Pesty Science

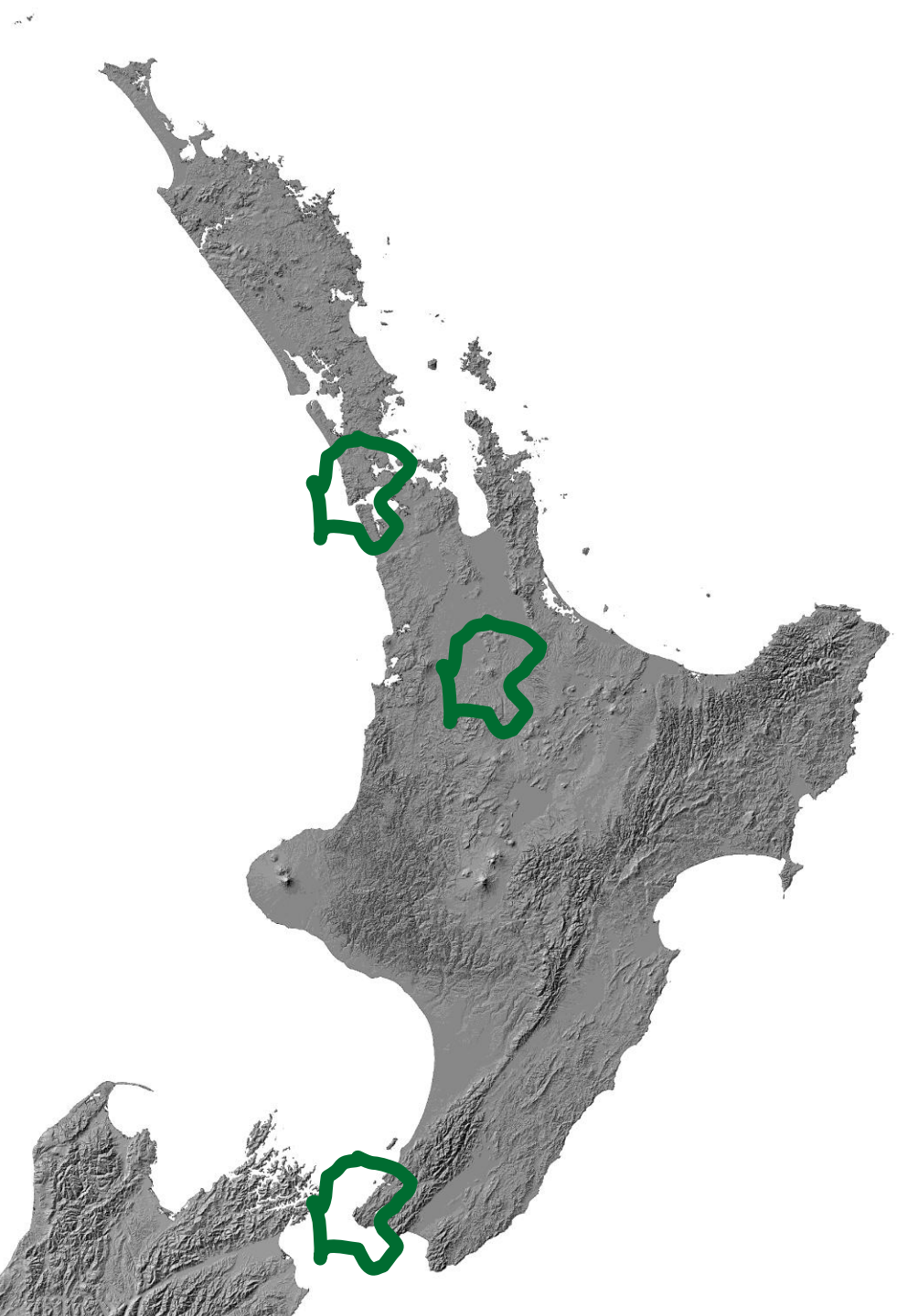


Is Predator-Free NZ a reasonable reality or an impossible dream?

