



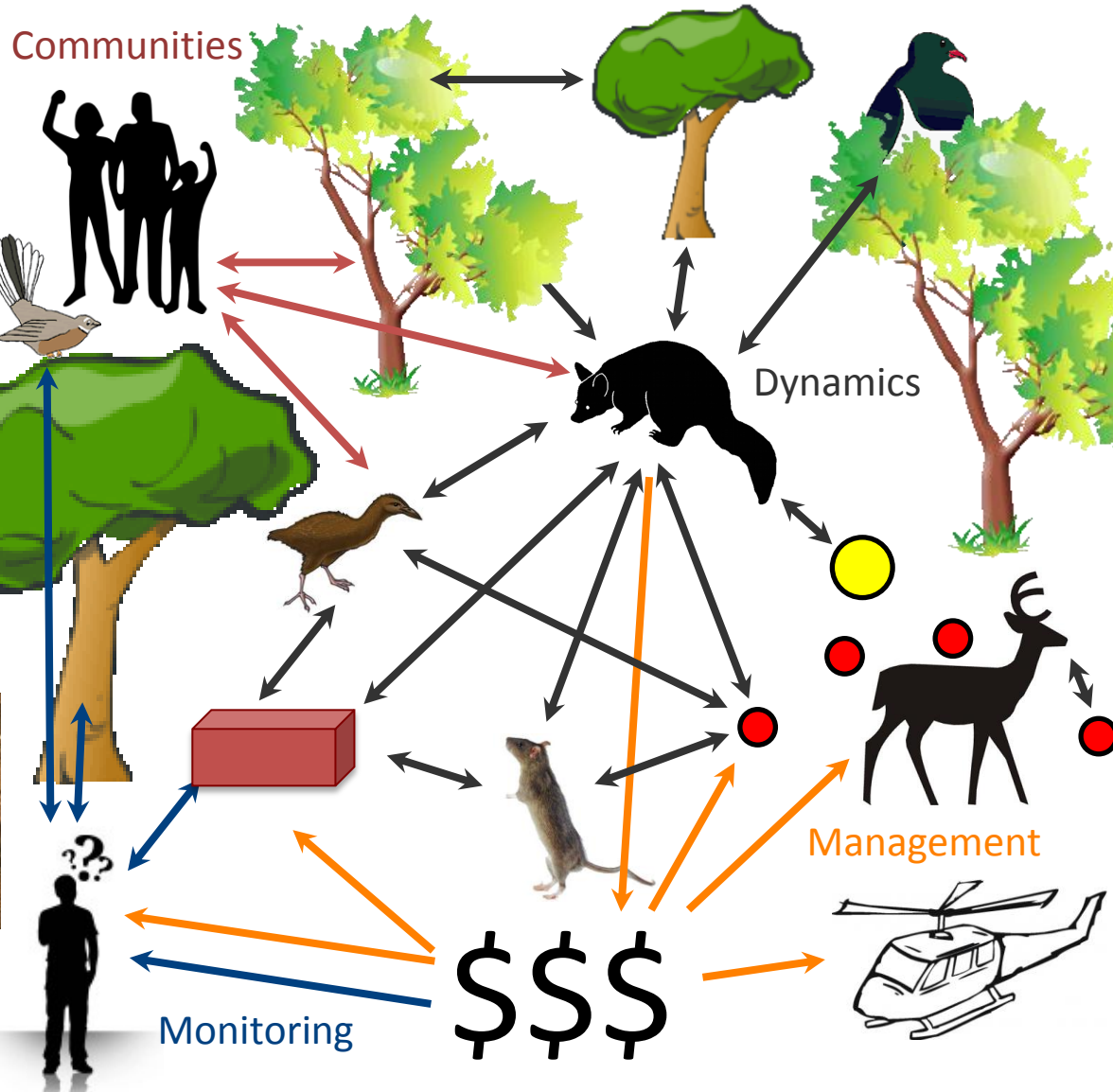
Landcare Research
Manaaki Whenua

From scientific models
to serious games
**Play your way to a
pest management strategy**

Pen Holland, Hazel Bradshaw,
Julian Looser, Bruce Warburton



Pest control for biodiversity



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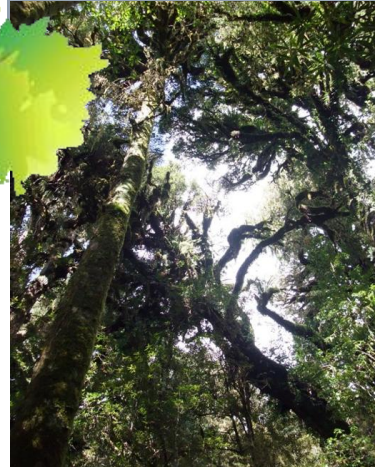
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A Wicked Problem

Strategic technologies for managing pests

- Complex interactions
- Restricted resources
- Multiple stakeholders
- Conflicting views

A Wicked Problem

Strategic technologies for managing ~~pests~~ people

- Scientific knowledge transfer
- Communicating complexity
- Community engagement
- Accepting compromise

Engaging people with science

BMC Ecology



Commentary

Open Access

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

Robert K Swihart^{*1}, Donald L DeAngelis², Zhilan Feng³ and John P Bryant⁴

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

^AEcology and Entomology Group, PO Box 84, Lincoln University, Canterbury, New Zealand

^BLandcare 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

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Available on-line at: <http://www.newzealandecology.org/nzjce/>

SHORT COMMUNICATION

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

Sarah J. Richardson^{*1}, Mark C. Smale², Jennifer M. Hurst¹, Neil B. Fitzgerald², Duane A. Peltzer¹, Robert B. Allen¹, Peter J. Bellingham¹ and Peter J. McKelvey³

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
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WHAT CAN WE LEARN FROM RESOURCE PULSES?

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Wildlife Research

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

Daniel M. Tompkins^{A,C} and David Ramsey^B

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

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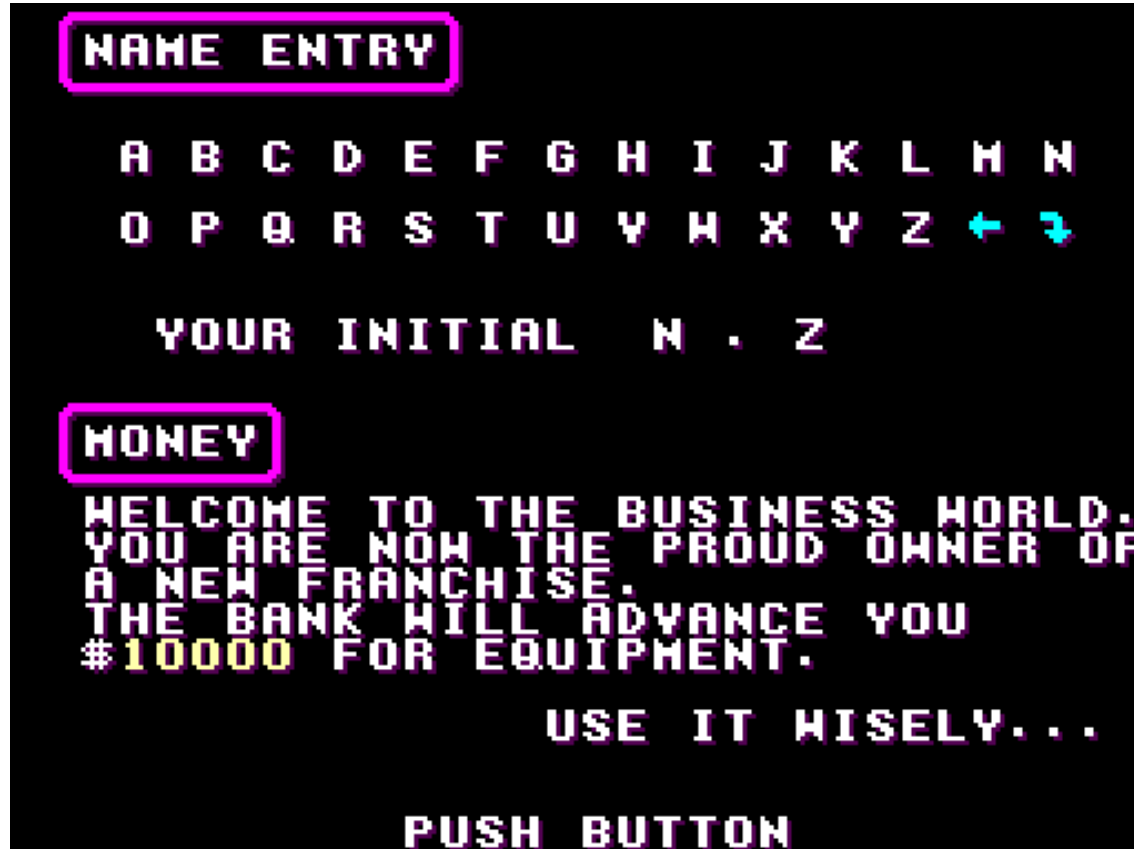
^ALandcare Research, Private Bag 11052, Palmerston North, New Zealand.

