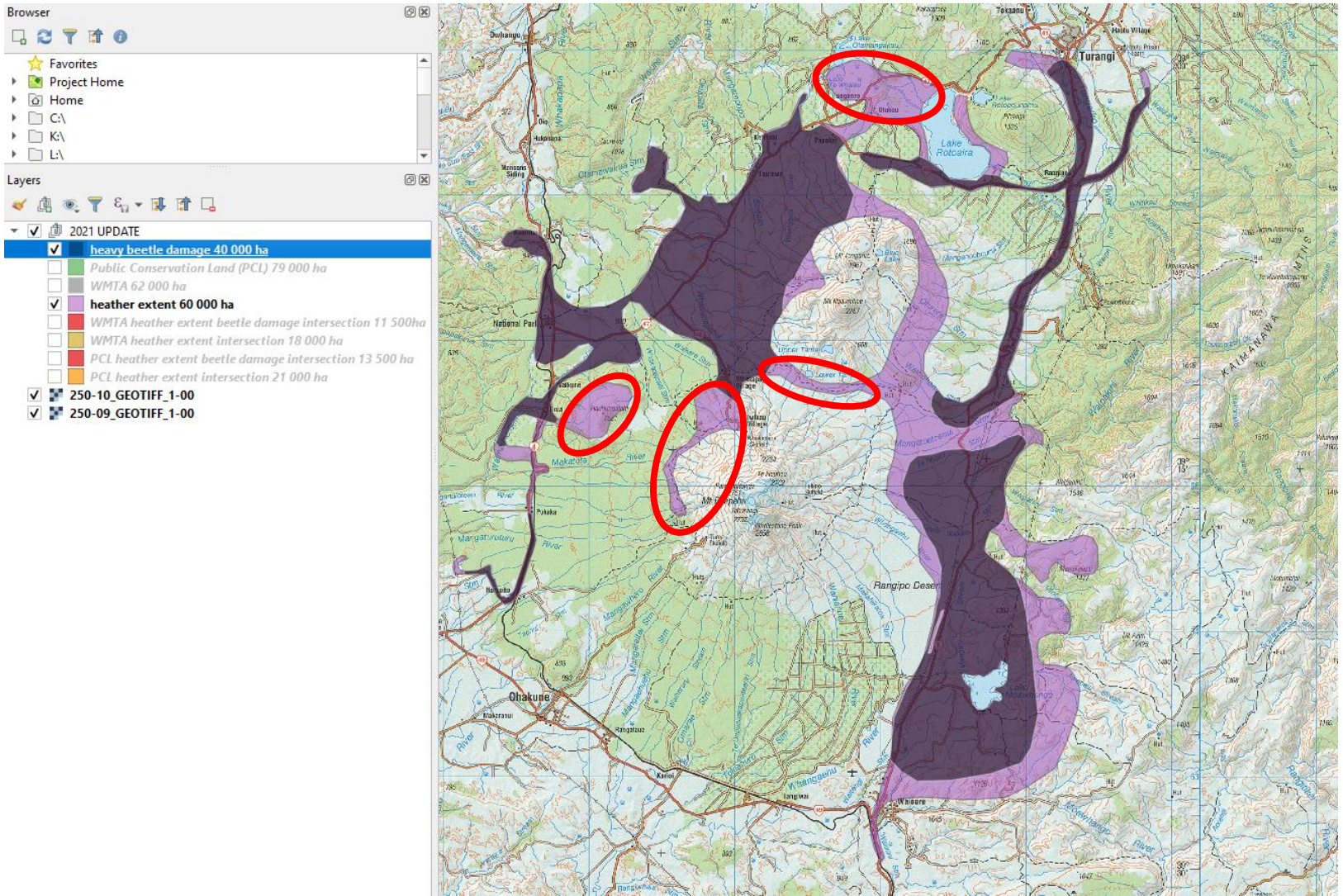
Layers
2021 UPDATE
heavy beetle damage 40 000 ha
Public Conservation Land (PCL) 79 000 ha
WMTA 62 000 ha
heather extent 60 000 ha
WMTA heather extent beetle damage intersection 11 500ha
WMTA heather extent intersection 18 000 ha
PCL heather extent beetle damage intersection 13 500 ha
PCL heather extent intersection 21 000 ha
250-10_GEOTIFF_1-00
250-09_GEOTIFF_1-00
Turangi
Lake Rotoaira
Rangipo Desert
Ohakune
Waiouru
National Park
Makatote River
Whanganui River
KAIMANAWA