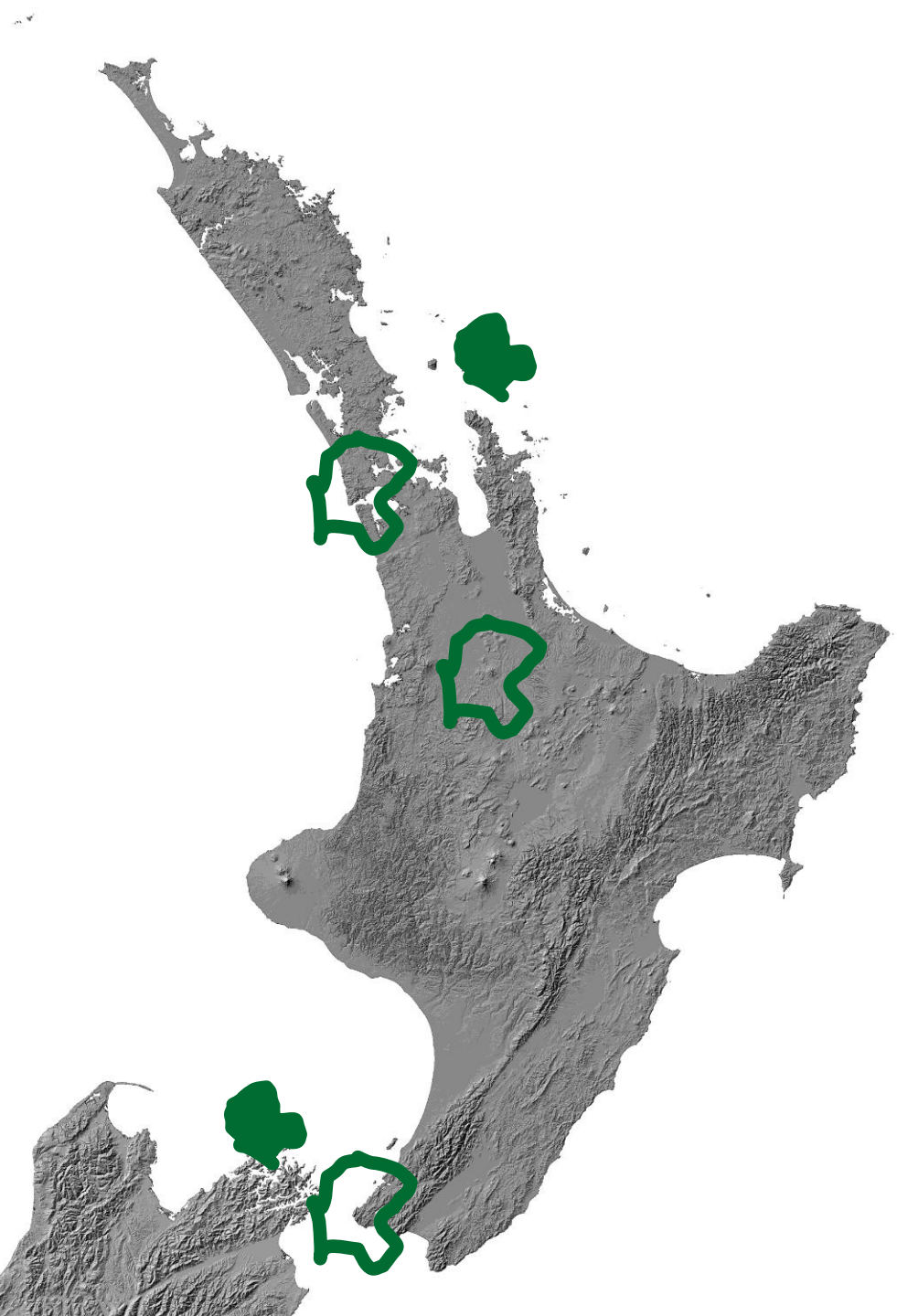
Landcare Research
Manaaki Whenua

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Predator-Free NZ

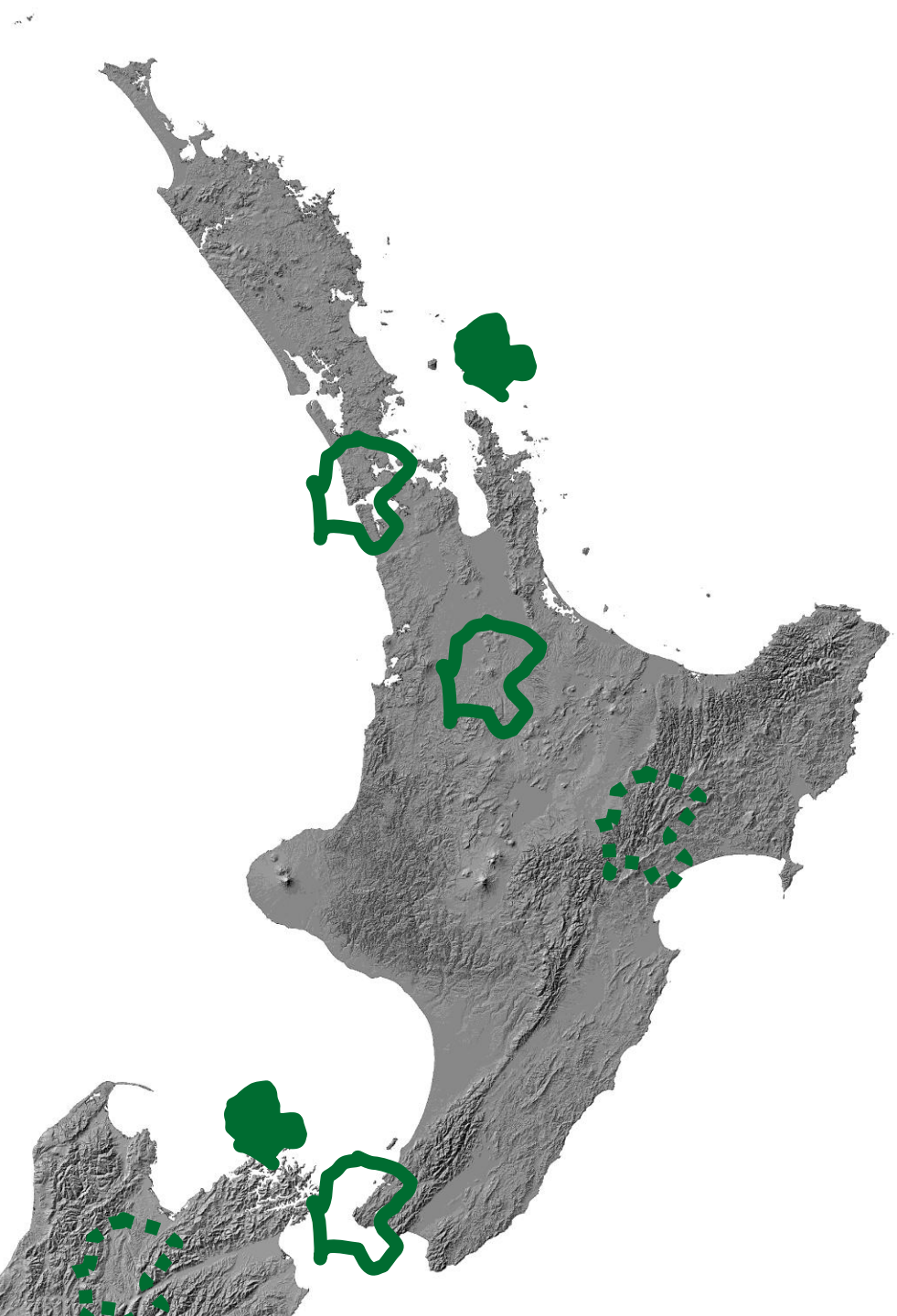


Fenced sanctuaries



Fenced sanctuaries

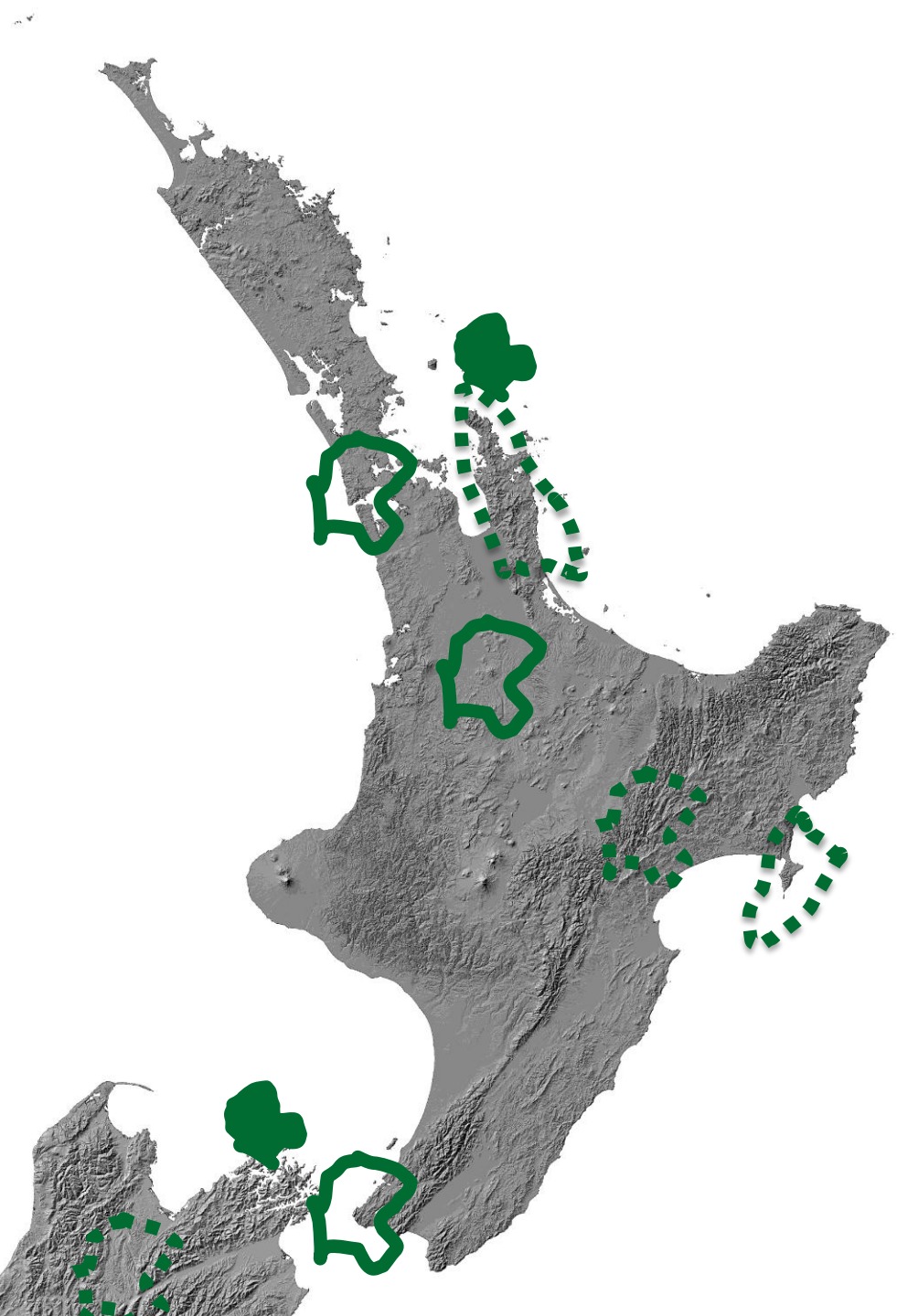
Offshore islands



Fenced sanctuaries

Offshore islands

Mainland islands



Fenced sanctuaries

Offshore islands

Mainland islands

Peninsulas

Two Questions

What do we want?

James Reardon

Which species?

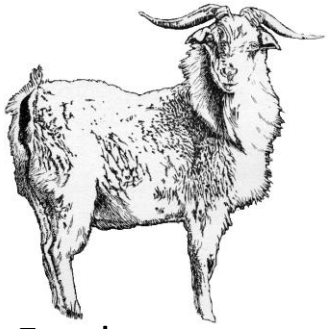
Nga Manu Images

House mouse

