

Inventory and monitoring of terrestrial biodiversity: imperatives, national initiatives and their relevance and opportunities for sanctuaries

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Why monitor?

Record how things are changing so we can:

- Know
- Reassure
- Choose

But do we do it?

Review of 37 audits of NGO conservation projects

- Less than 1/3 doing any monitoring at all
- Much less than that systematically or regularly

‘..it is quite possible that most conservation projects and therefore most conservation organisations – cannot credibly assess their effectiveness and impact, and seldom follow an iterative process necessary to learn from, share, and adapt based on successes and failures

Most monitoring is
done poorly, fails
or is not even started

Why?

It is expensive

The plural of anecdote is not data

Acquisition,
archiving & analysis
of reliable data is never cheap

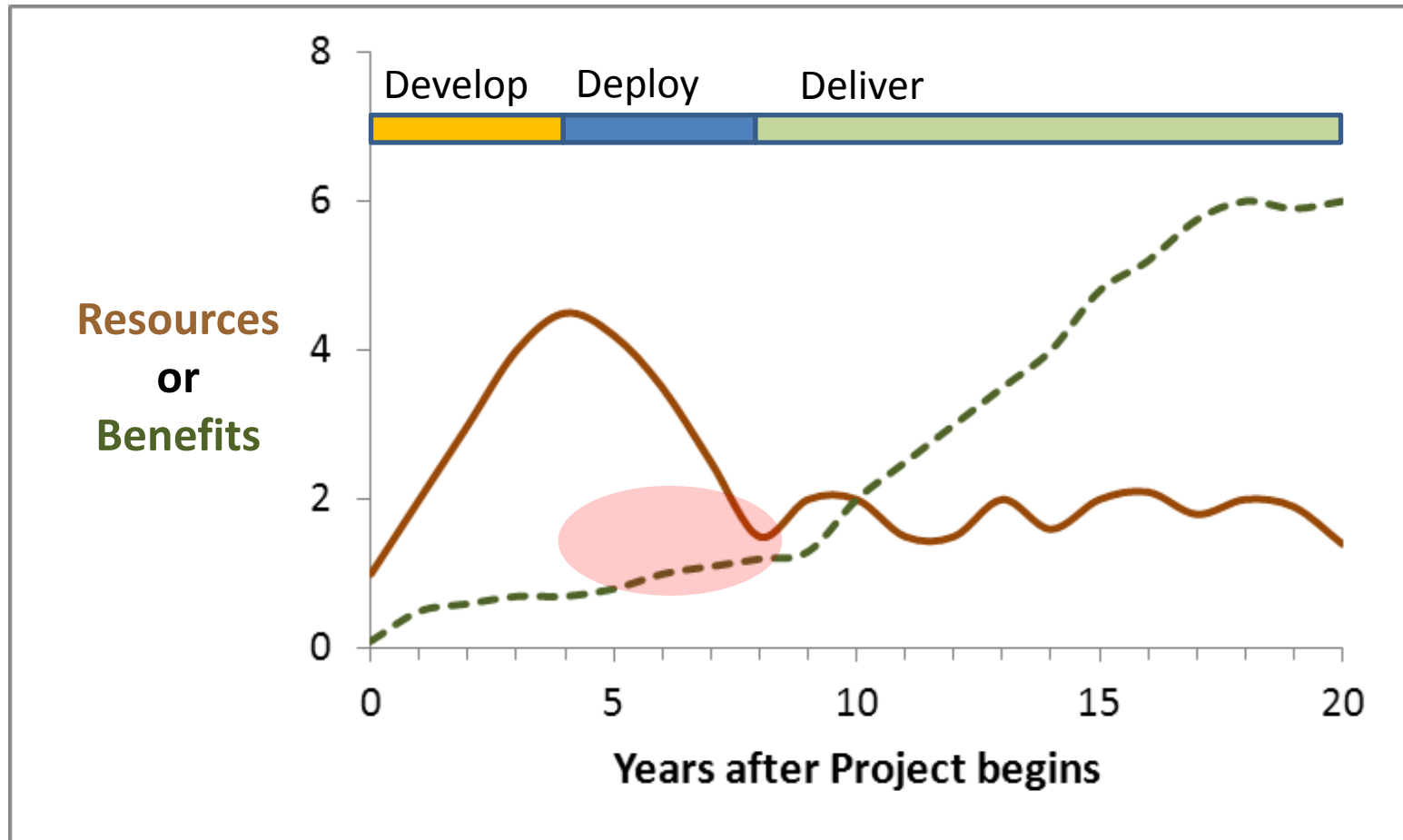
Costs:

Underestimated

Results:

Over-anticipated

Valley of Death for a Monitoring Scheme



Normal people hate monitoring

- Takes funding from things they like doing
- Makes them do stuff they don't like doing
- Reduces autonomy
- Passes judgement
- May conflict with their insights

Resistance to monitoring is like rust

You are measuring:

The wrong things

In the wrong way

In the wrong places

Telling us what we already know

Wasting **SCARCE** conservation resources

GLASS COMPLETELY EMPTY CONSERVATION SEMANTICS

Google Search hits
(17.07.2013)

Glass Half Empty

Limited conservation resources	116 000
Scarce conservation resources	108 000
Insufficient conservation resources	276
Scant conservation resources	4
Inadequate conservation resources	3

Glass Half Full

Sufficient conservation resources	7
Adequate conservation resources	6
Plentiful conservation resources	1
Abundant conservation resources	1
Ample conservation resources	0
Copious conservation resources	0

We know why monitoring schemes fail

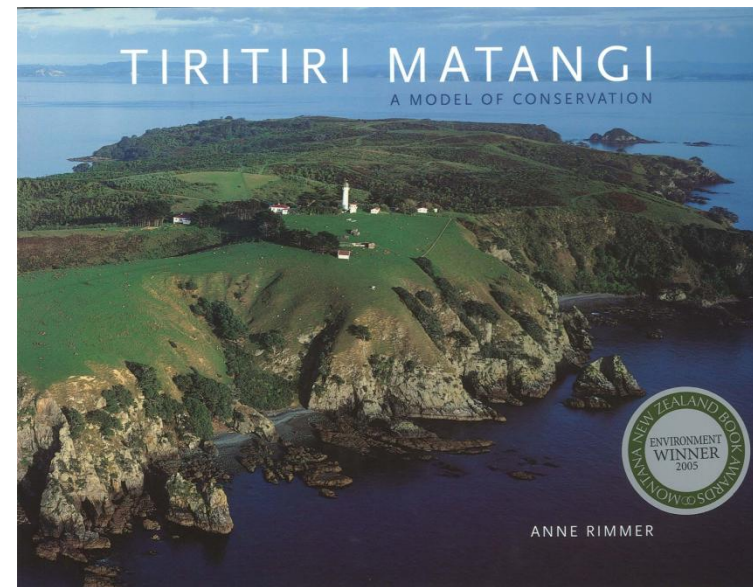
- Lack of commitment
- Lack of willing staff cooperation
- Little provision for archiving/analysis/reporting
- Costs not proportional to benefits

Sanctuaries and monitoring

- Many have a long history of **output** monitoring (tonnes of pest mammal carcasses per annum)
- Less emphasis for many on **outcome** monitoring (e.g. progress towards the outcome of “returning a catchment to as near as possible to a pre-human state”)

Sanctuaries: is monitoring outcomes necessary?

- Anecdote might be appropriate
- Monitoring by walking around and assessing threats
- Documentation by books
- Presence of juveniles may be all the evidence required



Sanctuaries: when might monitoring be necessary?

- When you're spending public money (central Government, local Government)
- There's an increasing culture of auditing against claimed outcomes
- When you want to know when to intervene
- When you want to know whether your intervention worked

What is an audit?