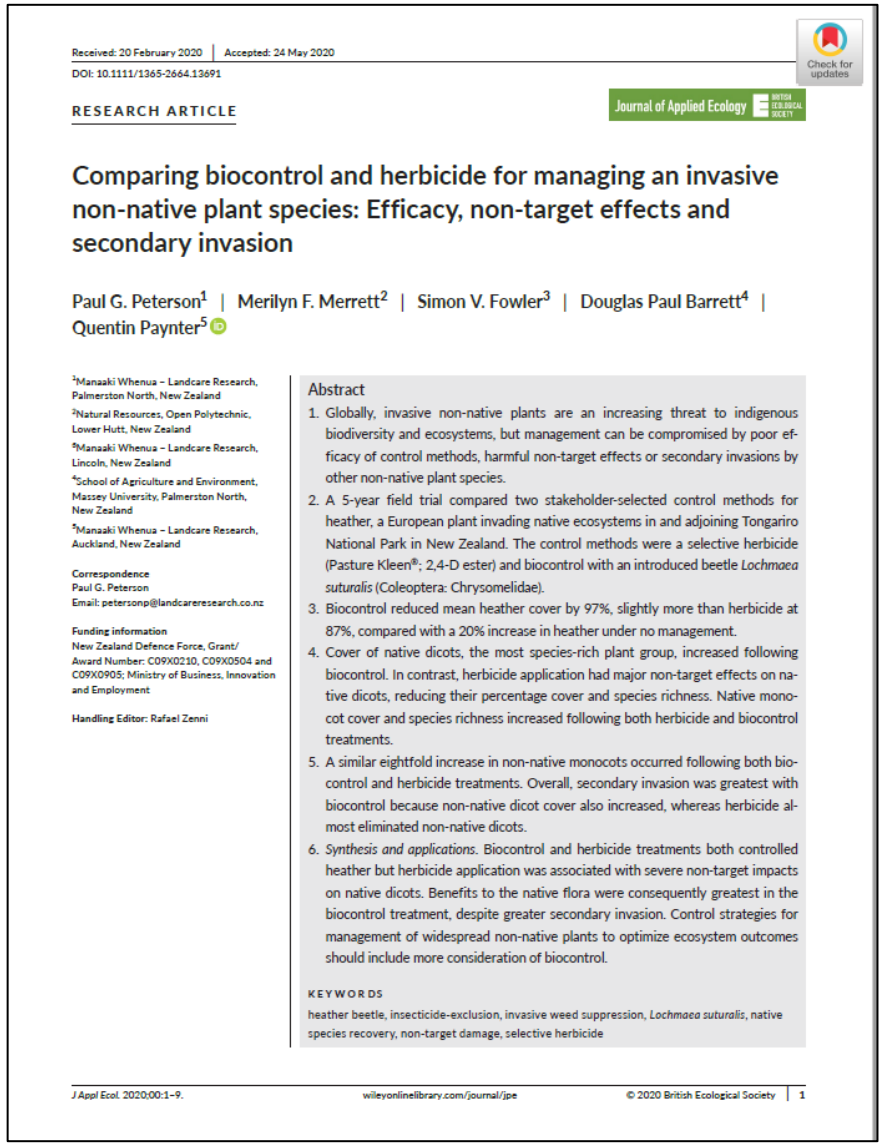
Total area of heather beetle damage since introduction in 1996 is approx. 40 000 ha



Still some areas of uncertainty that need checking



What about benefits – what do we know?



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DOI: 10.1111/1365-2664.13691

RESEARCH ARTICLE

Journal of Applied Ecology

Comparing biocontrol and herbicide for managing an invasive non-native plant species: Efficacy, non-target effects and secondary invasion

Paul G. Peterson[1] | Merilyn F. Merrett[2] | Simon V. Fowler[3] | Douglas Paul Barrett[4] | Quentin Paynter[5]

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Paul G. Peterson
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Funding information
New Zealand Defence Force, Grant/Award Number: C09X0210, C09X0504 and C09X0905; Ministry of Business, Innovation and Employment

Handling Editor: Rafael Zenni

Abstract

1. Globally, invasive non-native plants are an increasing threat to indigenous biodiversity and ecosystems, but management can be compromised by poor efficacy of control methods, harmful non-target effects or secondary invasions by other non-native plant species.
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6. *Synthesis and applications*. Biocontrol and herbicide treatments both controlled heather but herbicide application was associated with severe non-target impacts on native dicots. Benefits to the native flora were consequently greatest in the biocontrol treatment, despite greater secondary invasion. Control strategies for management of widespread non-native plants to optimize ecosystem outcomes should include more consideration of biocontrol.

KEYWORDS
heather beetle, insecticide-exclusion, invasive weed suppression, *Lochmaea suturalis*, native species recovery, non-target damage, selective herbicide

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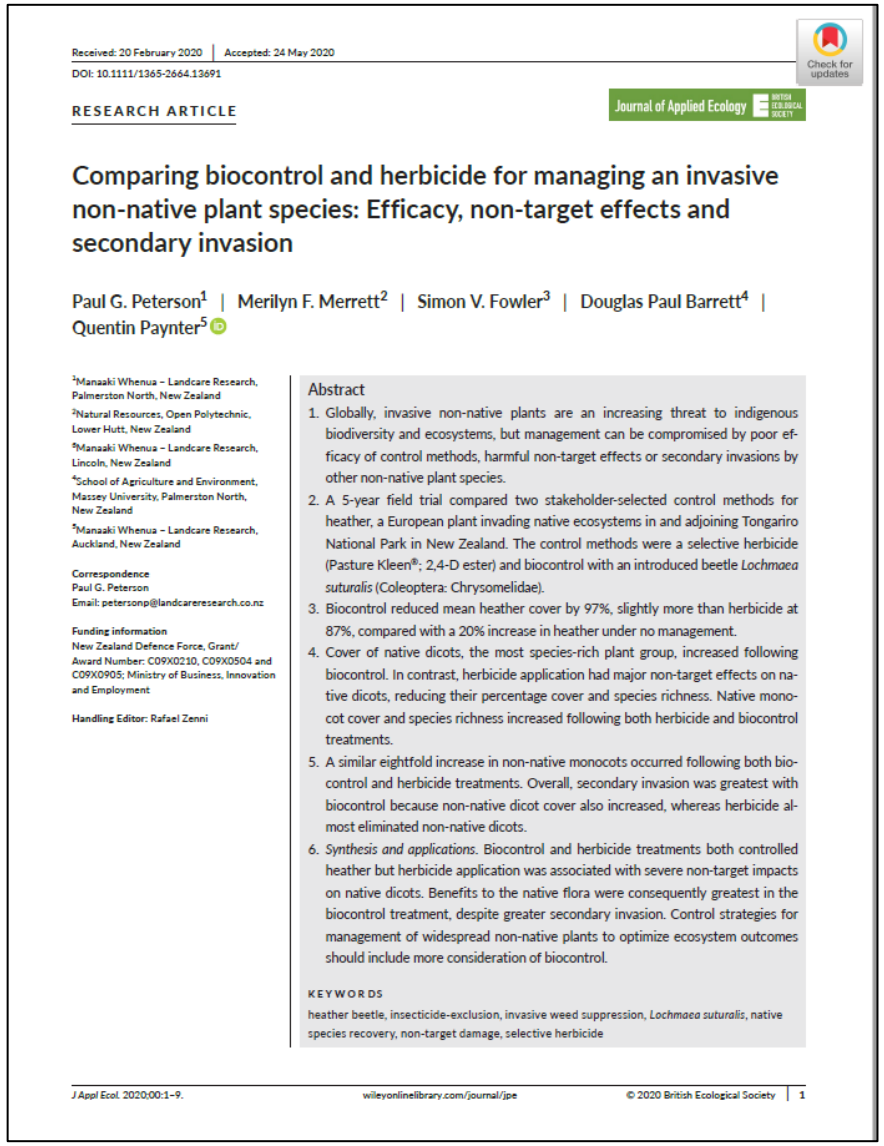

