Manaaki Whenua
Landcare Research

Case study of a cost effective method to assess biocontrol releases: Nodding thistle

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National Biocontrol Collective

Ministry for Primary Industries
Manatū Ahu Matua

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Overview

- Background
- Assessment of nodding thistle biocontrol
- Discussion of results
- Other projects
- Questions and Discussion

History of Assessment

Councils are the applicants for introduction of new organisms and wanted to follow up on the outcomes of these introductions

Questions about monitoring always come up in EPA hearings. The NBC has committed to follow up on these organisms. We state this commitment in applications

Monitoring can be prohibitively expensive and time consuming. Funding cycles are short term, and new projects tend to be a priority

History of Assessment

The NBC & MWLR agreed on a simple protocol for council staff to monitor:

Agent establishment

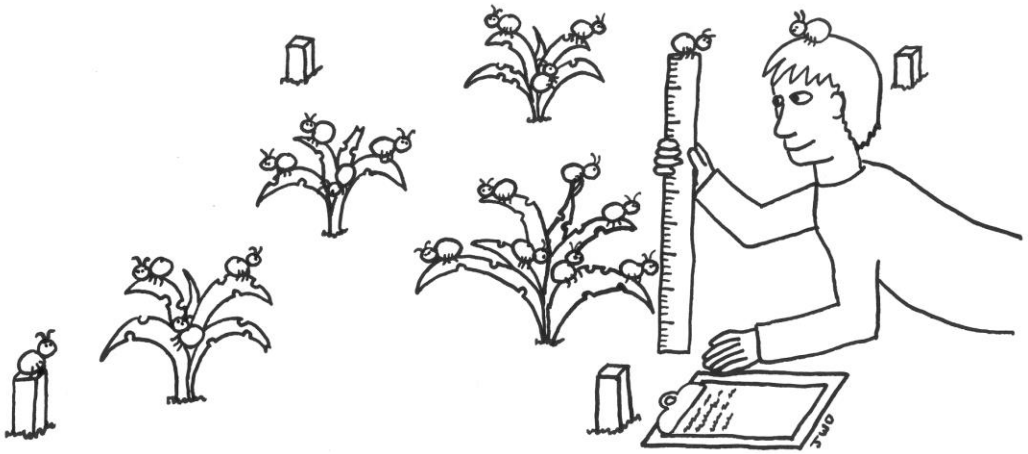
Population build-up

Impact on the target weed

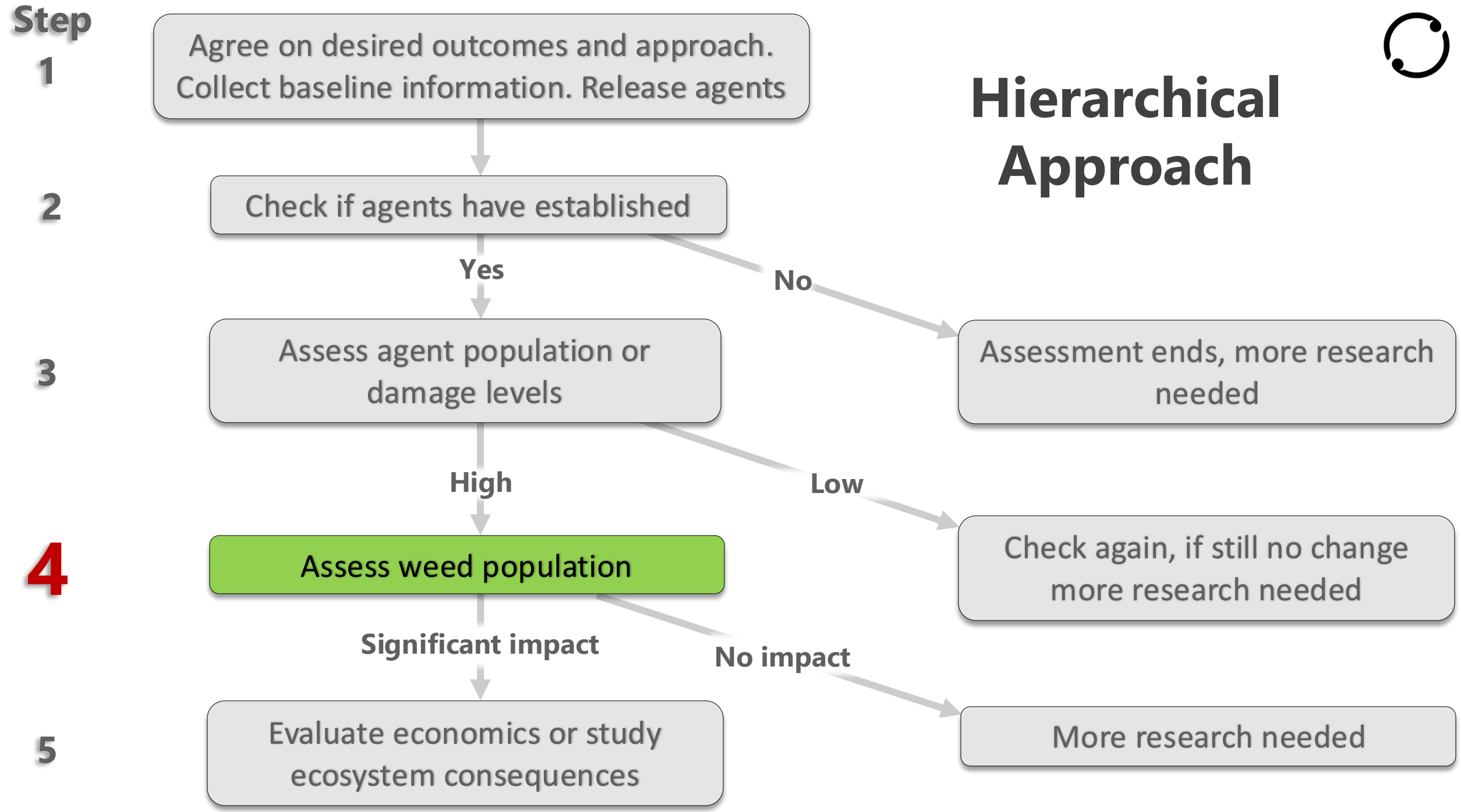
MWLR monitors more complex aspects like:

Non-target effects

Intensive studies of flagship programmes



Hierarchical Approach



Assessment of Matured Programmes

Power in numbers: low-intensity surveys of a large number of release sites across the geographic range of the weed

Release sites have (some) info on level of weed infestation + land use/management at the time of release – point of comparison

Uniquely NZ approach – possible only thanks to commitment by NBC members

Surveying release sites to assess change in nodding thistle

Nodding Thistle Assessment

1. Thistle density

Nodding thistle crown weevil
Trichosirocalus horridus

Nodding thistle gall fly
Urophora solstitialis

Surveying release sites to assess change in nodding thistle

Nodding Thistle Assessment

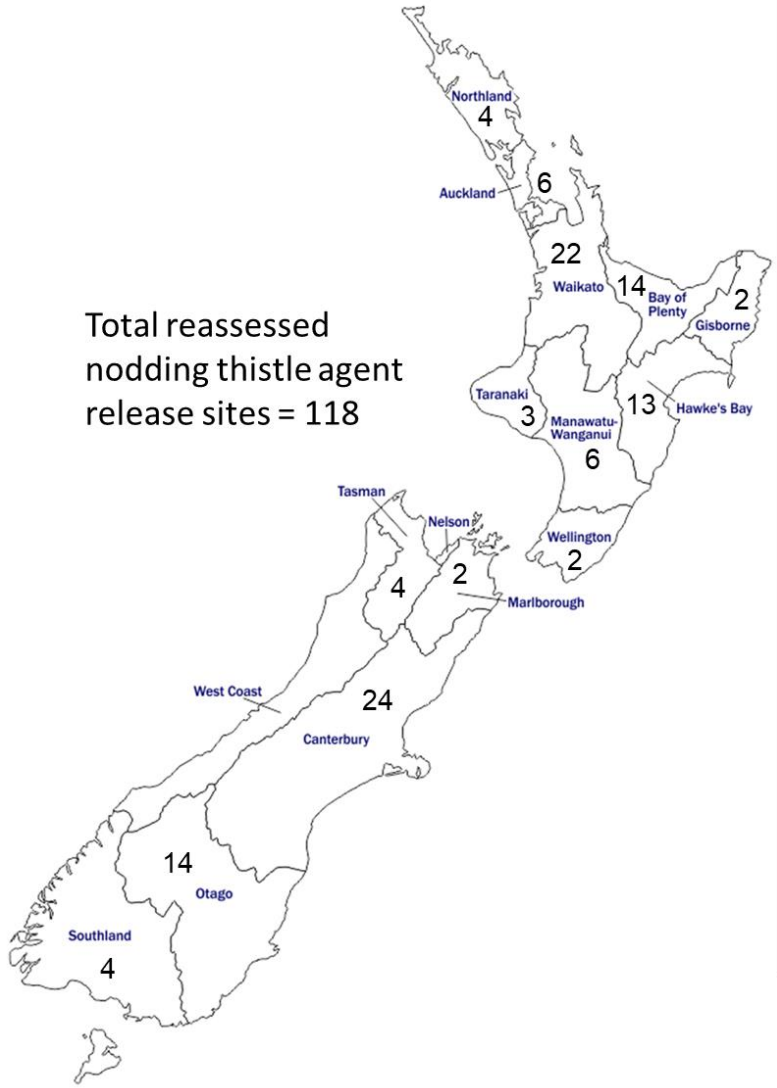
2. Manager survey

Nodding thistle crown weevil
Trichosirocalus horridus

Nodding thistle gall fly
Urophora solstitialis

Representative range of sites revisited nationwide

- Revisited ~ 70 sites for each agent
- 13 different regions
- 2 visits to each site
- Combined data sets for the two agents



Impressive reduction in nodding thistle

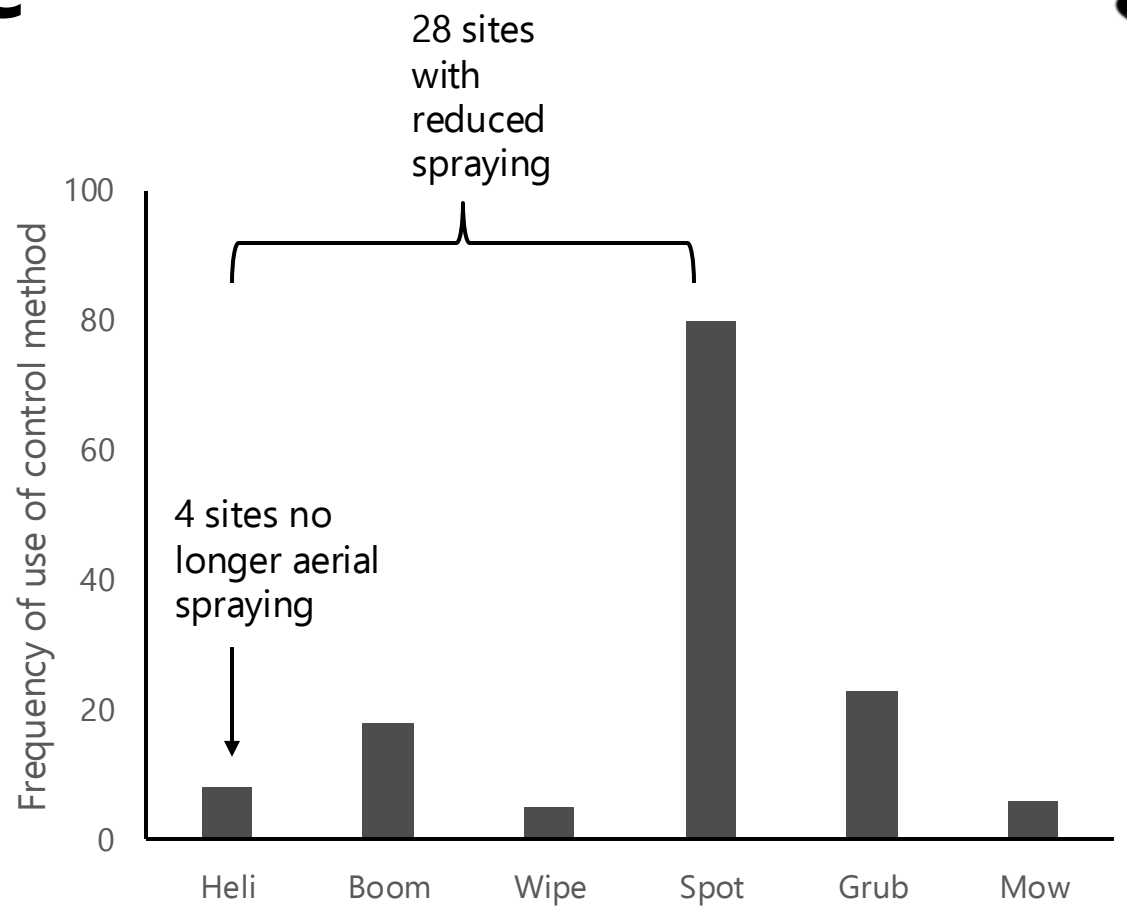
- Density just after agent release (1988-98): mean **3.1** plants/m^2
- Revisit 2013-2021: mean **0.65**/m^2