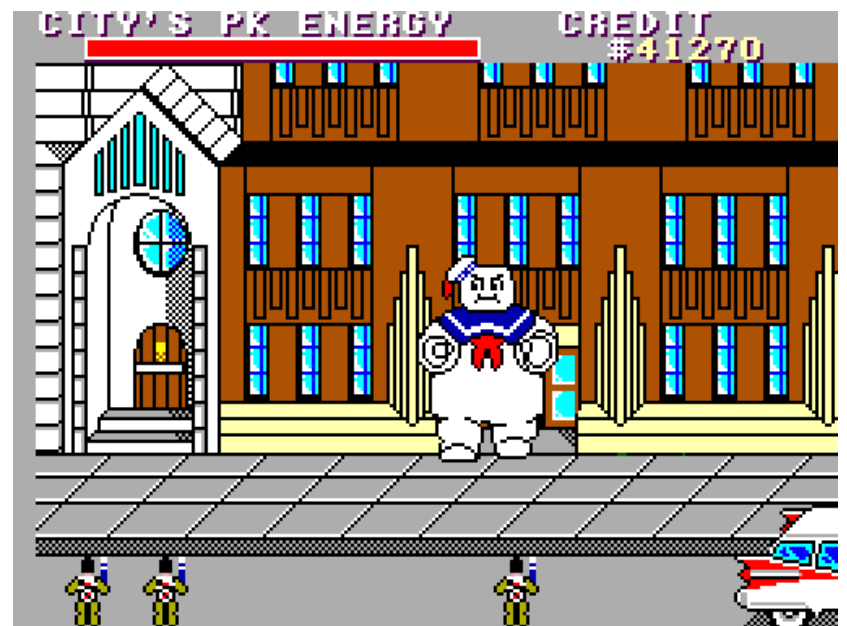
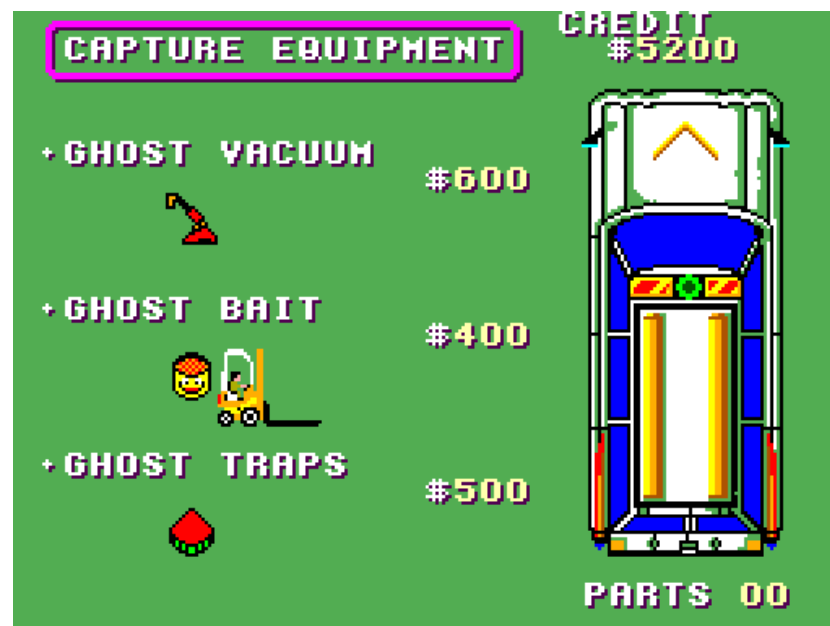
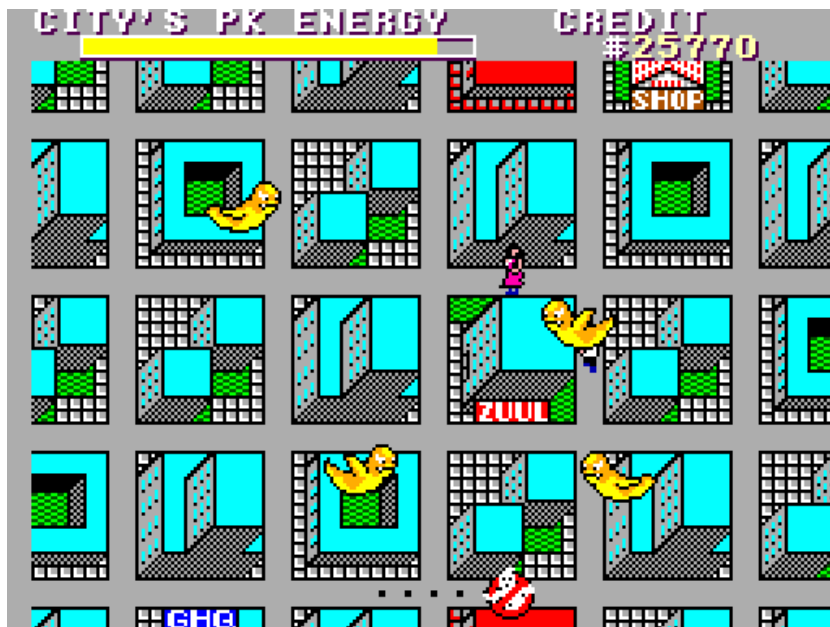
^BLandcare Research, PO Box 69, Lincoln, New Zealand.

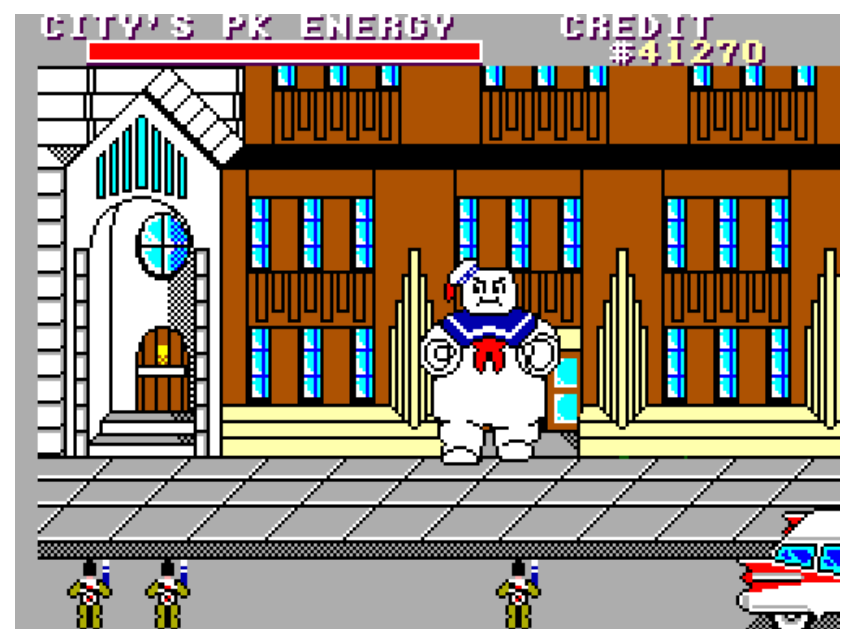
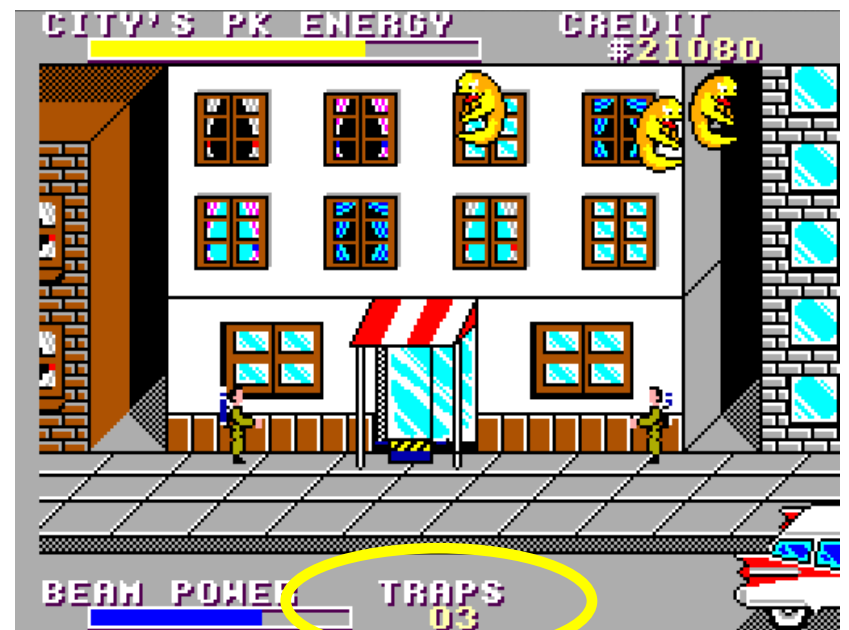
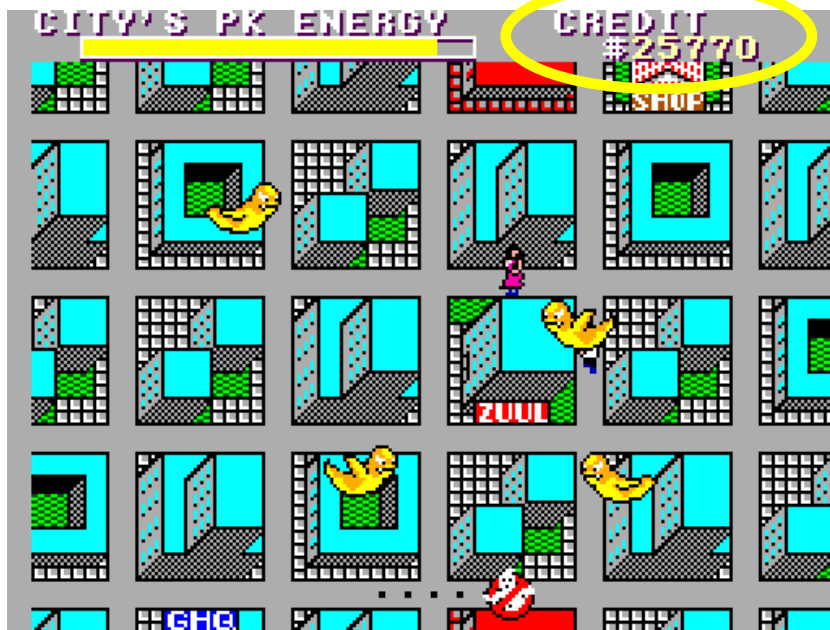
^CLandcare Research, Private Bag 1020, Dunedin, New Zealand.