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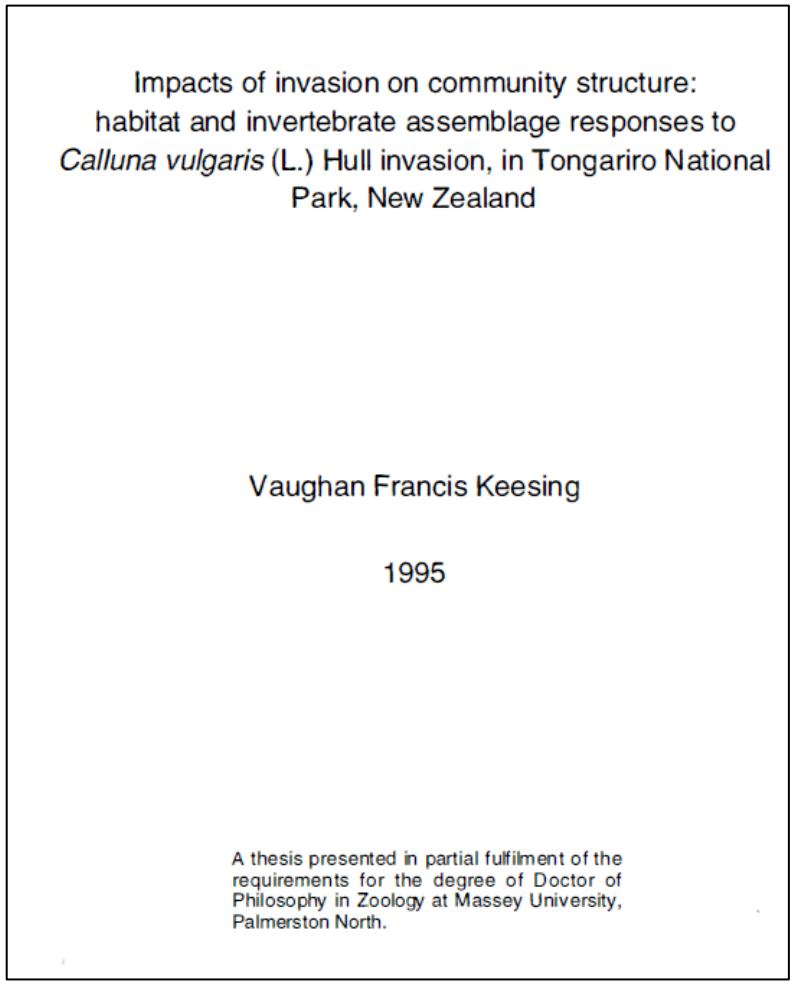

Impacts of invasion on community structure: habitat and invertebrate assemblage responses to *Calluna vulgaris* (L.) Hull invasion, in Tongariro National Park, New Zealand

Vaughan Francis Keesing

1995

A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Zoology at Massey University, Palmerston North.

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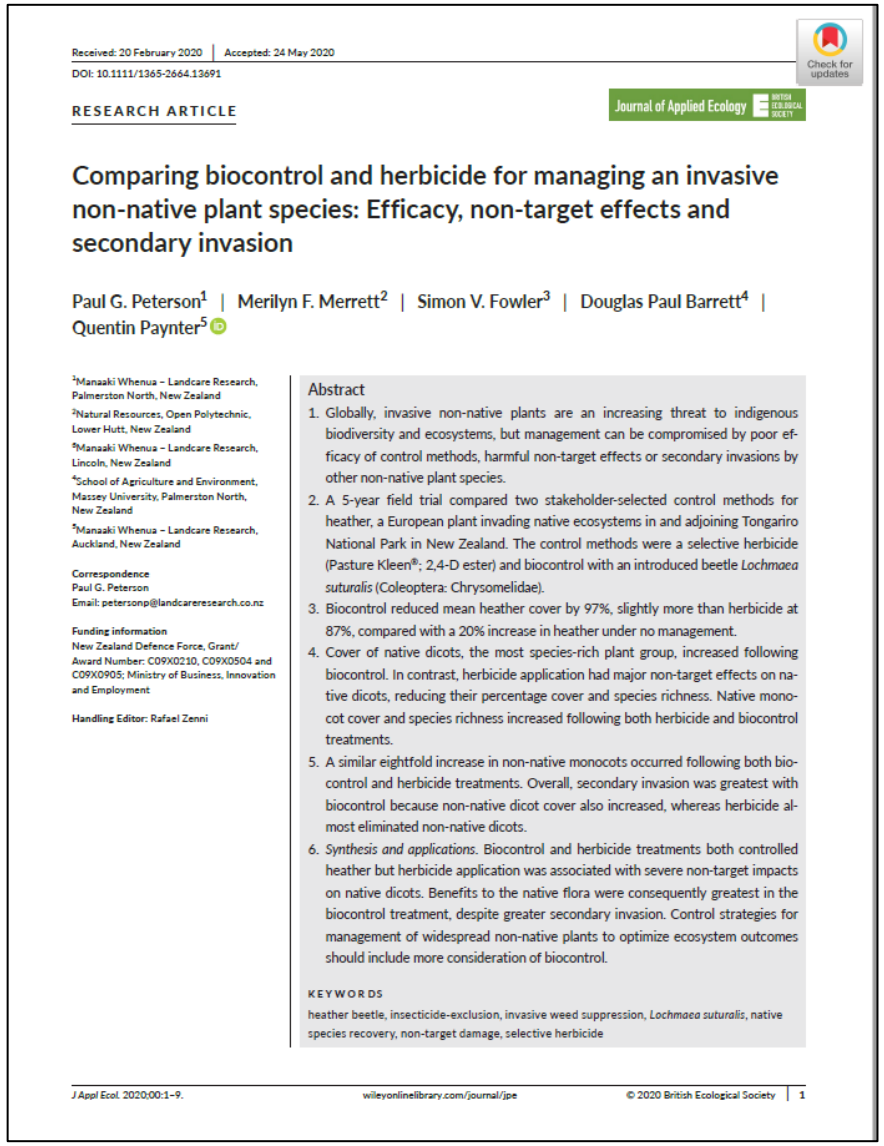