Red deer

Norway rat

Hedgehog



Feral goat

Ship rat

Feral cat

Stoat

Brushtail possum

Which pests?

Possums

Stoats
Ferrets

Ship rats
Norway rats

House mice

Which pests?

Possums

Stoats
Ferrets

Ship rats
Norway rats

House mice

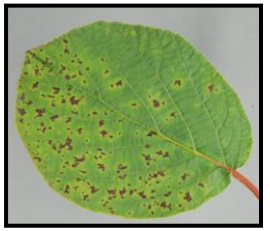
?

Weeds

Hedgehogs

Rabbits

Invertebrates



Plant
Pathogens

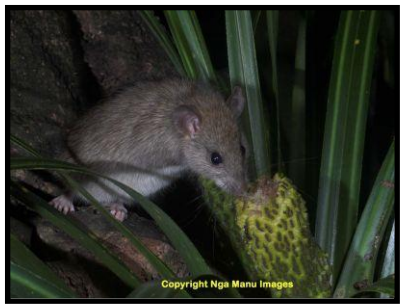
Which pests?

Definitions

- Control:

  Reduction of pests to low density

  Sometimes sustained in perpetuity



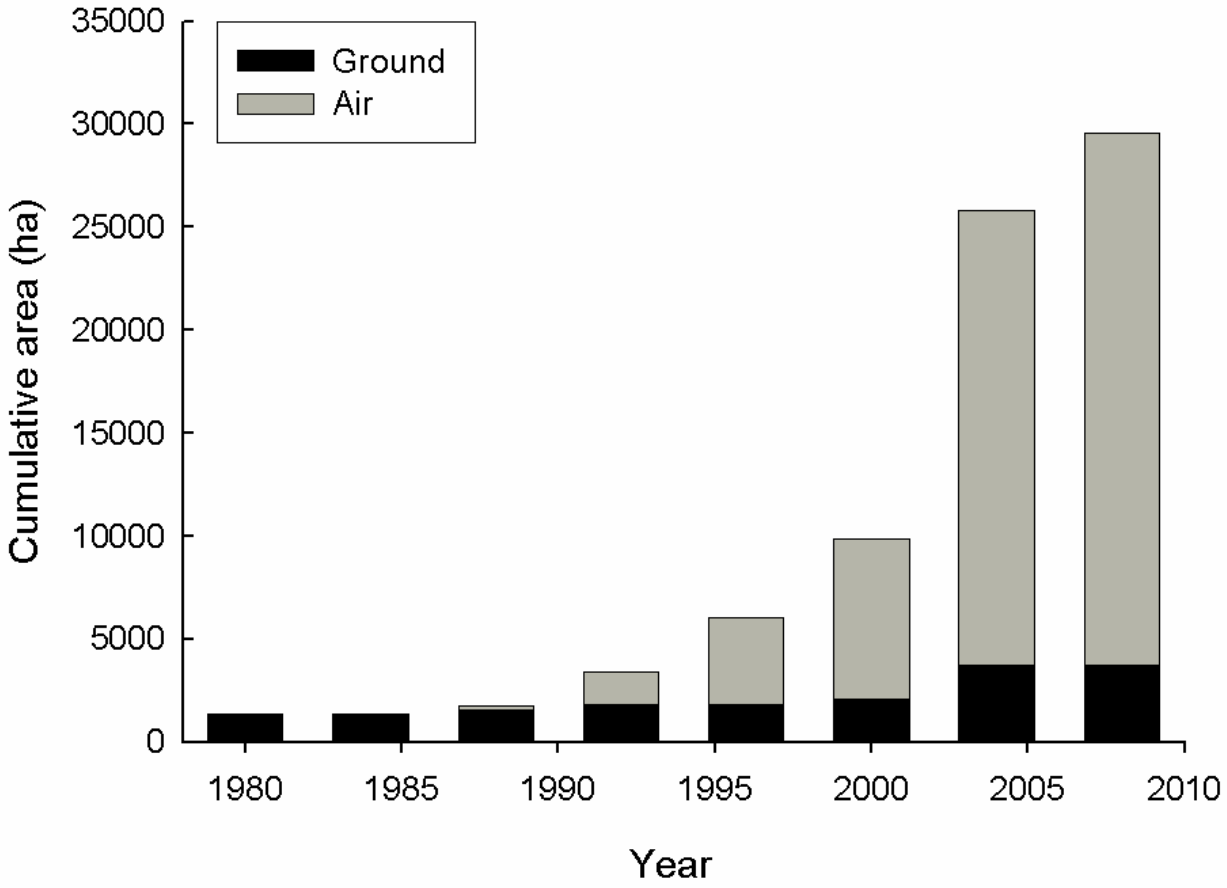
- Eradication:

  One-off, complete removal of all pests

  Not necessary to repeat

Island eradications

Ground (*n* islands)	10	12	15	23	23	24	24	24
Air (*n* islands)	0	0	1	20	28	36	41	47

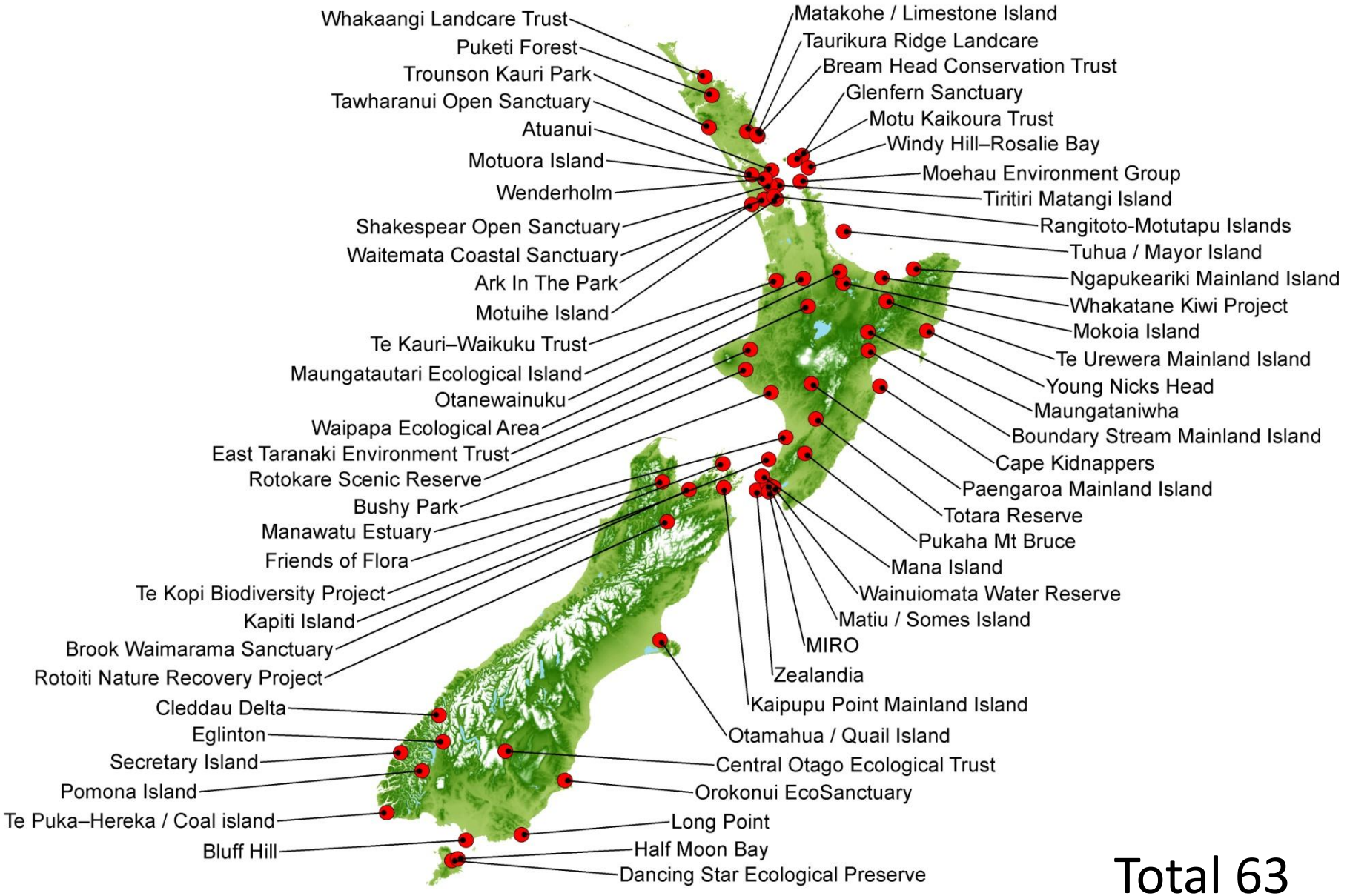


1985-2010:

14 forest bird species established by translocation

On 44 islands from which pest mammals eradicated

Bellingham et al 2010



Total 63

Innes & Fitzgerald

Sanctuary area

- 48 mainland sites 34,800 ha
- 14 near-shore and freshwater islands 18,250 ha
- Total area 53,050 ha

- cf. pest-free islands – 36,480 ha

Total sanctuary area is 0.2% NZ land area

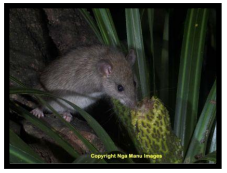
Innes & Fitzgerald

Defendable chunk of mainland

Defendable chunk of mainland

115 000 ha

Has pest species of interest



Defendable chunk of mainland

Department of Conservation
Te Papa Atawhai

Christchurch City Council

Selwyn DISTRICT COUNCIL

Te Rūnanga o NGĀI TAHU

Environment Canterbury Regional Council

Defendable chunk of mainland

Community engagement in pest control

BANKS PENINSULA
CONSERVATION TRUST

Defendable chunk of mainland

Tourism

Akaroa

Defendable chunk of mainland

Variety of habitats, natural and modified

Defendable chunk of mainland

?What do we need to know?

To achieve predator-free status for Banks Peninsula

Challenges

Technical

Ecological

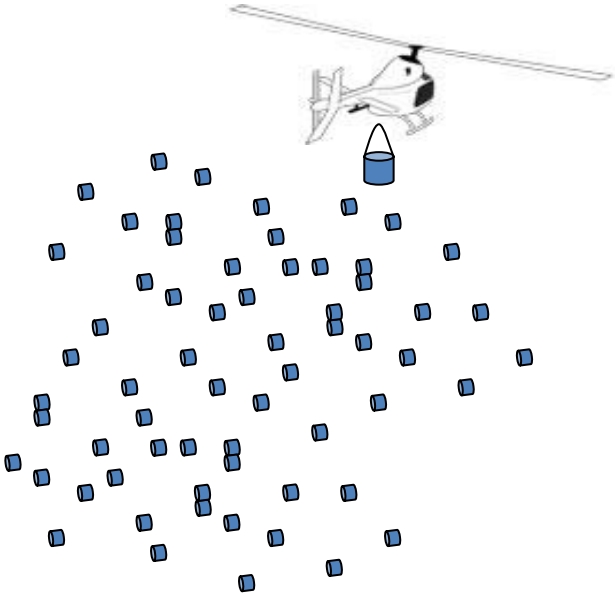
Social

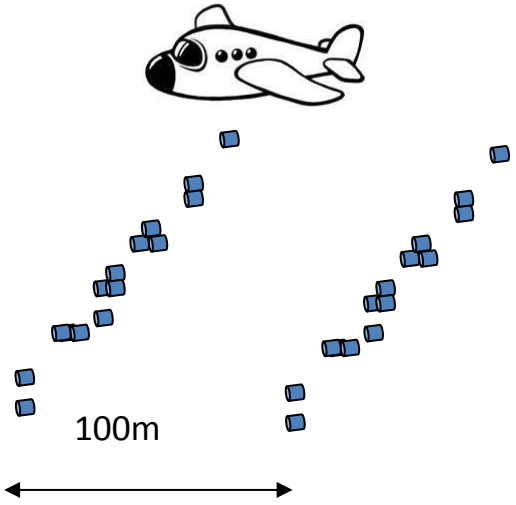
Financial

Political/policy

Technical

Control of pests from the air





Nugent, Warburton et al

Control of pests from the air

1970s
20-30 kg bait/ha

2010s
1-3 kg bait/ha (operations)
500g bait/ha (research)