Engaging people with science

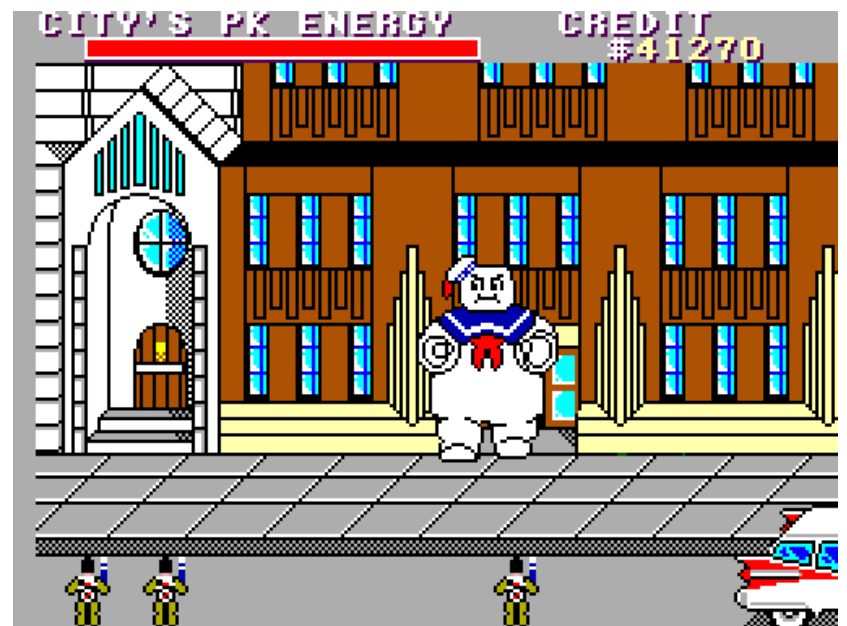
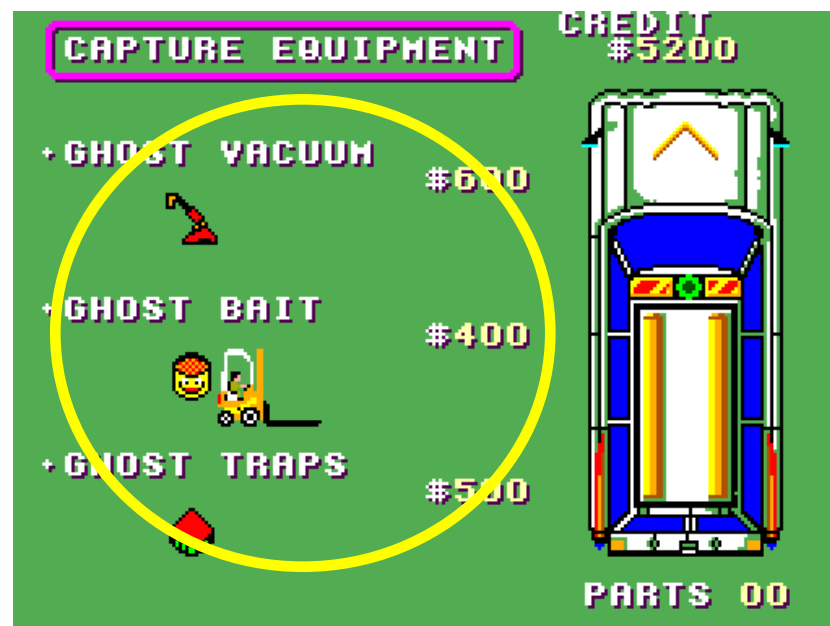
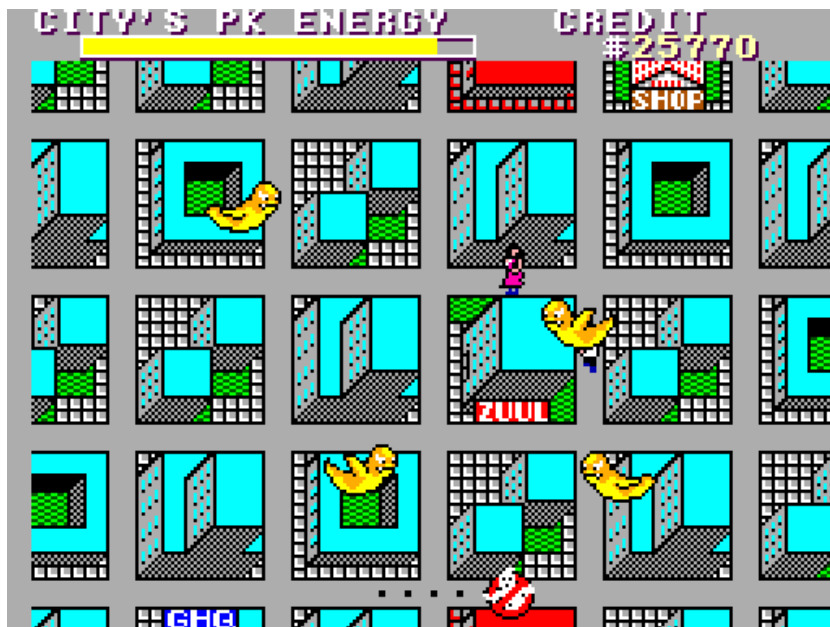
- It's easier to understand a process if you are part of it, and if you can play with it.



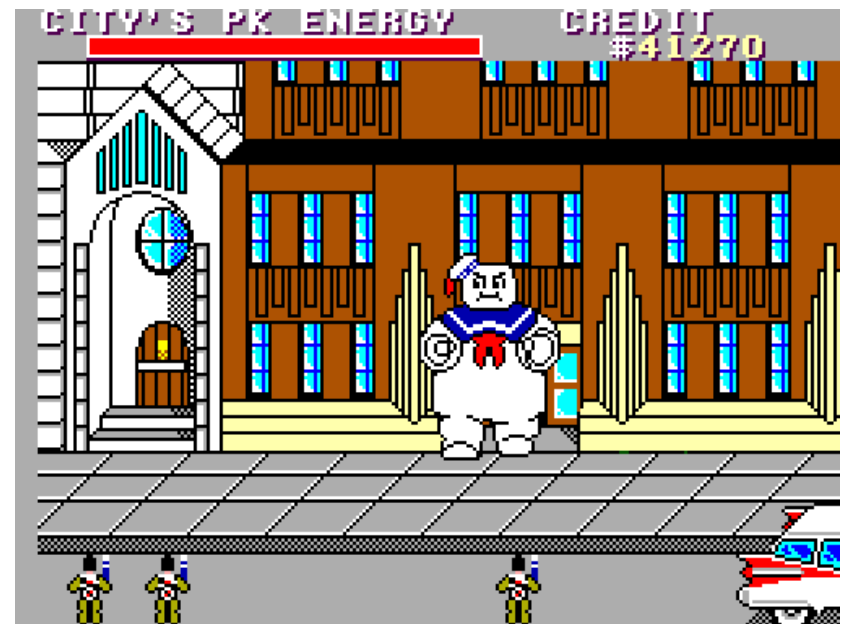
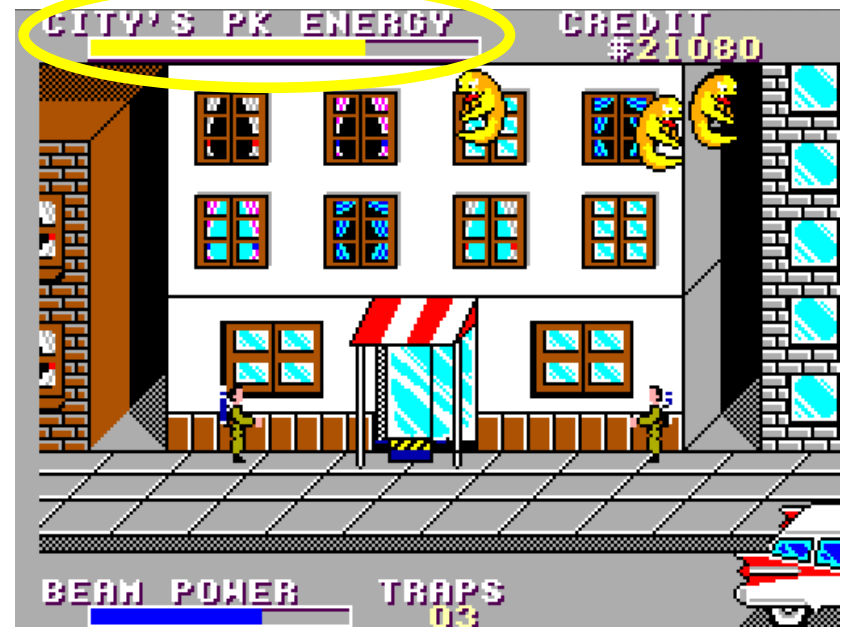
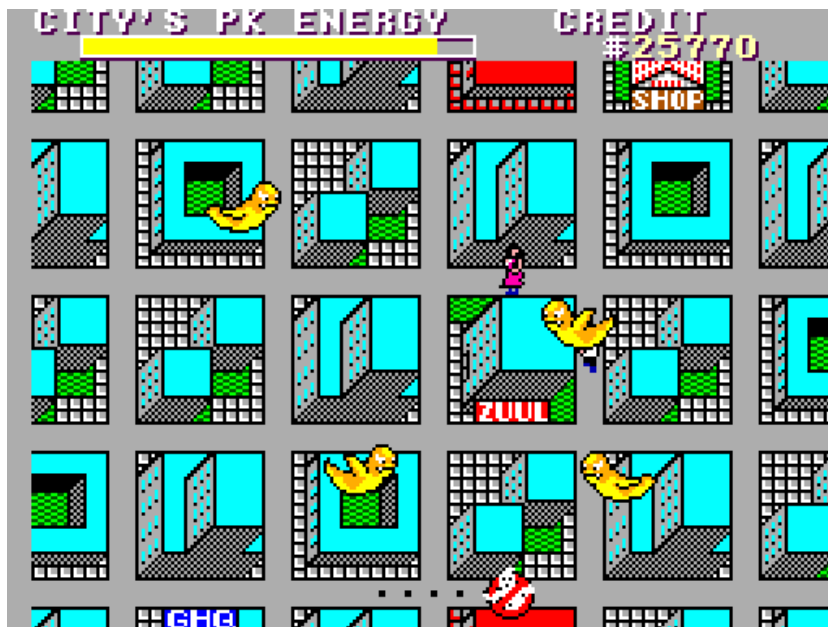