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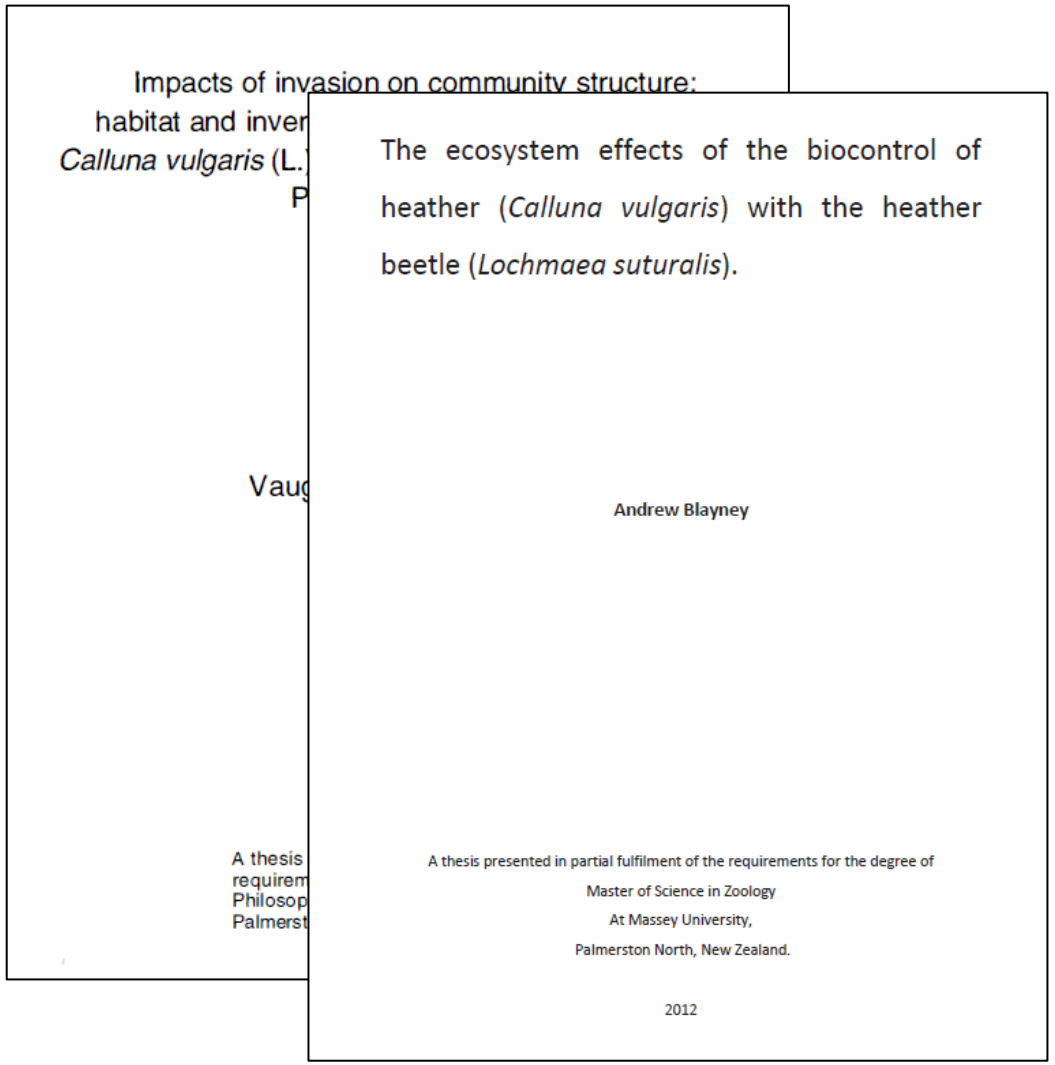

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The ecosystem effects of the biocontrol of heather (*Calluna vulgaris*) with the heather beetle (*Lochmaea suturalis*).