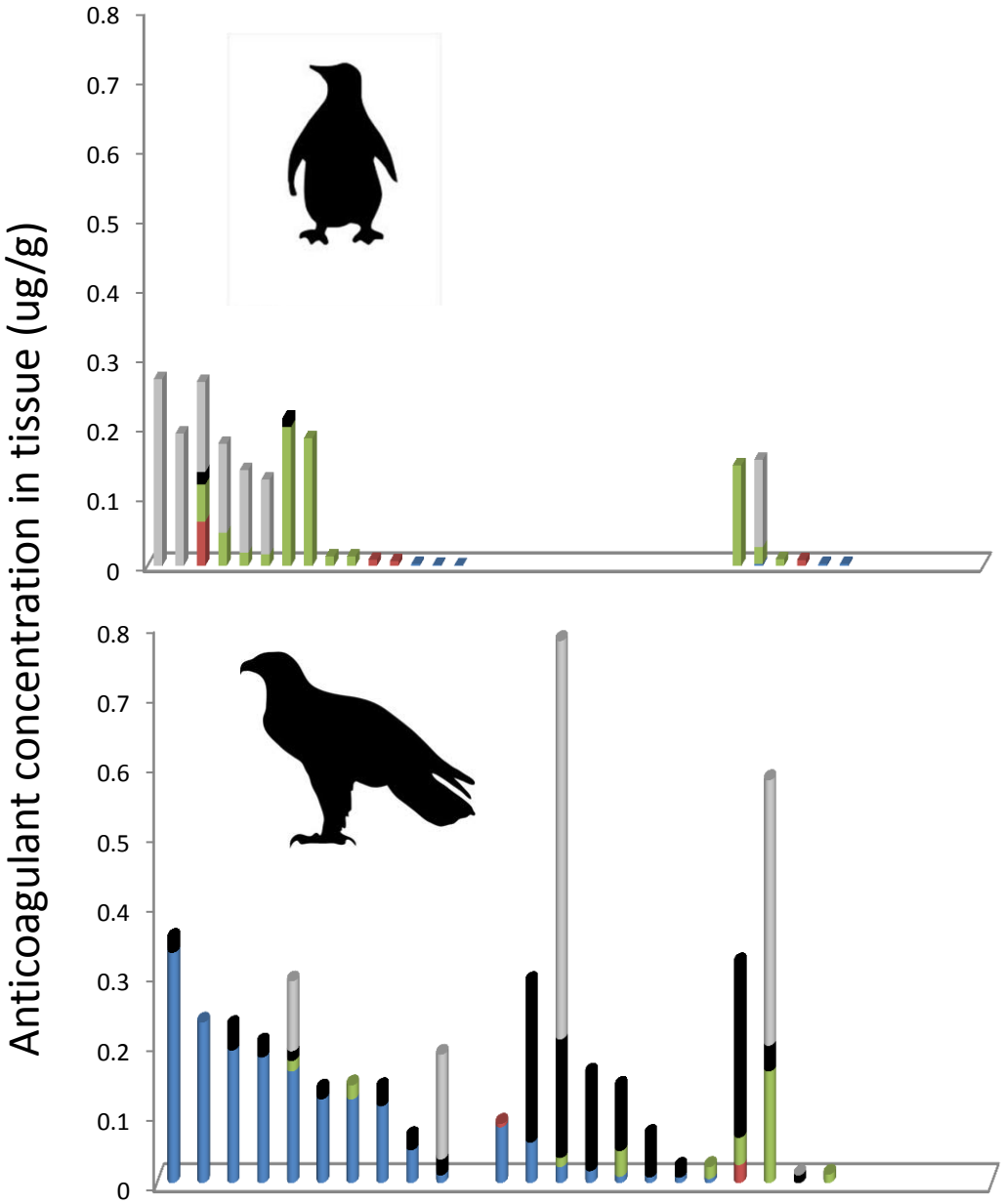
Control of pests from the ground

Trap cost $9

Others $60

Nugent, Warburton et al

Fisher

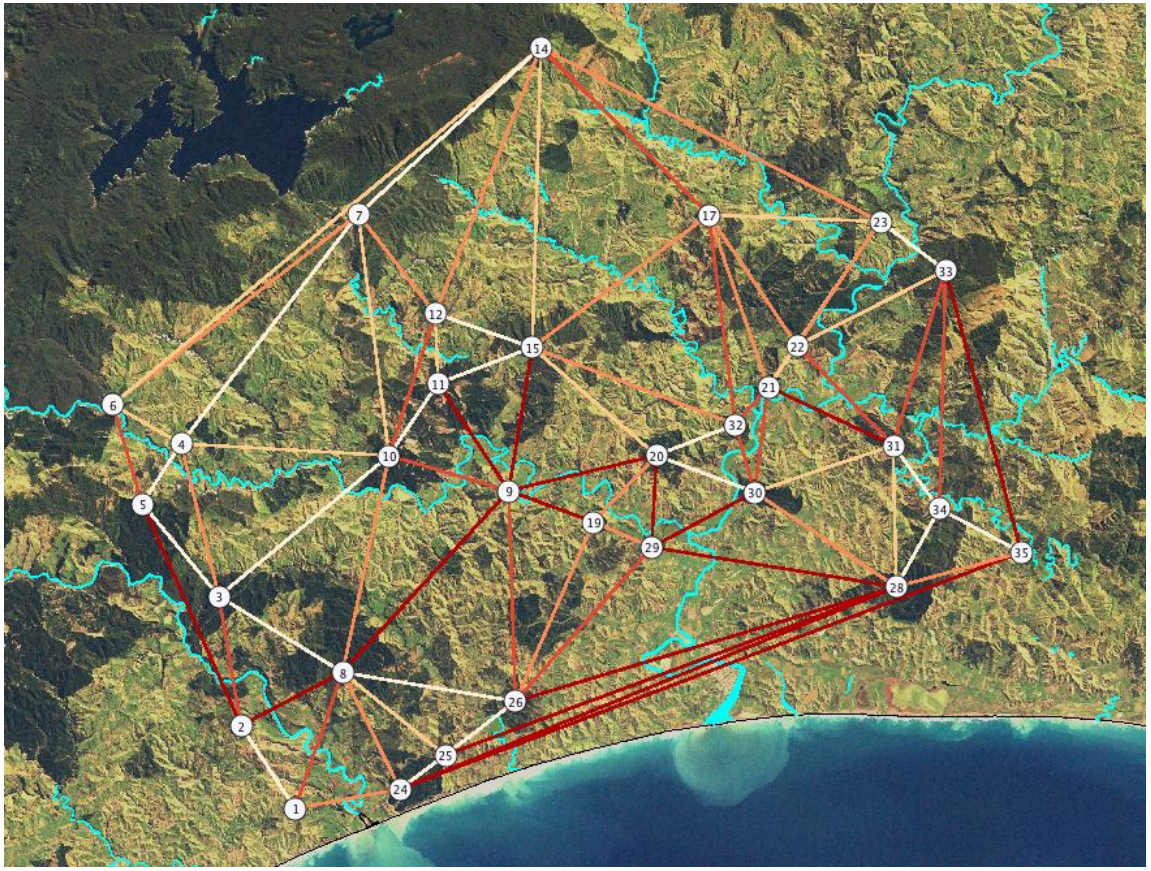


Distinct anticoagulant residue profiles in penguins and harriers

Fisher

Ecological

Hawke's Bay Possum Genetics



Wide river

Genetic distance

High

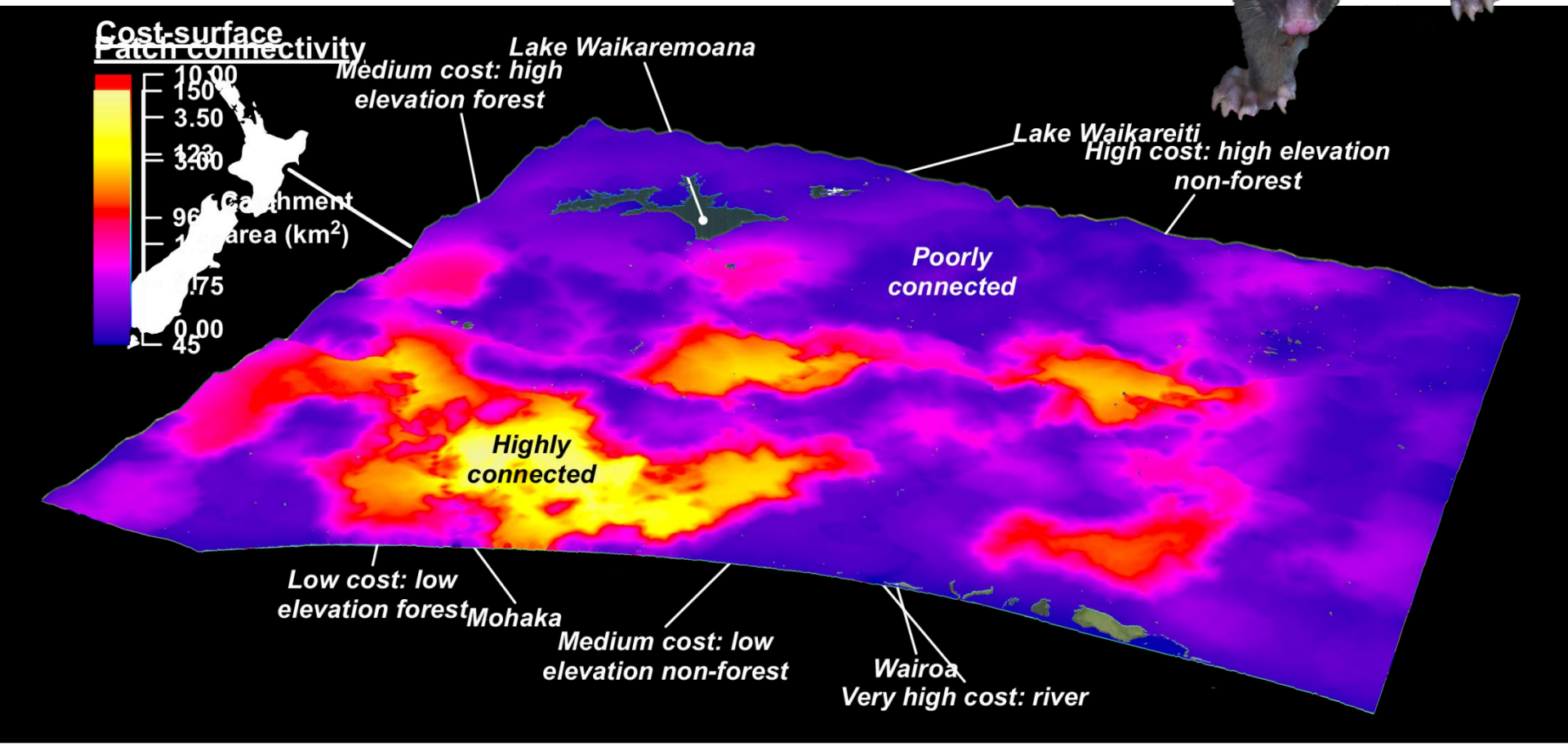
Low

N

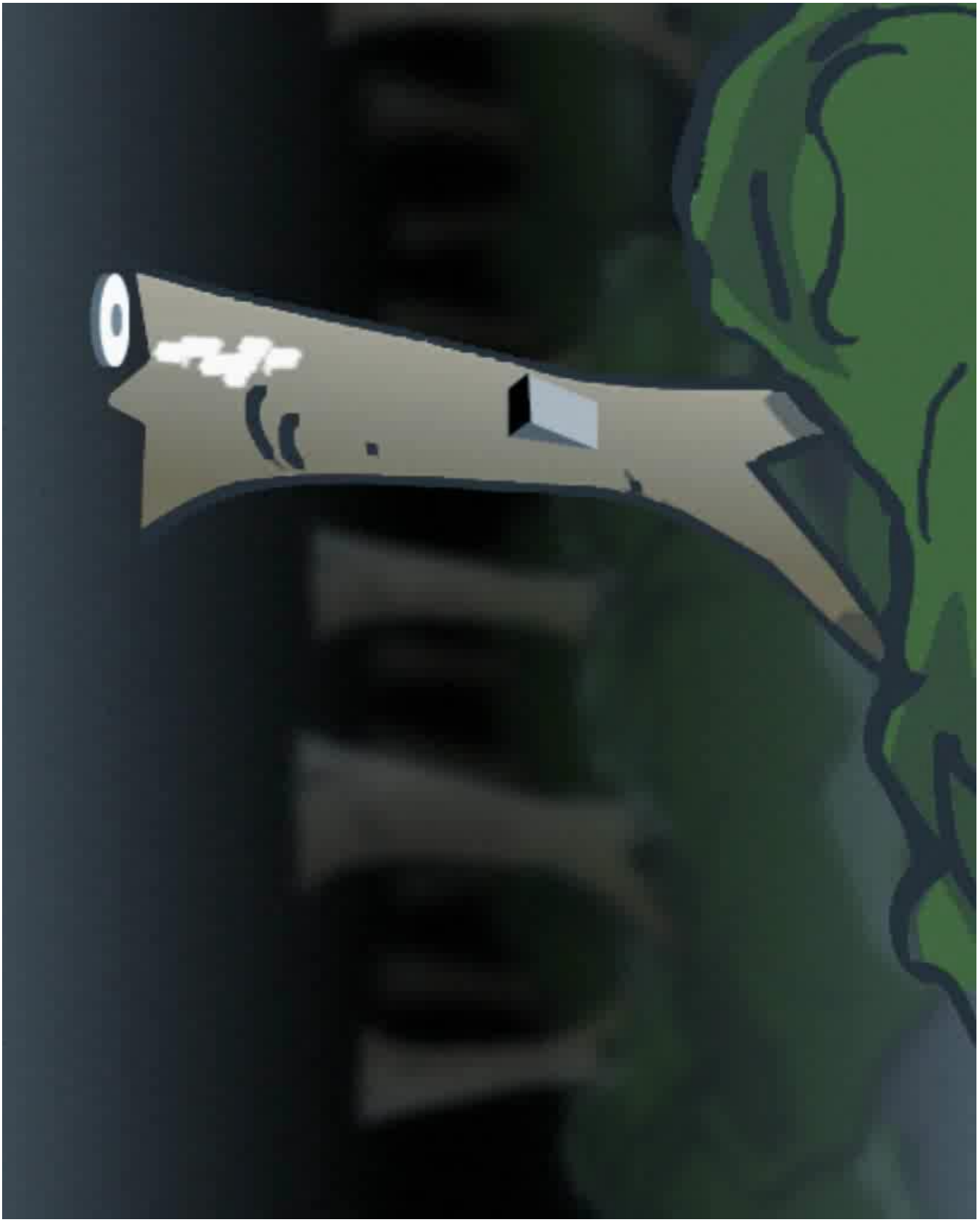
10 Kilometres

Etherington

Hypothetical possum connectivity map



Etherington



Warburton

Social

Engaging people with science

BMC Ecology

BioMed Central

Commentary

Open Access

Troublesome toxins: time to re-think plant-herbivore interactions in vertebrate ecology

Robert K Swihart*[1], Donald L DeAngelis[2], Zhilan Feng[3] and John P Bryant[4]

Austral Ecology (2001) **26**, 571–581

Heterogeneity in vertebrate and invertebrate herbivory and its consequences for New Zealand mistletoes

LAURA A. SESSIONS* AND DAVE KELLY

Plant and Microbial Sciences, University of Canterbury, Private Bag 4800, Christchurch, New Zealand (Email: l.sessions@botn.canterbury.ac.nz)

Ecology, 89(3), 2008, pp. 621–634

Wildlife Research, 2000, **27**, 69–74

The role of non-toxic prefeed and postfeed in the development and maintenance of 1080 bait shyness in captive brushtail possums