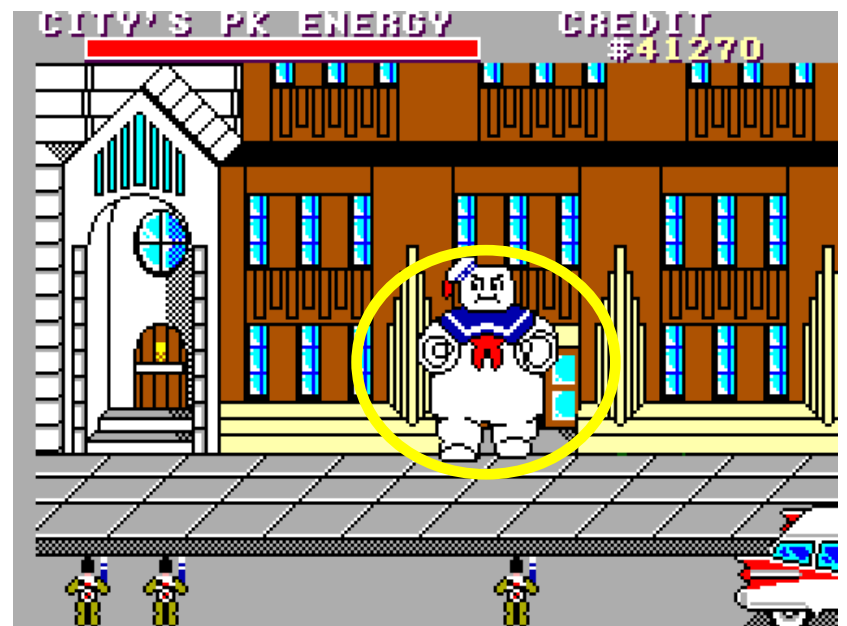
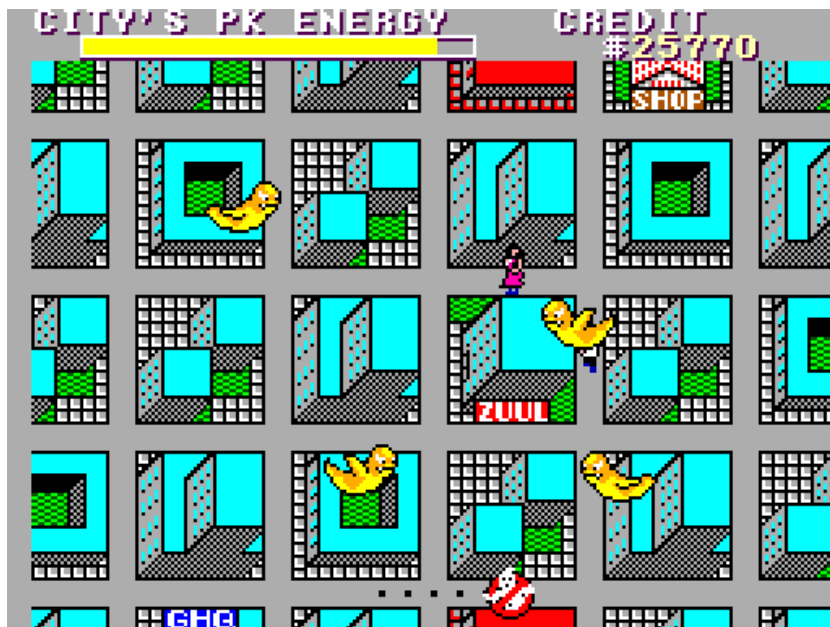
Budget/restricted resources



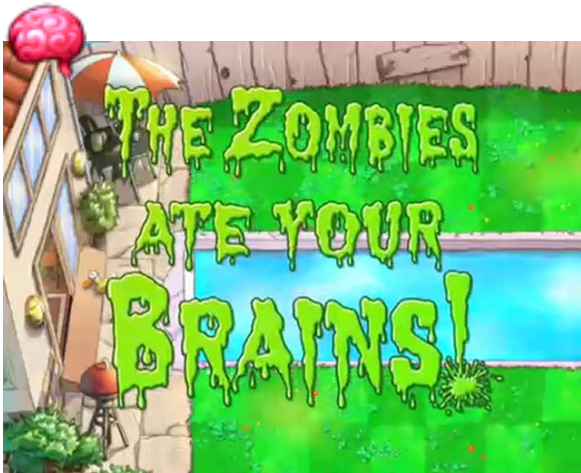
Budget/restricted resources – Equipment/skills



Budget/restricted resources – Equipment/skills – Feedback



Budget/restricted resources – Equipment/skills – Feedback – Clear mission



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Abstract The use of non-toxic cereal 'prefeed' and 'postfeed' in cereal bait can persist in sub-lethally poisoned possums. We investigated the use of non-toxic cereal 'prefeed' and 'postfeed' in cereal bait. The postfeed result was also compared with control.



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

Heterogeneity in vertebrate and invertebrate herbivory: its consequences for New Zealand mistletoe

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)

Abstract Vertebrate herbivores generally have greater effects than invertebrate herbivores on plant populations. We investigated the effects of both invertebrate and vertebrate herbivory on New Zealand mistletoe populations. Nationwide declines in mistletoe populations have often been attributed to insect herbivory. The main goal of the present study was to document