Andrew Blayney

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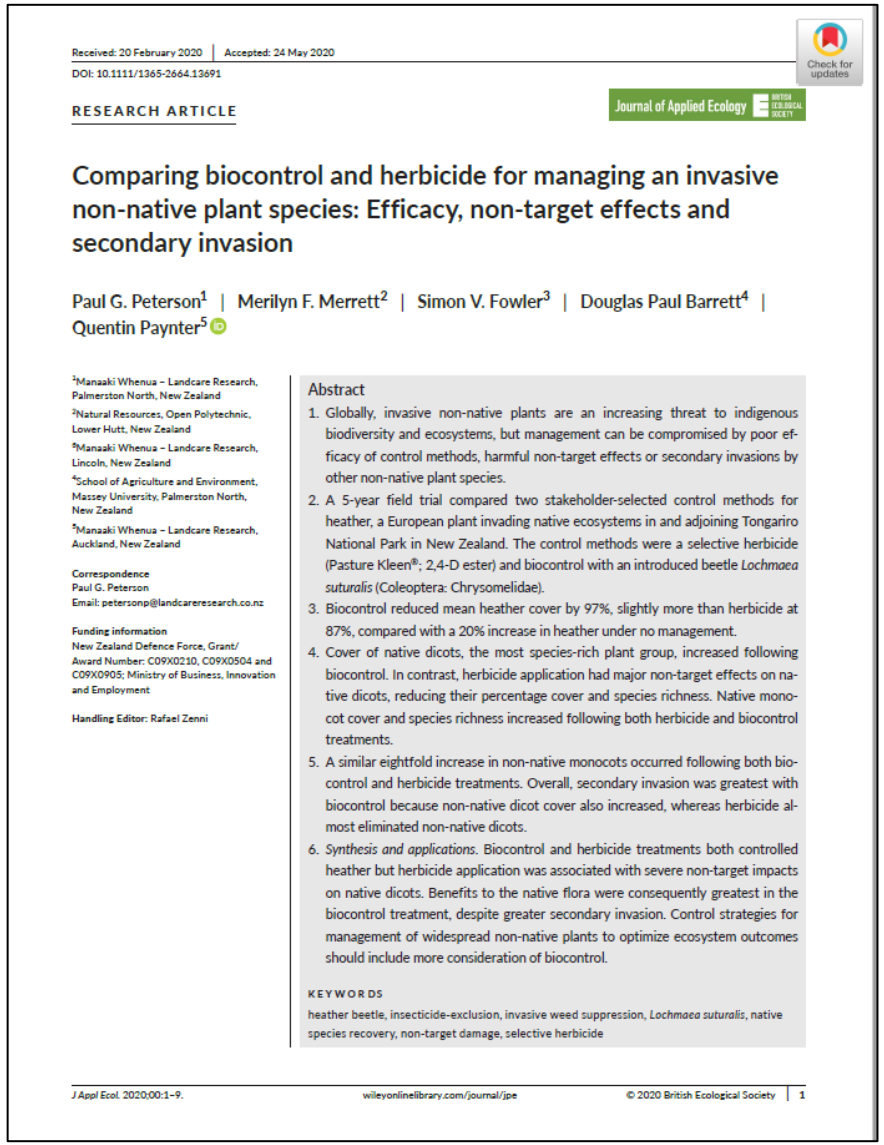

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Consequences of weed control – focusing on below ground process with some above ground invertebrate sampling.

Chris McGrannachan et al.

Next steps

- Check higher altitude sites that are harder to access to see how high beetles will go.
- Monitor heather rebound. Already doing this at one site.
- Follow up why beetles took so long to do this?
  - Testing original hypotheses
    - Climate – have changes occurred over the last 25 years?
    - Genetic bottleneck – have beetles adapted?
    - Low nitrogen in heather on Central Plateau – has N deposition increased?

Acknowledgements

Lawrie Cairns (Aerial Photography)

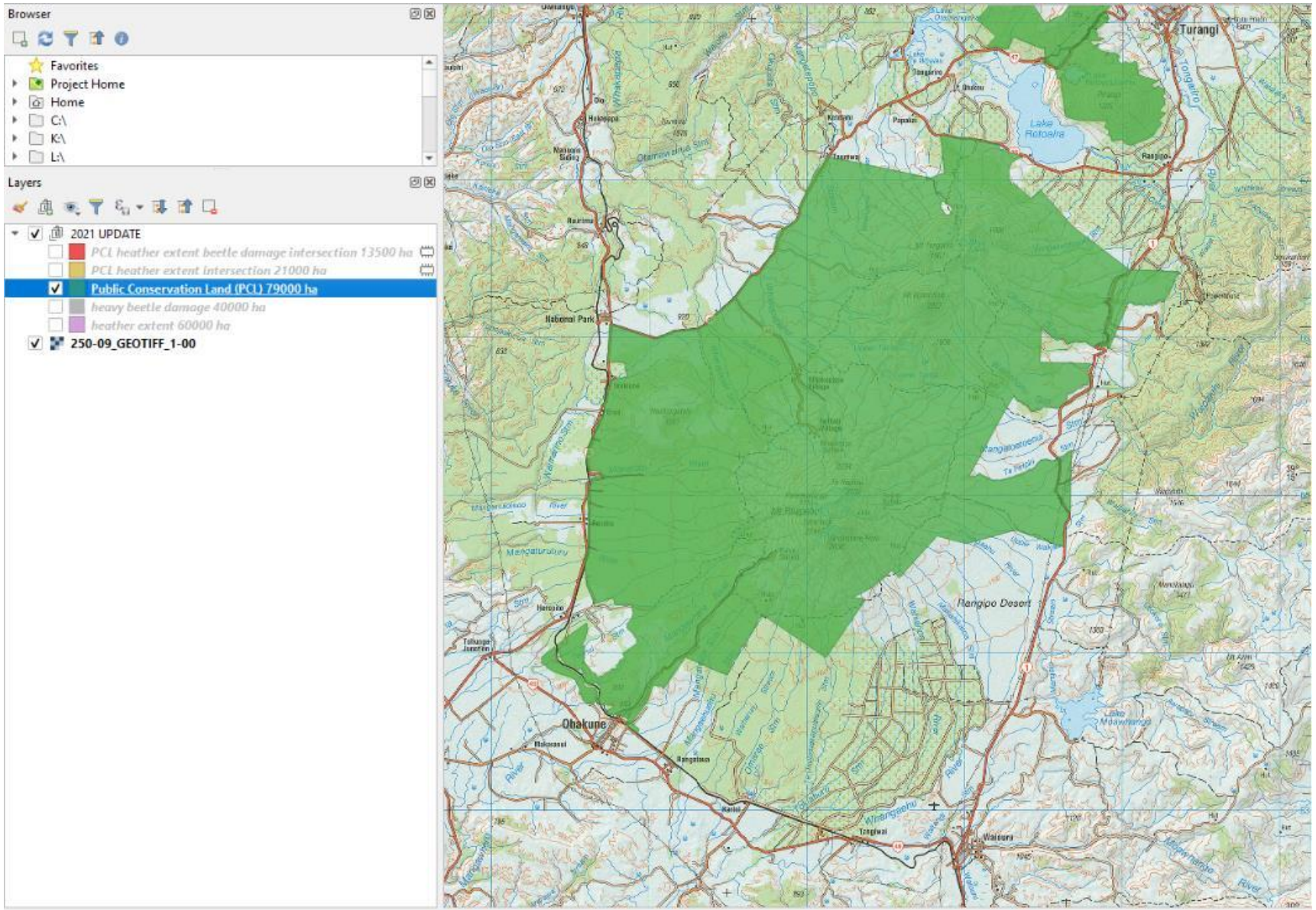
Jonathon Persson (Action Aviation Ltd)