J. G. Ross[A], *G. J. Hickling*[A], *D. R. Morgan*[B] *and C. T. Eason*[B]

[A]Ecology and Entomology Group, PO Box 84, Lincoln University, Canterbury, New Zealand
[B]Landcare Research, PO Box 31-011, Lincoln, Canterbury, New Zealand

Abstract. Shyness to sodium monofluoroacetate (1080) in cereal bait can persist in sub-lethally poisoned po: (*Trichosurus vulpecula*) populations for at least 2 years. We investigated the use of non-toxic cereal 'prefeed 'postfeed' as ways of inhibiting and overcoming such shyness. The postfeed result was also compared with cl:

WHAT CAN WE LEARN FROM RESOURCE PULSES?

LOUIE H. YANG,[1,3] JUSTIN L. BASTOW,[1] KENNETH O. SPENCE,[2] AND AMBER N. WRIGHT[1]

[1]*Section of Evolution and Ecology, University of California, One Shields Avenue, Davis, California 95616 USA*
[2]*Department of Entomology, University of California, One Shields Avenue, Davis, California 95616 USA*

CSIRO PUBLISHING

www.publish.csiro.au/journals/wr *Wildlife Research,*

Optimising bait-station delivery of fertility control agents to brushtail possum populations

Daniel M. Tompkins[A,C] *and David Ramsey*[B]

urnals/wr *Wildlife Research*, 2005, **32**, 229–237