- **78.9%** reduction in NT density

- Due to biocontrol?
- Agents common + no change in Californian thistle

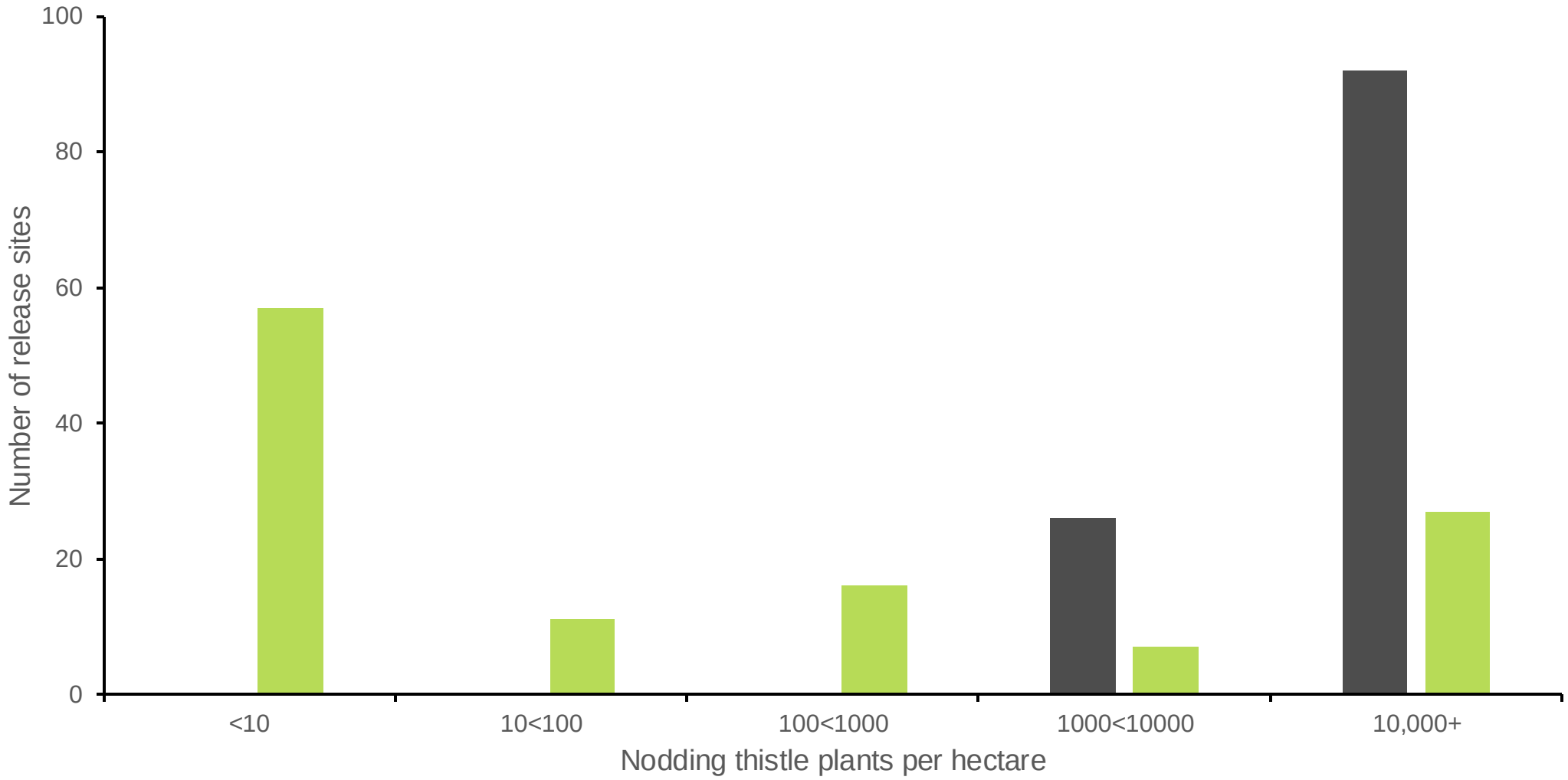
Control of nodding thistle

- Still substantial ongoing control, but less than when biocontrol started
- 25% of sites now do no control