Harry Keys (ex-DOC)

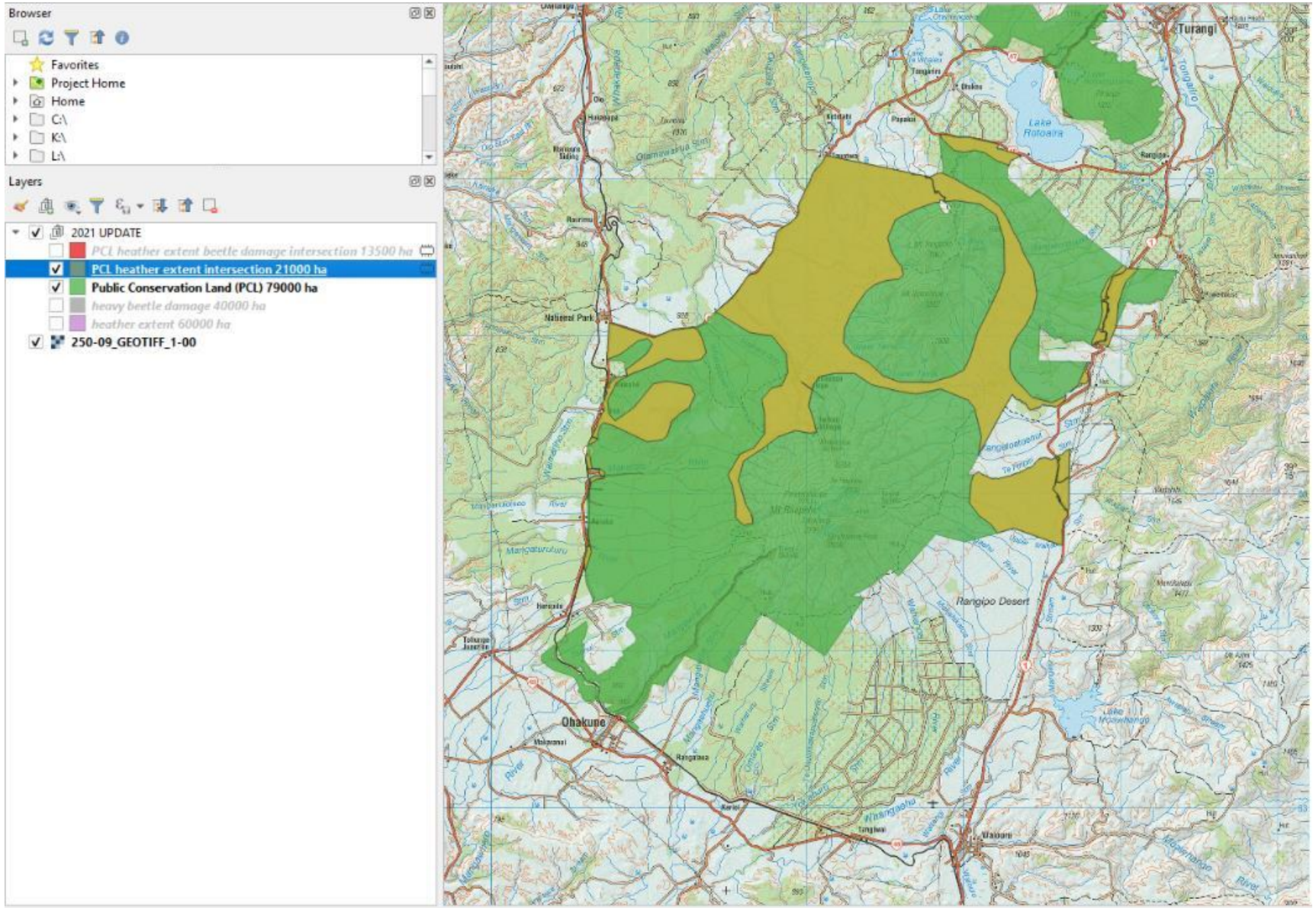
New Zealand Defence Force Staff:
Stephen Phillipson
Adam Hoffman
Eric Theodore