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Invasive Pests

vs

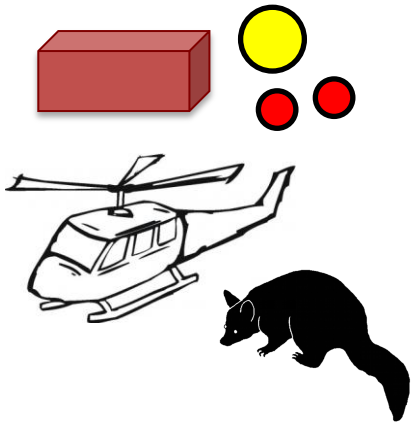
New Zealand

\$\$\$



Invasive Pests vs New Zealand

Science



Game



Better informed
stakeholders

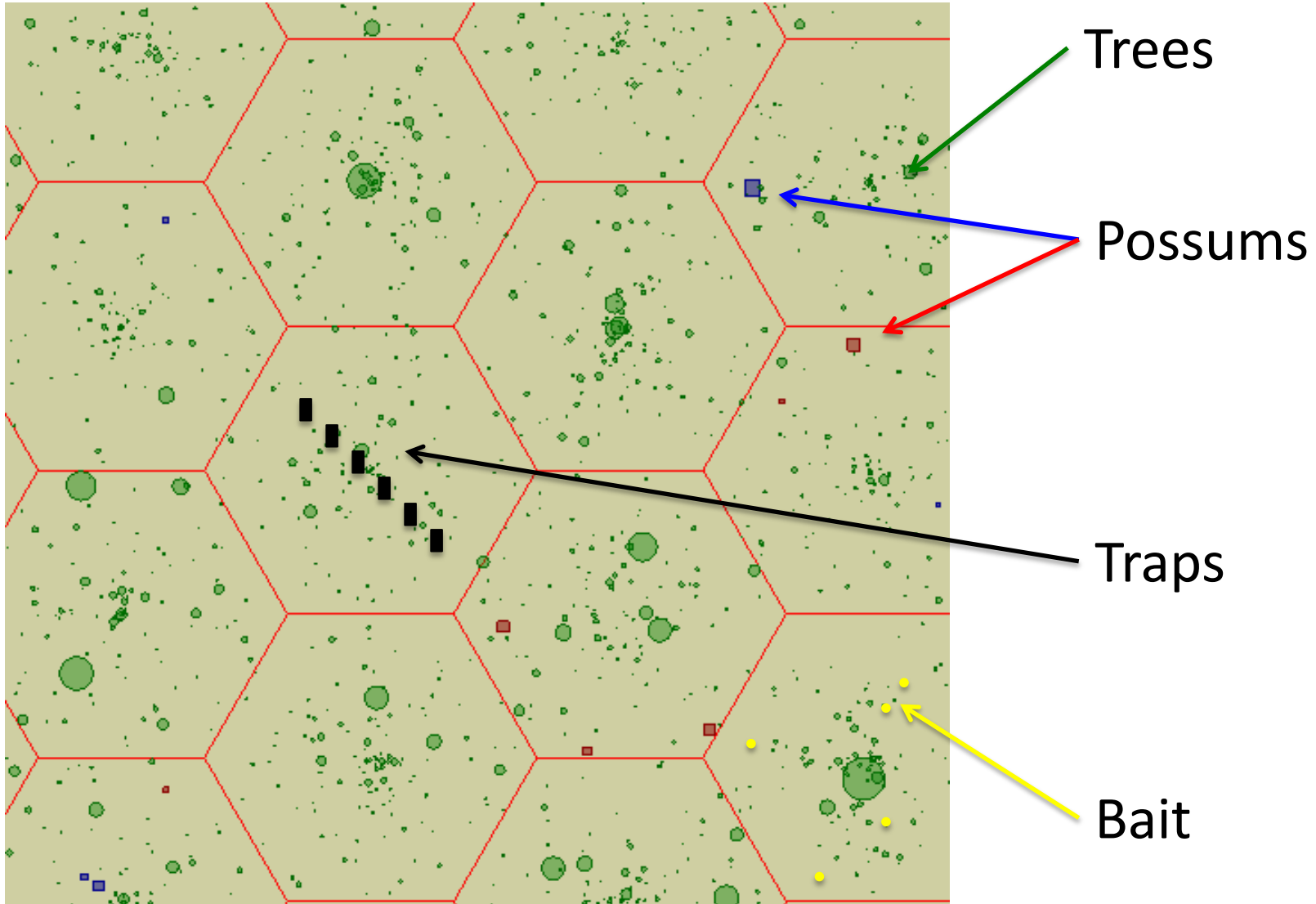


Integrating models

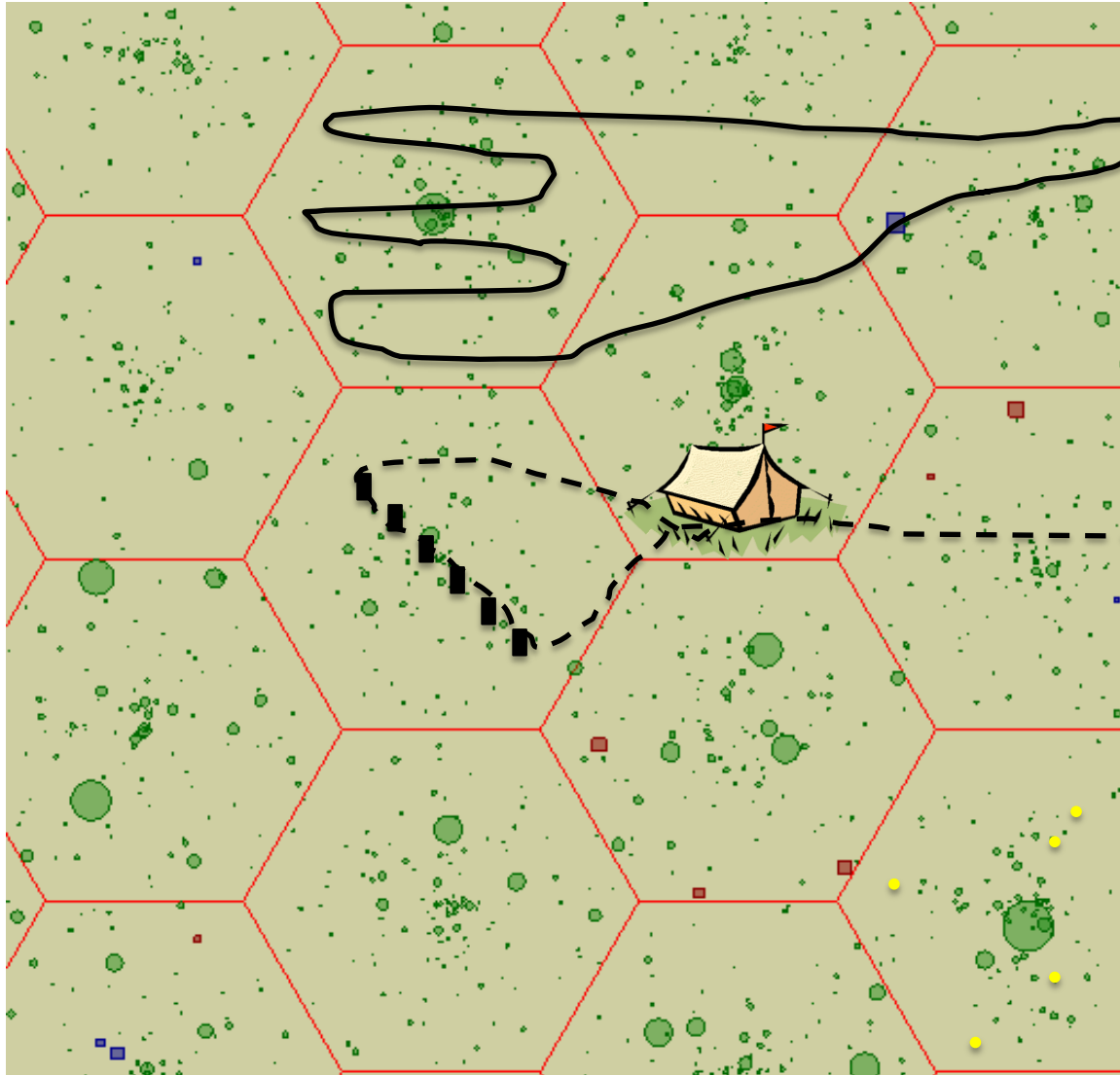
- Possum dynamics (birth, death, dispersal)
- Possum impacts on tree health and mortality
- Possum interactions with traps, baits and fences
- Cost of control operations (ground and aerial)