SHORT COMMUNICATION

Large-tree growth and mortality rates in forests of the central North Island, New Zealand

Sarah J. Richardson[1*], Mark C. Smale[2], Jennifer M. Hurst[1], Neil B. Fitzgerald[2], Duane A. Peltzer[1], Robert B. Allen[1], Peter J. Bellingham[1] and Peter J. McKelvey[3]

The evaluation of indices of animal abundance using spatial simulation of animal trapping

Dave Ramsey[A,D], *Murray Efford*[C], *Steve Ball*[B] *and Graham Nugent*[B]

[A]Landcare Research, Private Bag 11052, Palmerston North, New Zealand.
[B]Landcare Research, PO Box 69, Lincoln, New Zealand.

Possum management computer game

Landcare Research
Manaaki Whenua

HITLabNZ
Human Interface Technology Laboratory New Zealand
www.hitlabnz.org

driedfrog
software & game development

Holland, Warburton

Level 1

Level goal: Create area of forest suitable for kiwi sanctuary

Outcome: Positive tree health and a healthy bird population

Action: Reduce possum numbers in the area

Level Epic Win State – All Possums dead inside fenced area, trees at 80% health or more and release of nurtured Kiwi bird

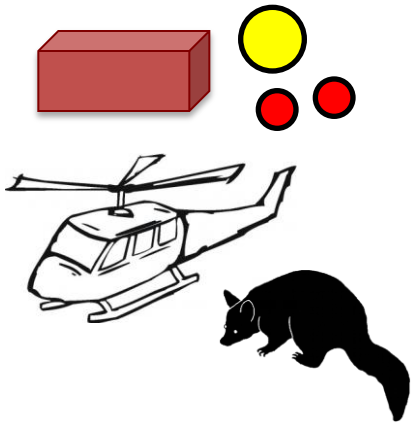
OR

Level Epic Fail State - 100% Possum health, 20% tree health and/or unhatched egg or released Kiwi