Manaaki Whenua Landcare Research

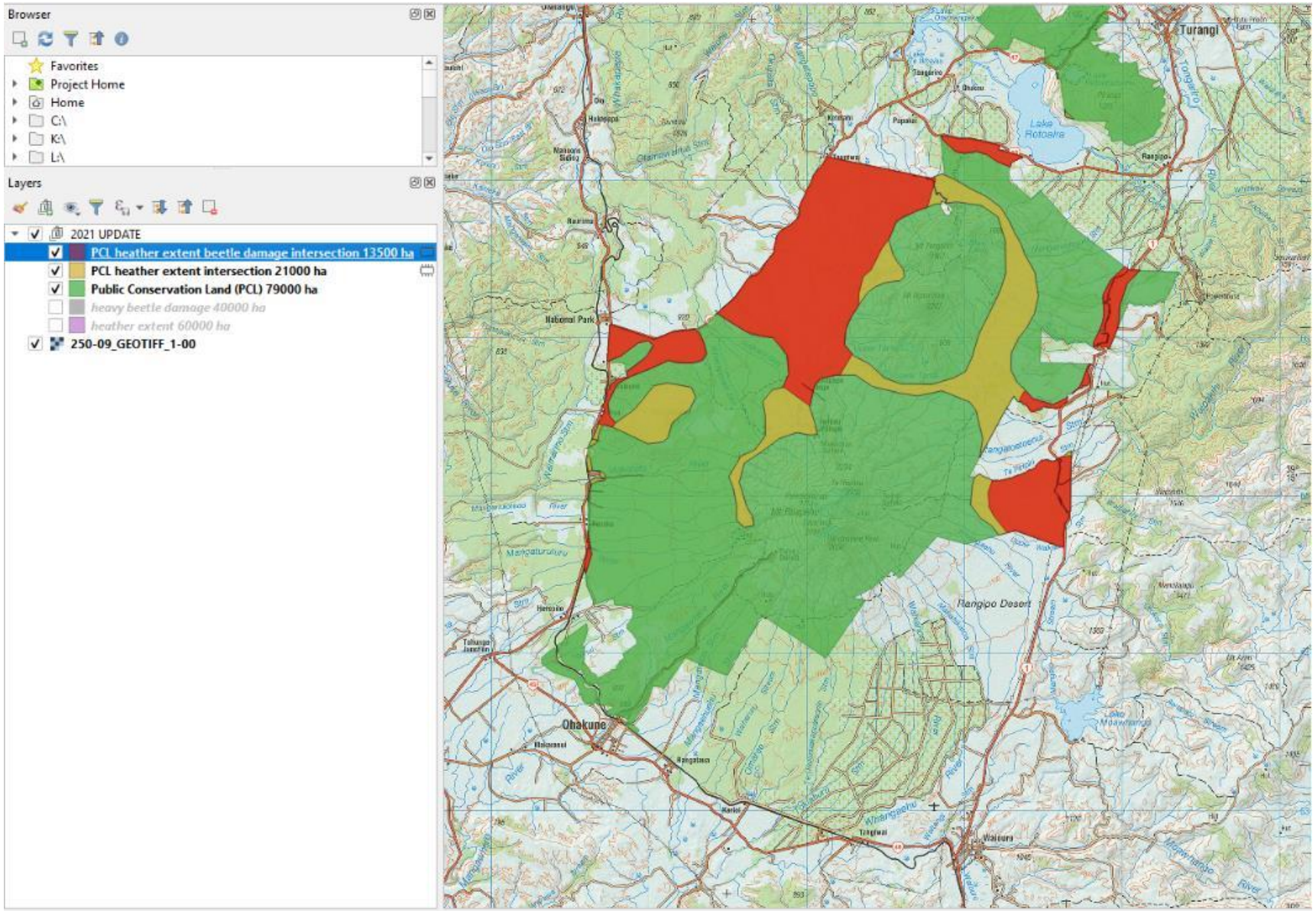
Total public conservation land (PCL) 79 000 ha