A spatial model



A spatial model



Flight time

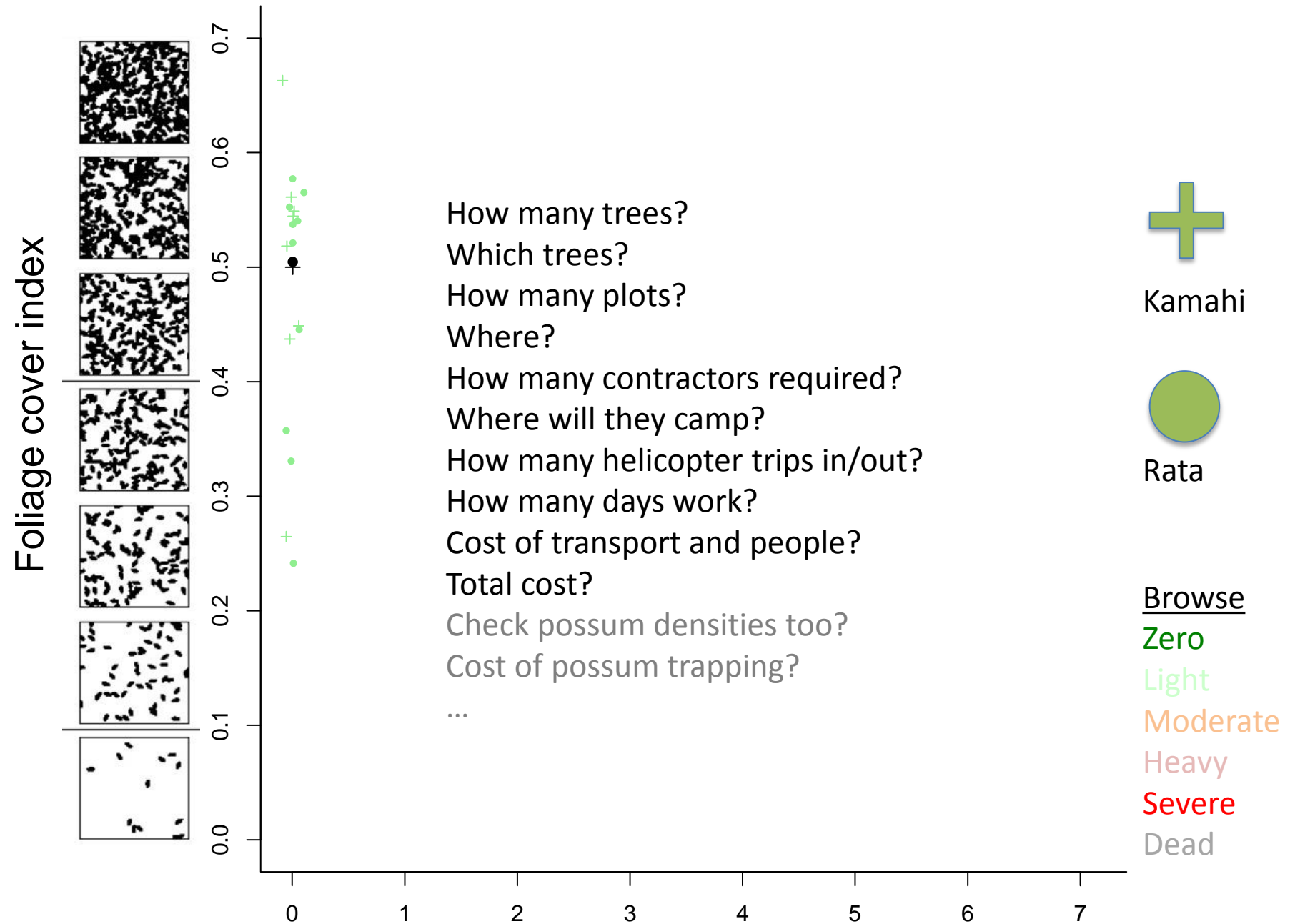


Contractor costs

Best routes

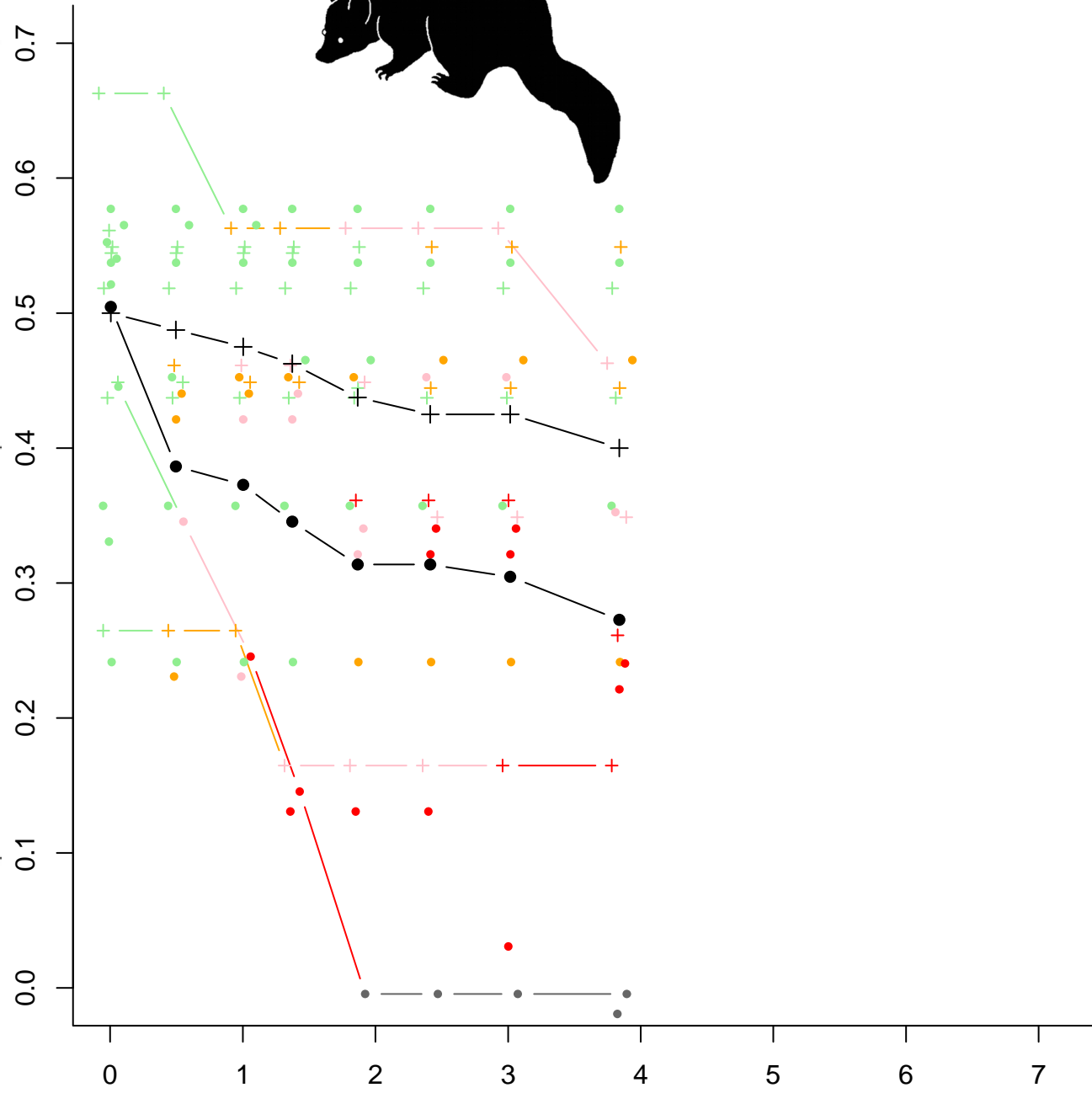
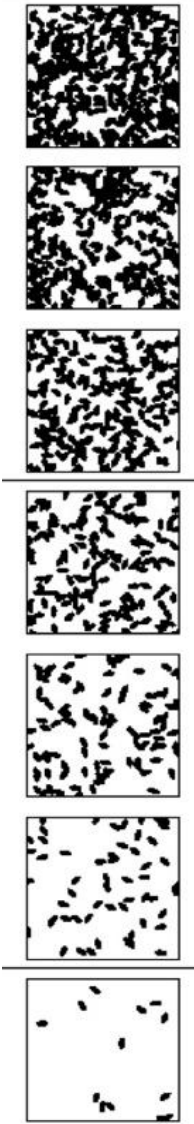
Equipment costs

Modelling possum impacts on tree health





Foliage cover index



Kamahi



Rata

Browse

Zero

Light

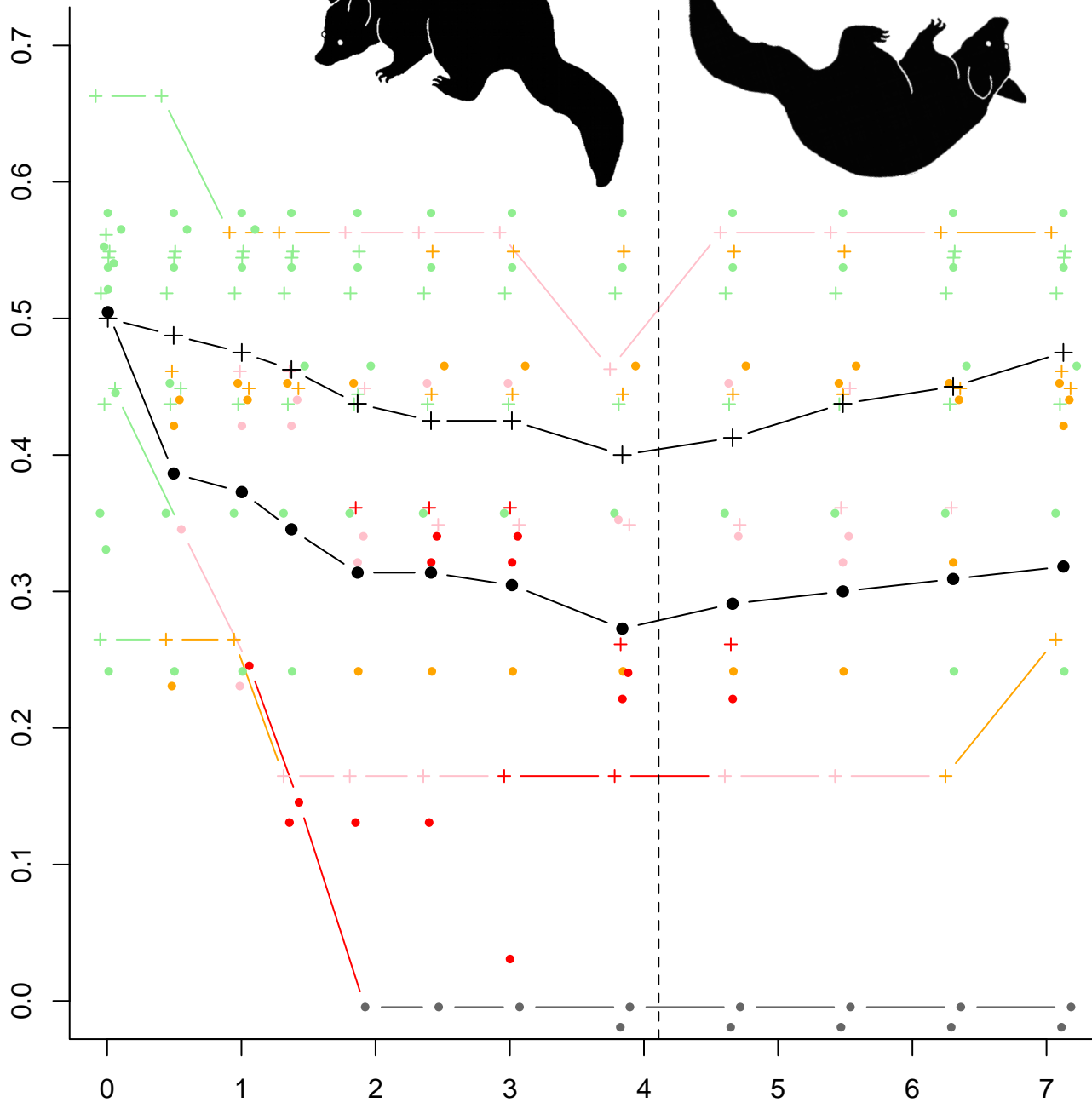
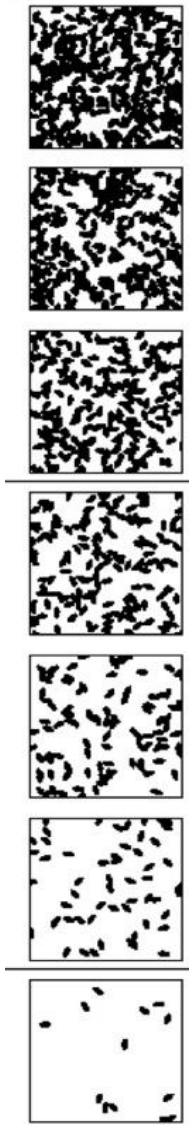
Moderate