Holland, Warburton

Invasive Pests vs New Zealand

Science

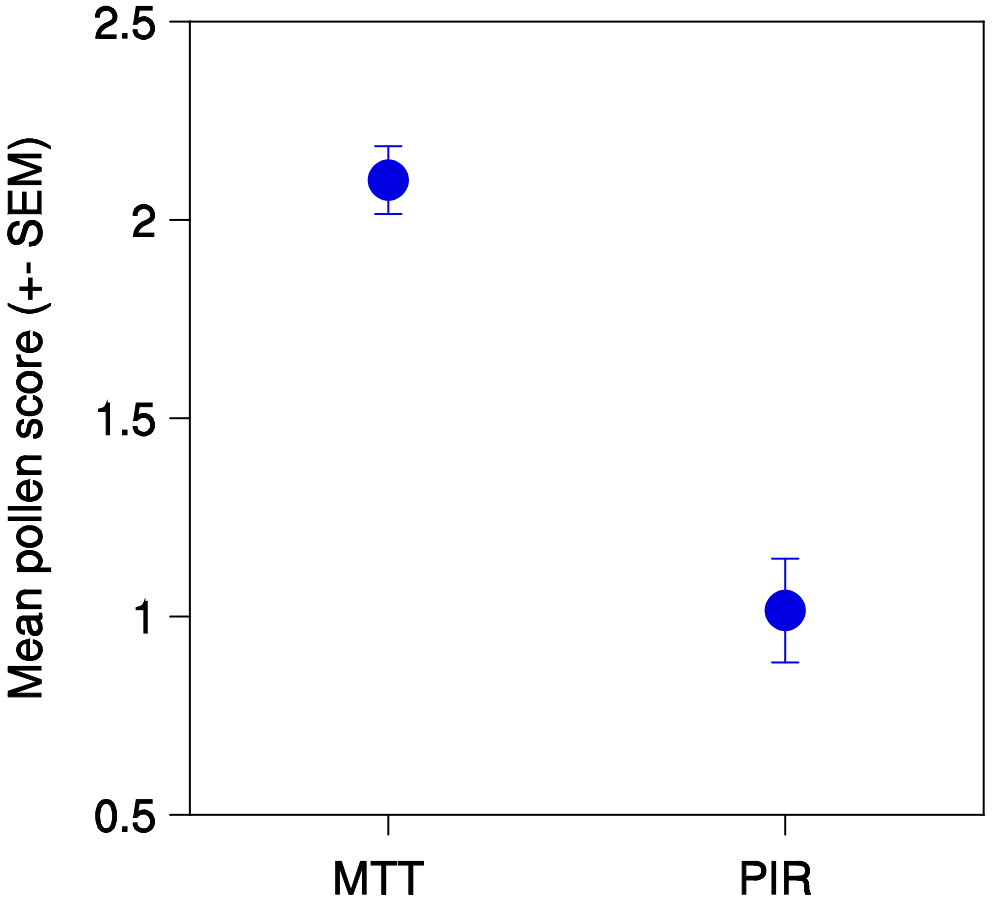


Game

Informed public

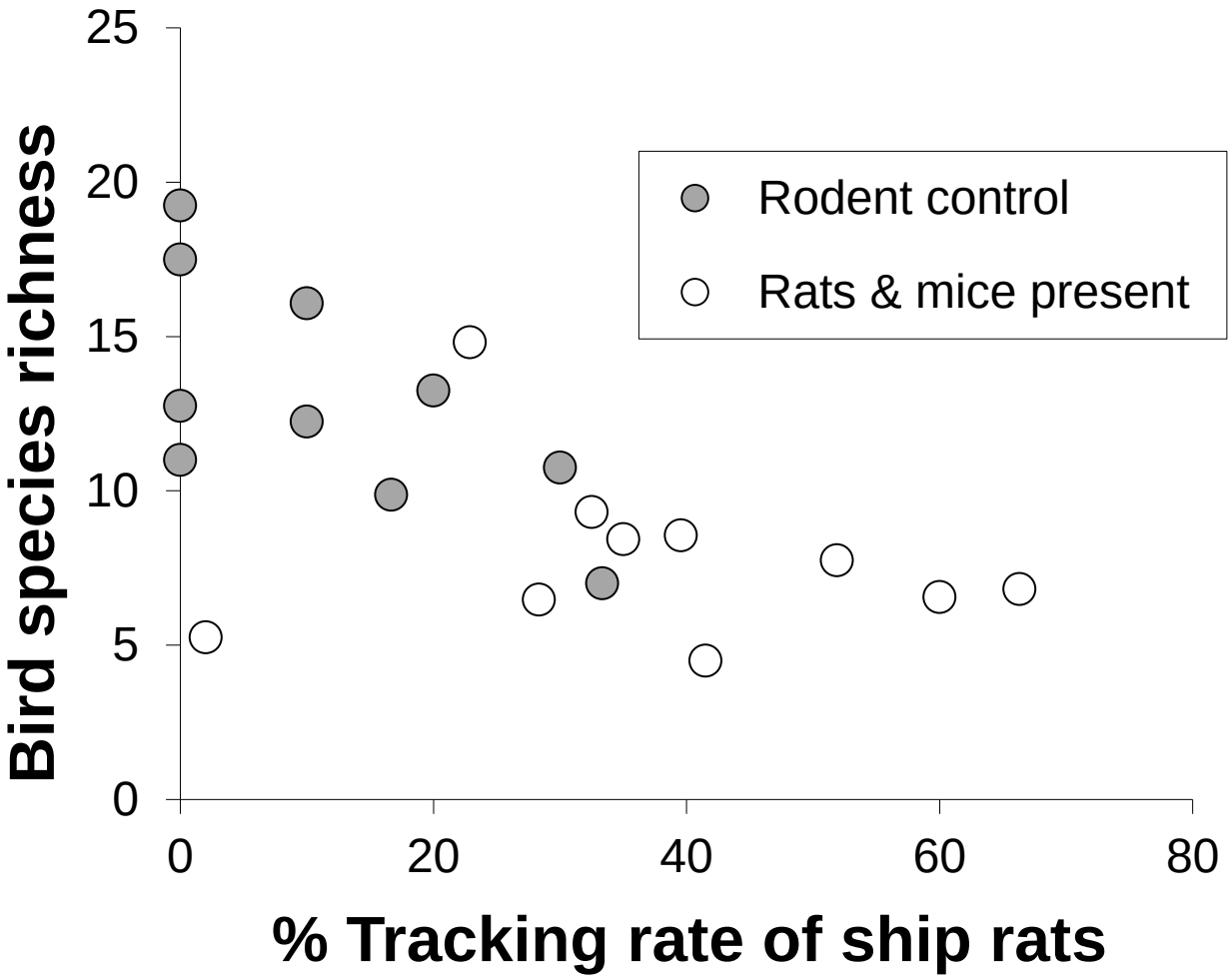
Fuchsia pollination restored

Higher pollen scores



Iles

Unfenced Sanctuaries



Bluff Hill/Motupōhue Environment Trust

Measuring outcomes, Not just killing things

Predator-Free NZ

Sobering facts and figures:

- NZ land area: 26.9M ha
- Cost of multi-pest control: $300/ha
- Cost of PFNZ: $9B

- Minimum

What have we learnt?

We can remove multiple pests from large islands
We have a variety of tools in the toolbox for mainland NZ
We can detect and remove pest animals at very low densities
And we know when they re-invade controlled areas
Even small community groups make a difference to biodiversity
Public motivations/concerns can be built into research

Predator-free NZ will cost a lot of money
And is a very long-term goal
BUT
We have a great history of innovation and improvement


Thank You