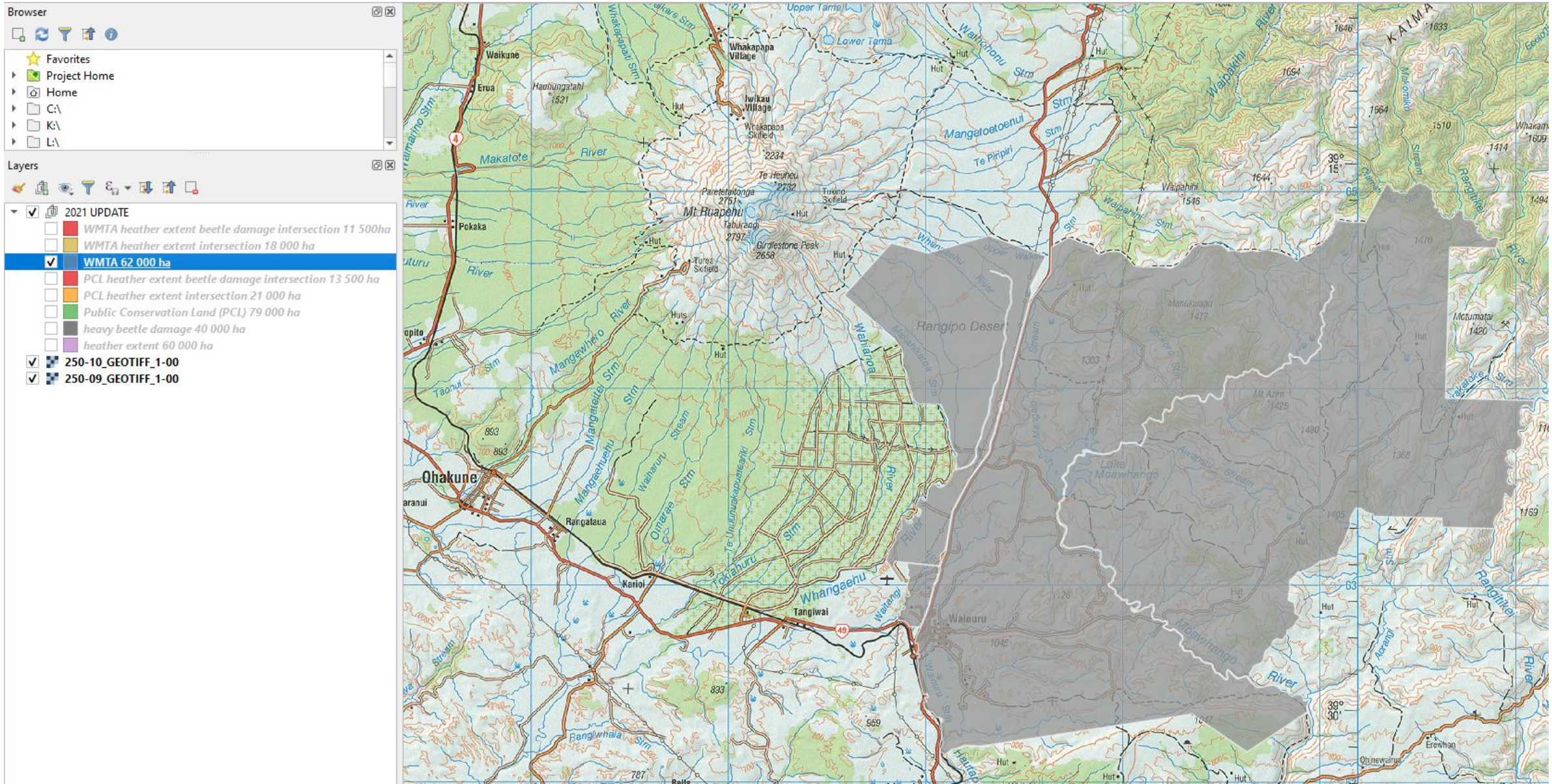
Heather infestation on PCL 21 000 ha



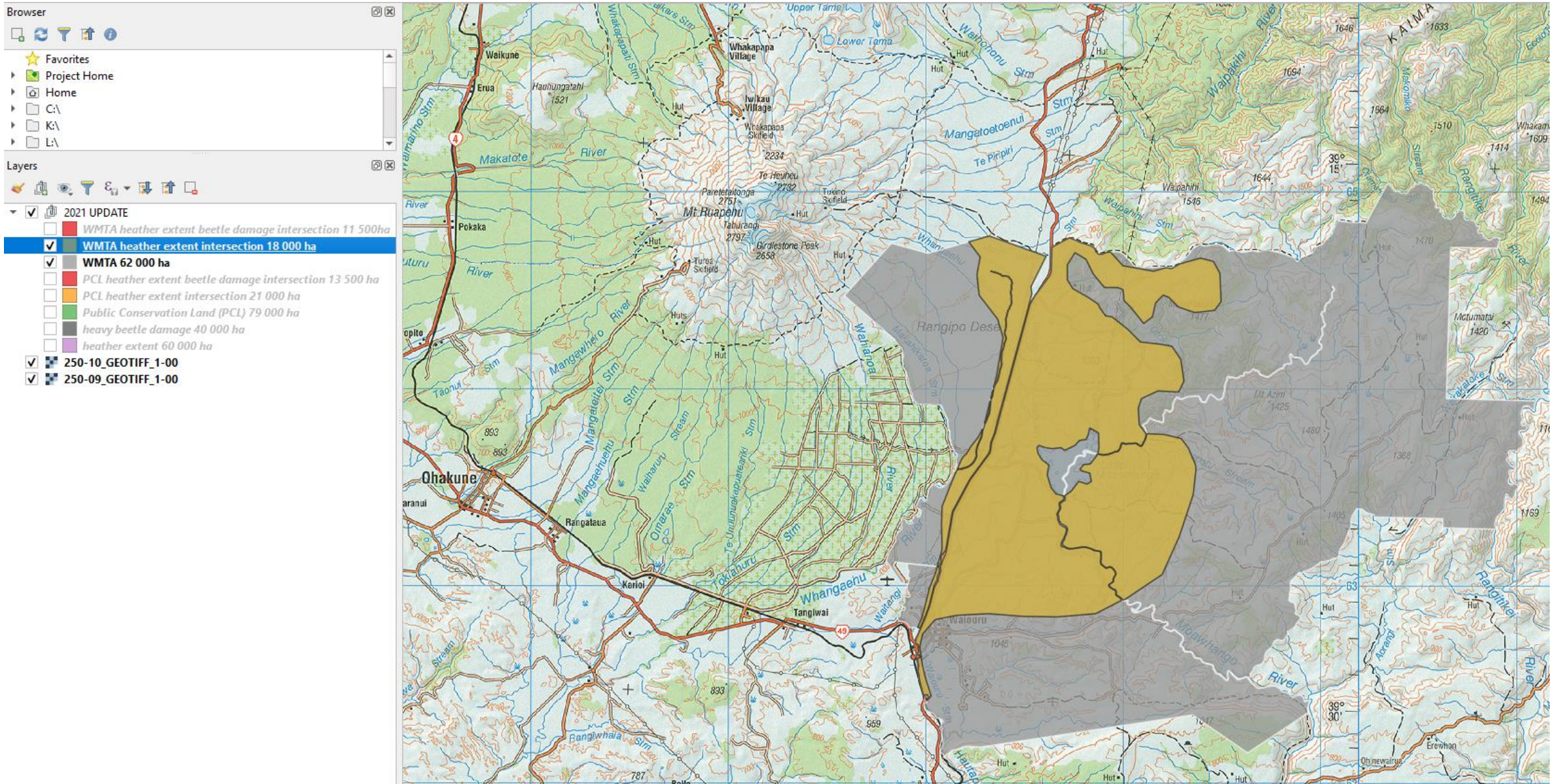
Heather beetle damage on PCL 13 500 ha



Waiouru military training area (WMTA) 62 000 ha



Heather infestation on WMTA land 18 000 ha



Heather beetle damge on WMTA land 11 500 ha