Heavy

Severe

Dead

Foliage cover index



Kamahi



Rata

Browse

Zero

Light

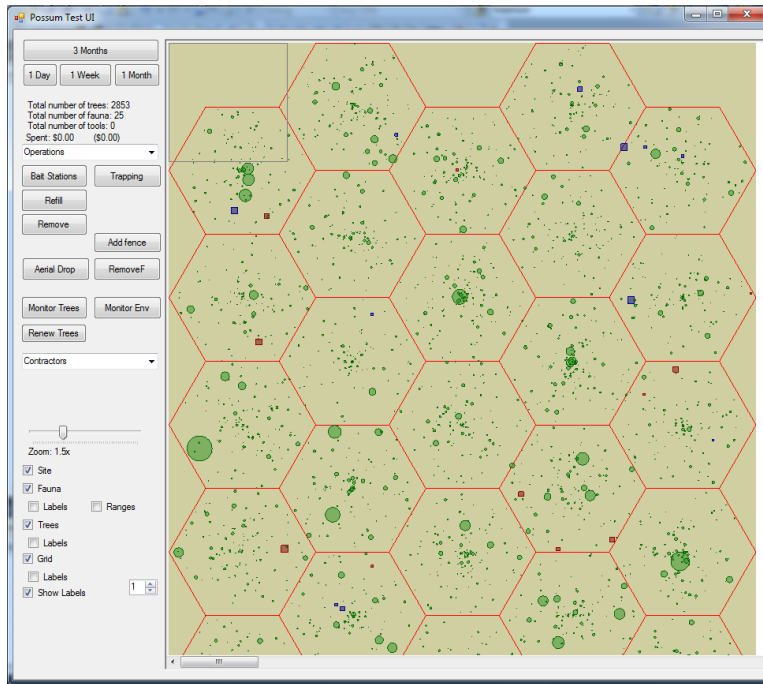
Moderate

Heavy

Severe

Dead

Two interfaces to the model



A 'science' graphical
user interface

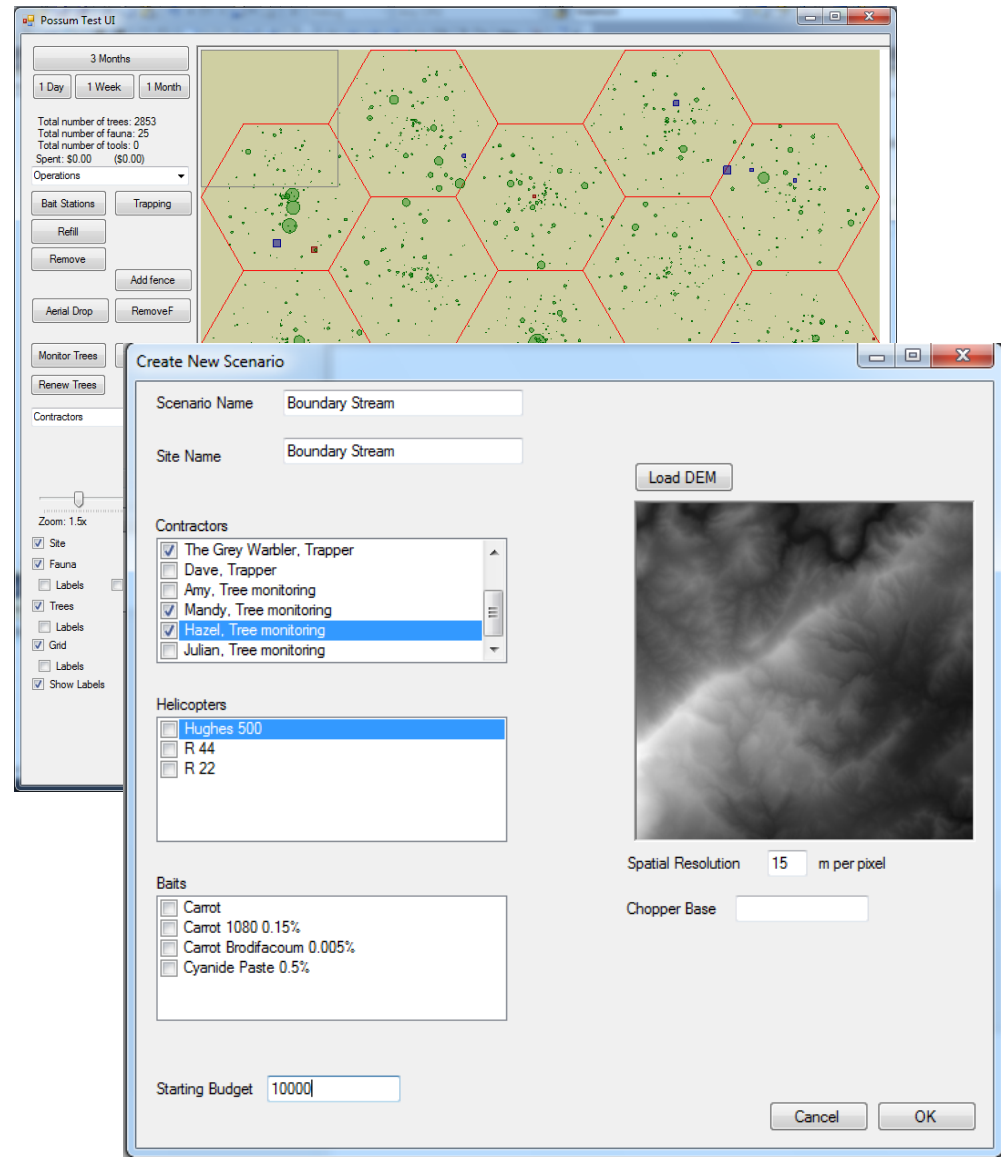


A forest
management game

The model

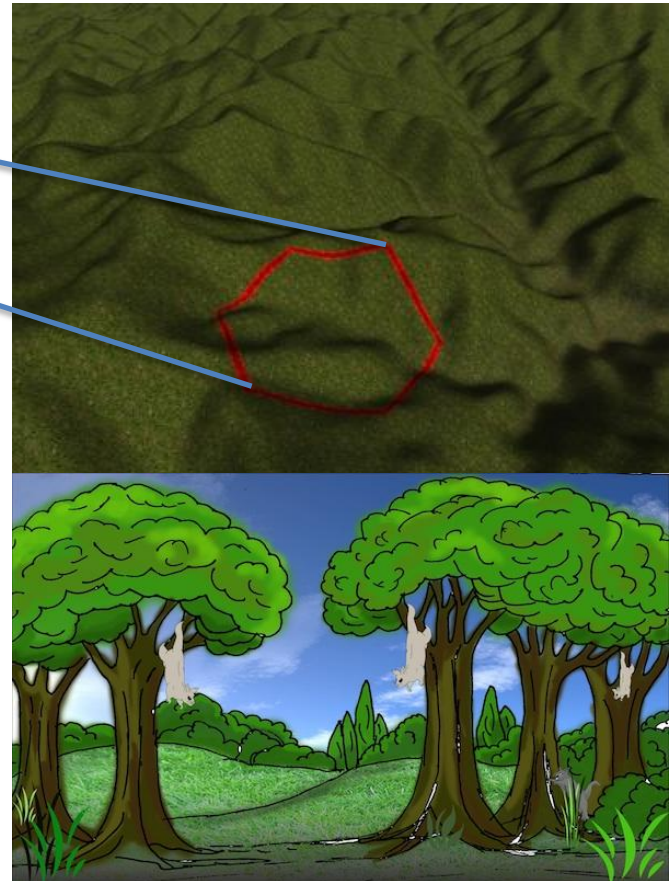
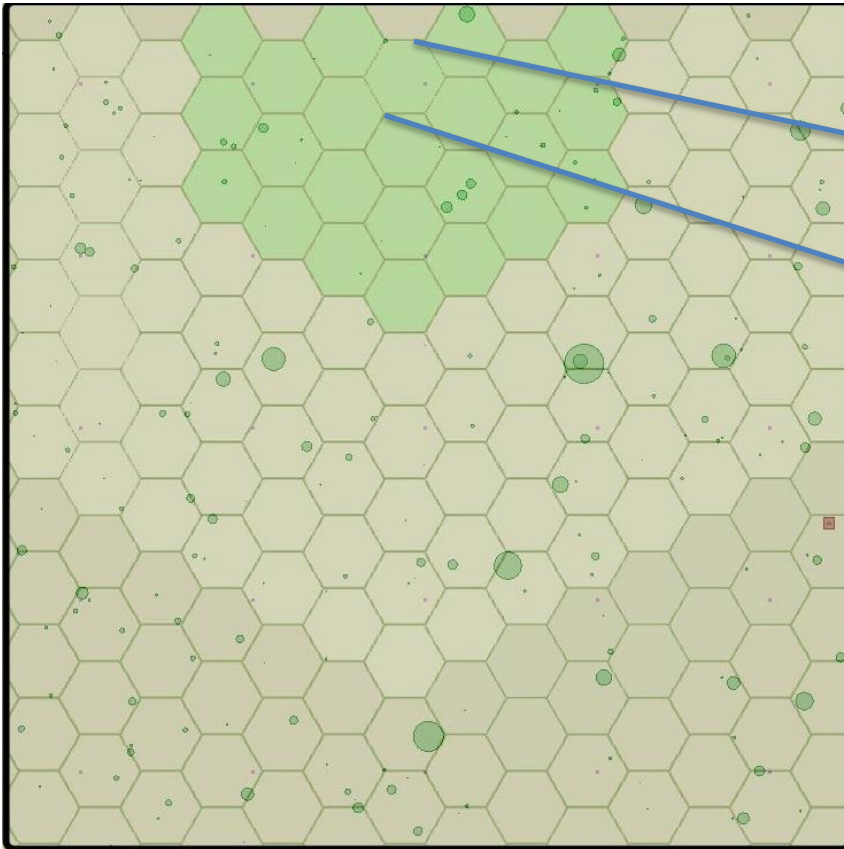
The science interface

- Custom built for a specific area
- All options open
- Allows managers to 'play'
- Still looks a bit like science!