- Annual saving in NT control costs = **NZ$28 m**
- Present value analysis – benefit:cost ratio of nodding thistle biocontrol programme = between **587:1 & 1250:1**

Fewer properties with high densities of nodding thistle. Most farms now have low density



Farmer opinion of biocontrol of nodding thistle

Opinion of biocontrol	No. farmers
Unaware or waste of time	22
Unsure or considered partially effective	39
Sure it had been successful	39

- 9/10 farmers who said biocontrol was “waste of time” (or similar wording) had NT reductions of >90%

“Provide 3 words that best describe your view of biological control of nodding thistle”

- Absolutely brilliant
- Bloody fantastic
- Effective, environmentally friendly
- Good, worth doing
- I'm pretty impressed
- Major ongoing benefit
- Preferred option. Sustainable. Cheaper.
- Quite remarkable now
- Thins them out
- Way to go!
- Bloody useless half-hearted
- F***g slow process
- No results observed
- Not helpful really
- Stick with spraying
- Waste of time

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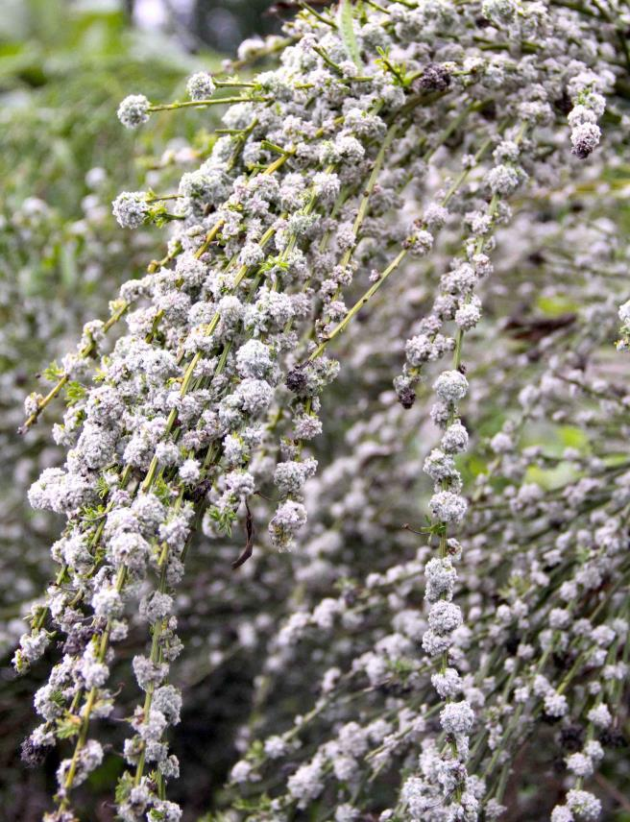
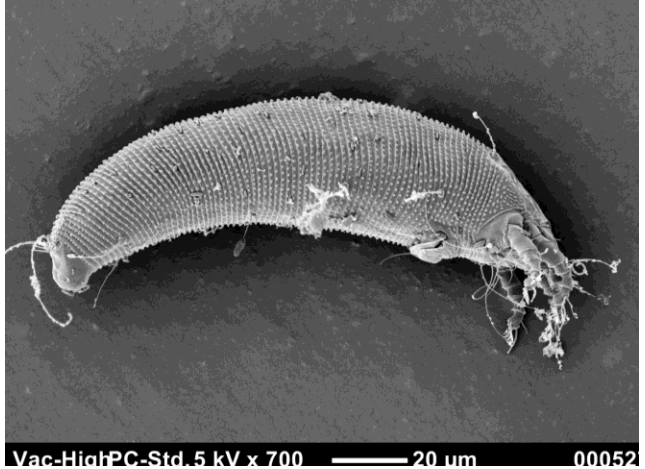
“I’ve got heaps of thistles”

Thank you NBC members and council staff

Ragwort

- Annual benefit: **NZ$41 m**
- B:C between **73:1** & **860:1**





A more challenging picture: Broom Gall Mite Assessment

- Background
  - BGM 1 of 6 Broom agents
  - First released 2008
- Challenges
  - Type of release sites
  - High number of sites sprayed
  - Regional variation
  - A much more complicated picture??

Californian Thistle Beetle Assessment

How should we measure other factors?

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Environmental?

Biodiversity?

Cultural?

Recreational?

Visual?

Climate change mitigation?

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