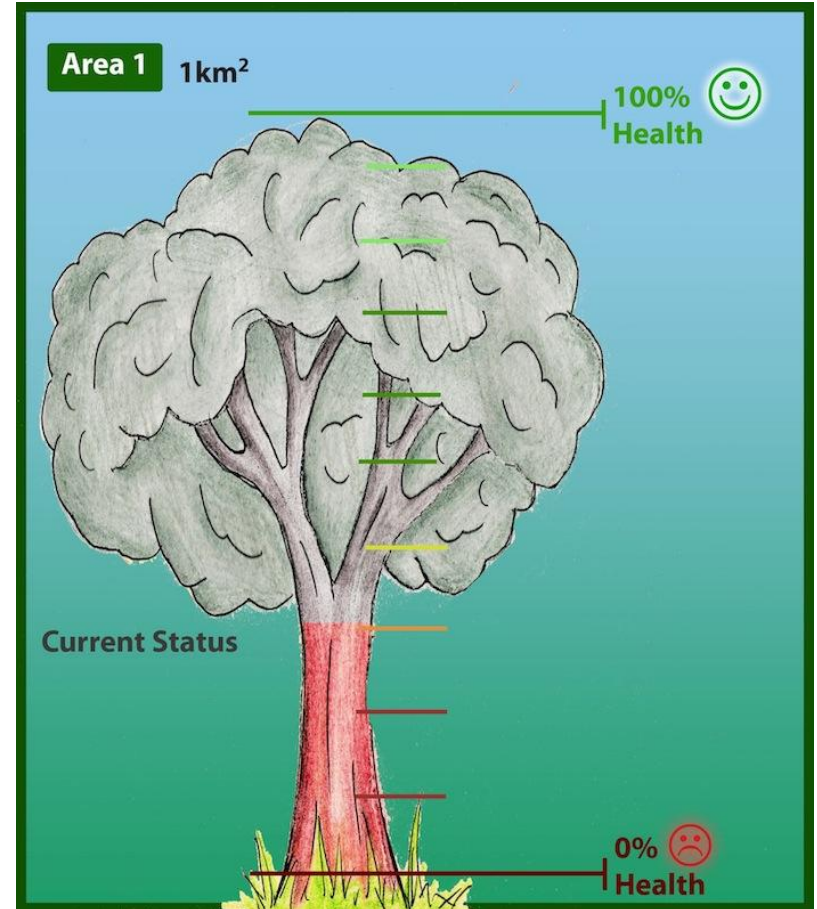
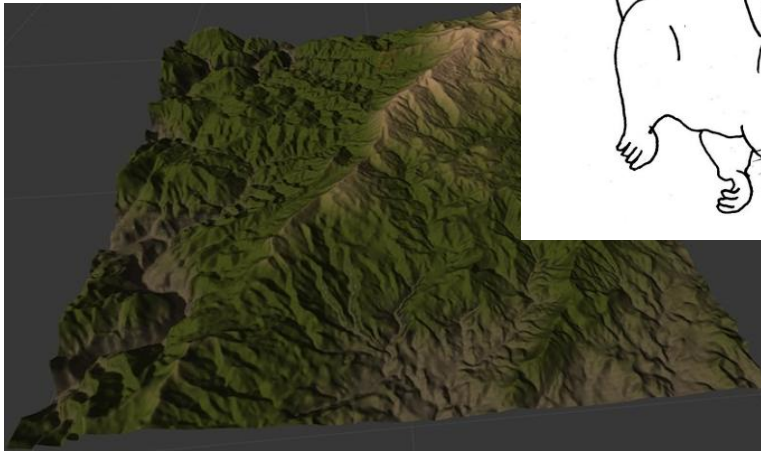
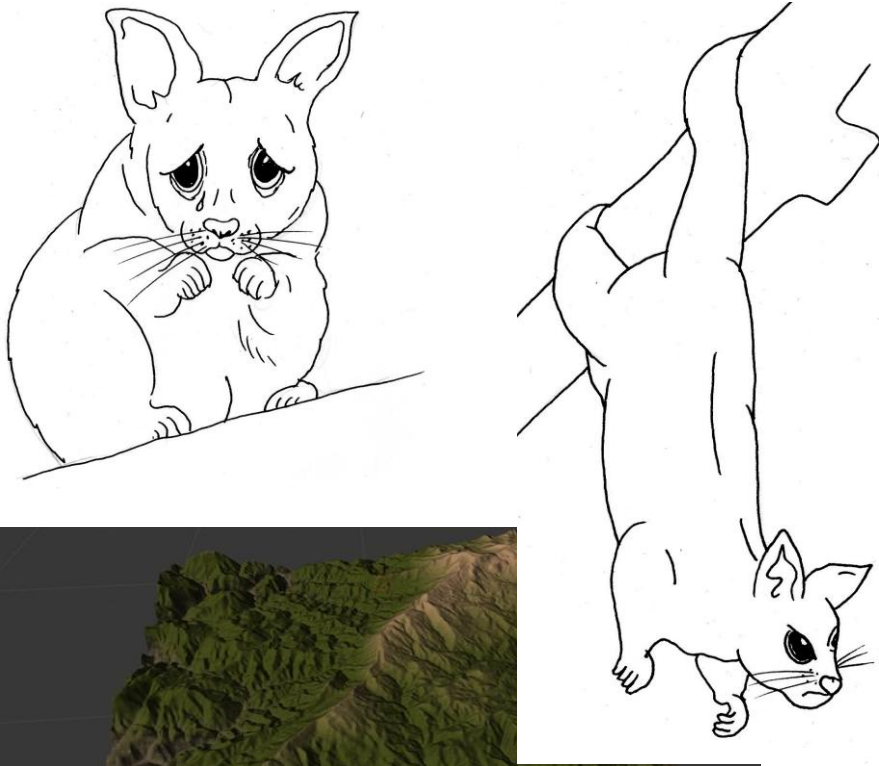
The game interface

- Leads players through a learning process



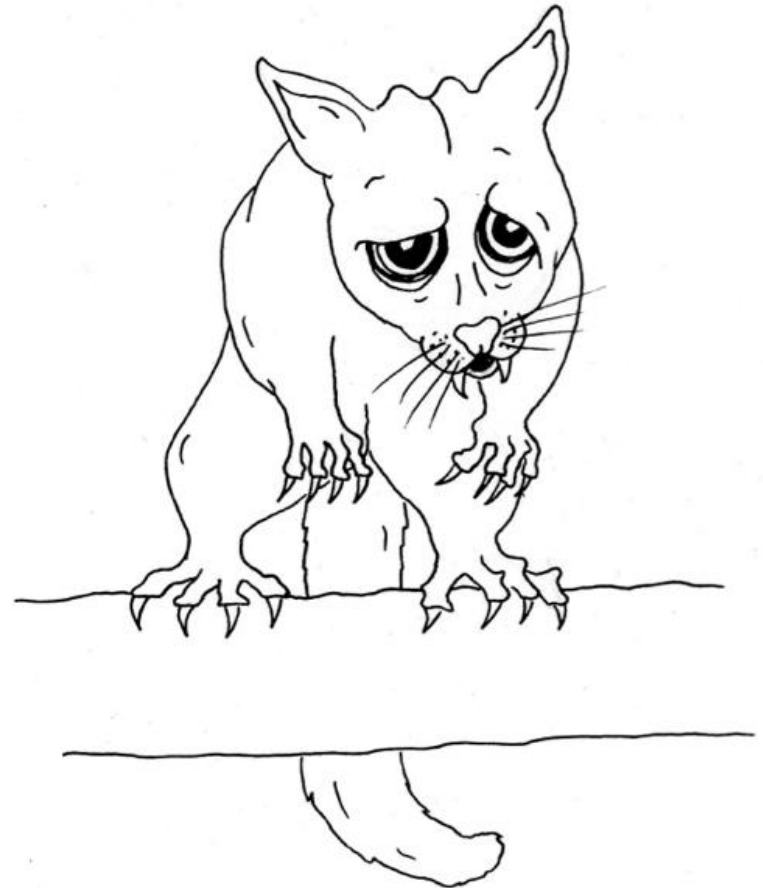
The game interface

- Enhances feedback



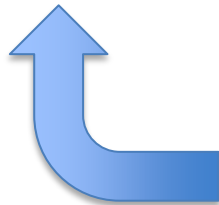
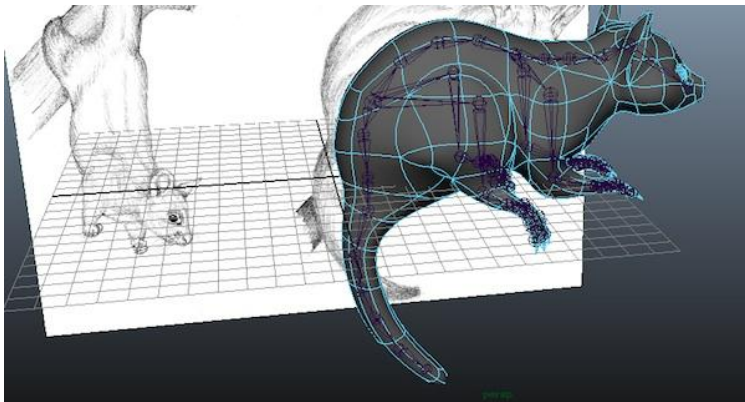
The game interface

- Gives greater incentives and rewards for persisting
 - mini games
 - league tables
 - native bird releases



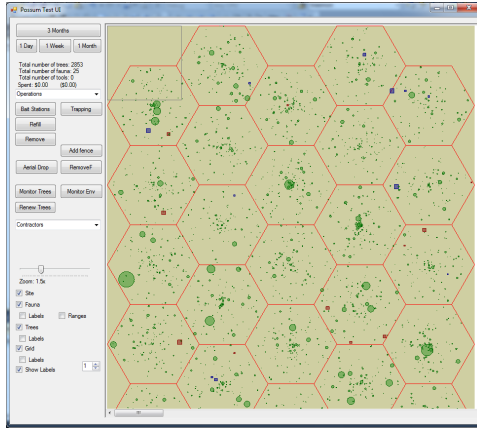
The game interface

- Makes the science easily accessible to anyone/everyone
- Includes stakeholder conflicts as well



Budget
Equipment
Manpower
Communities

Engage people with science

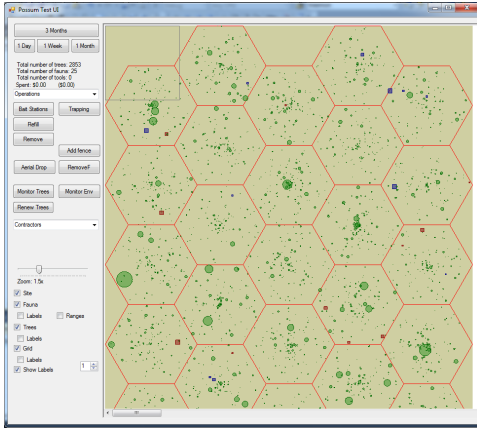


Learning goals



Community groups

Engage science with people



Learning goals

Management strategies

General public

Internet



What next?

- Get involved!
 - Testing the game
 - Getting your own science interface
 - Suggestions for game levels and mini games
 - Expanding the model to include multiple pests

Email Pen Holland on
hollandp@landcareresearch.co.nz