Systematic and
independent examination
of data, statements,
records, operations and
performances

Political/stakeholder demand for:

‘Value for money’ controls

Accountability & transparency

Quality assurance & regulation

Ensuring monitoring is successful

Ensure management support

Ensure audit agency approval

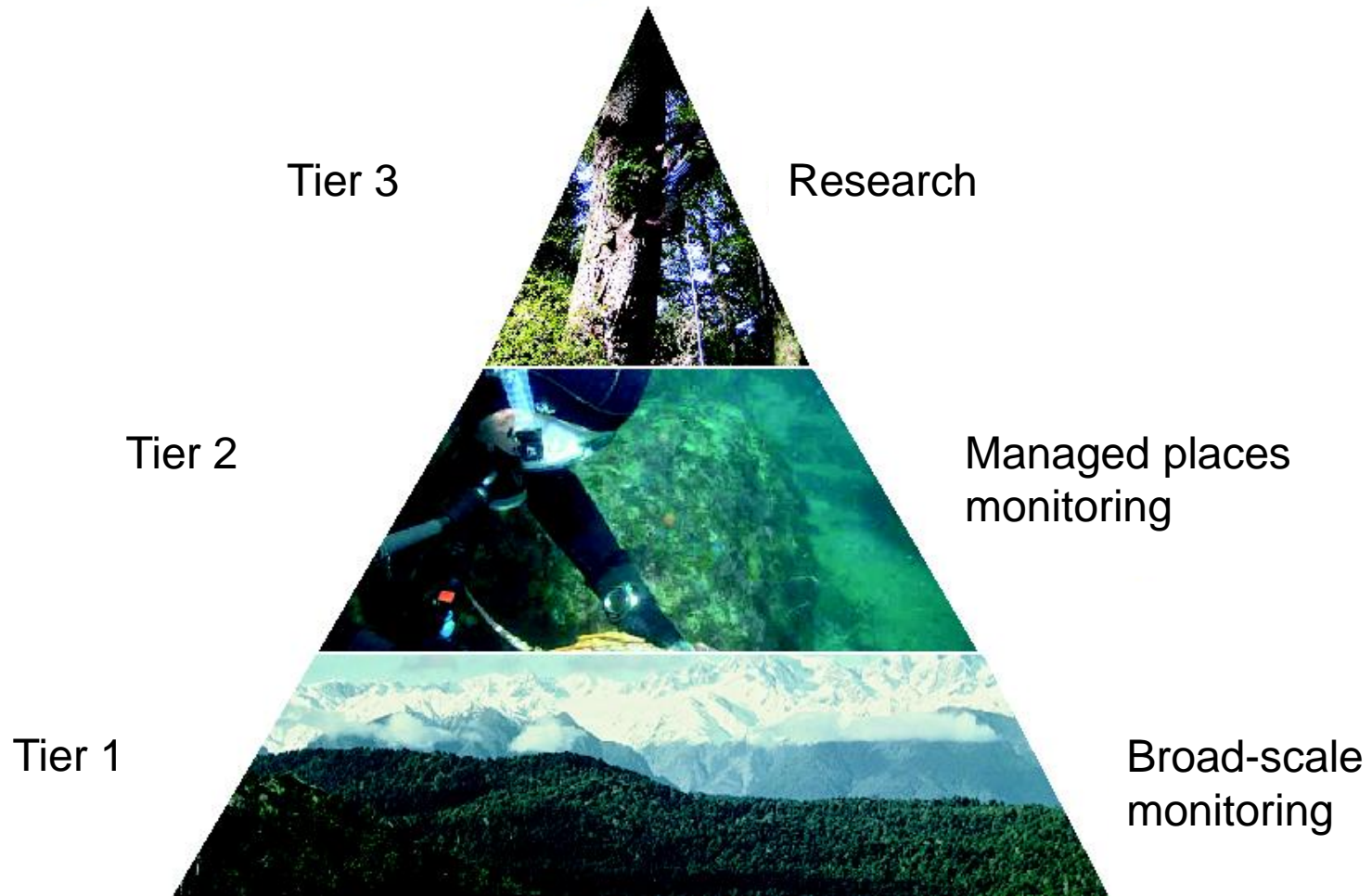
Professionalize monitoring

Separate operational & monitoring
budgets

Communicate well & often

DOC's approach

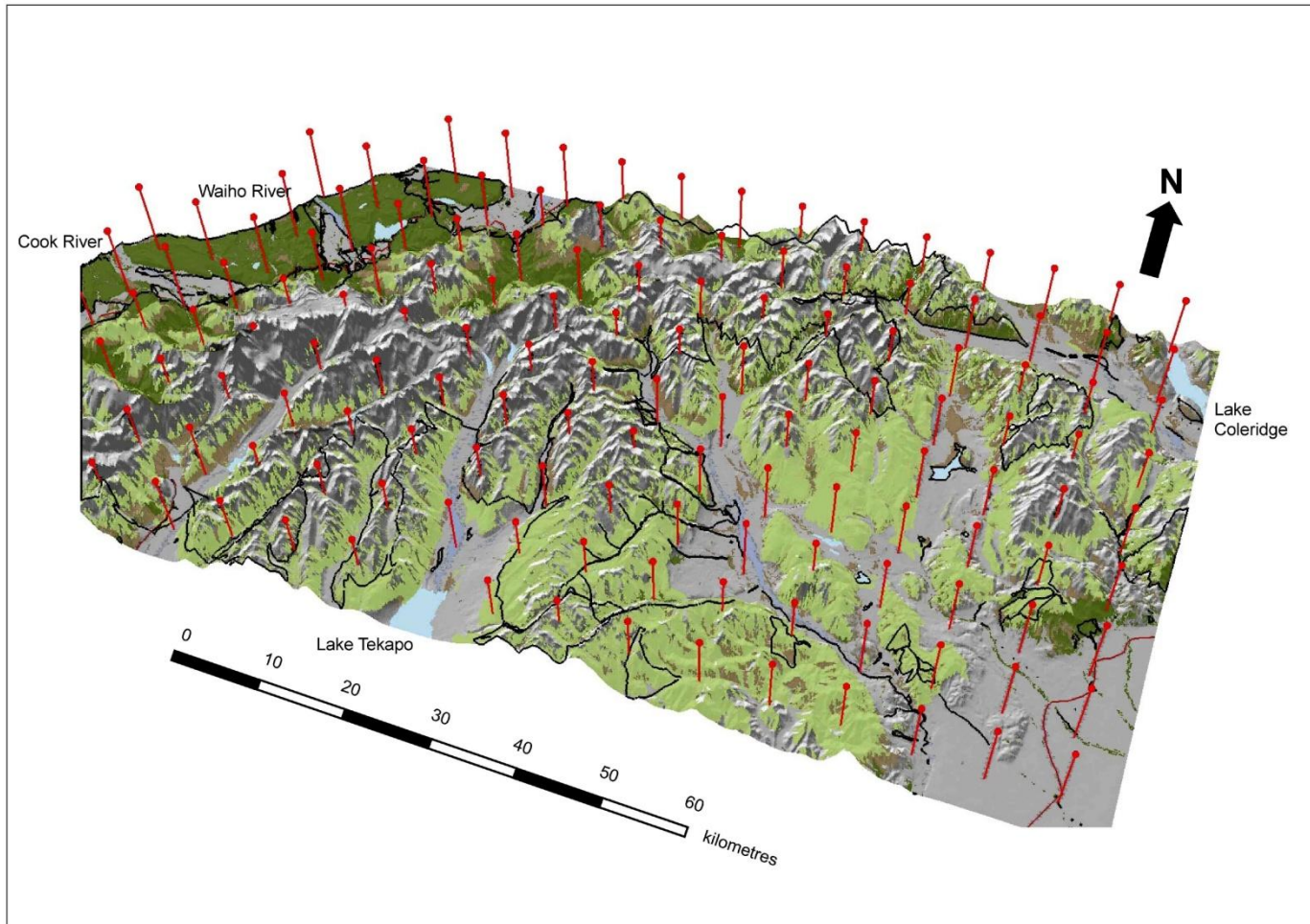
Biodiversity Monitoring and Reporting System



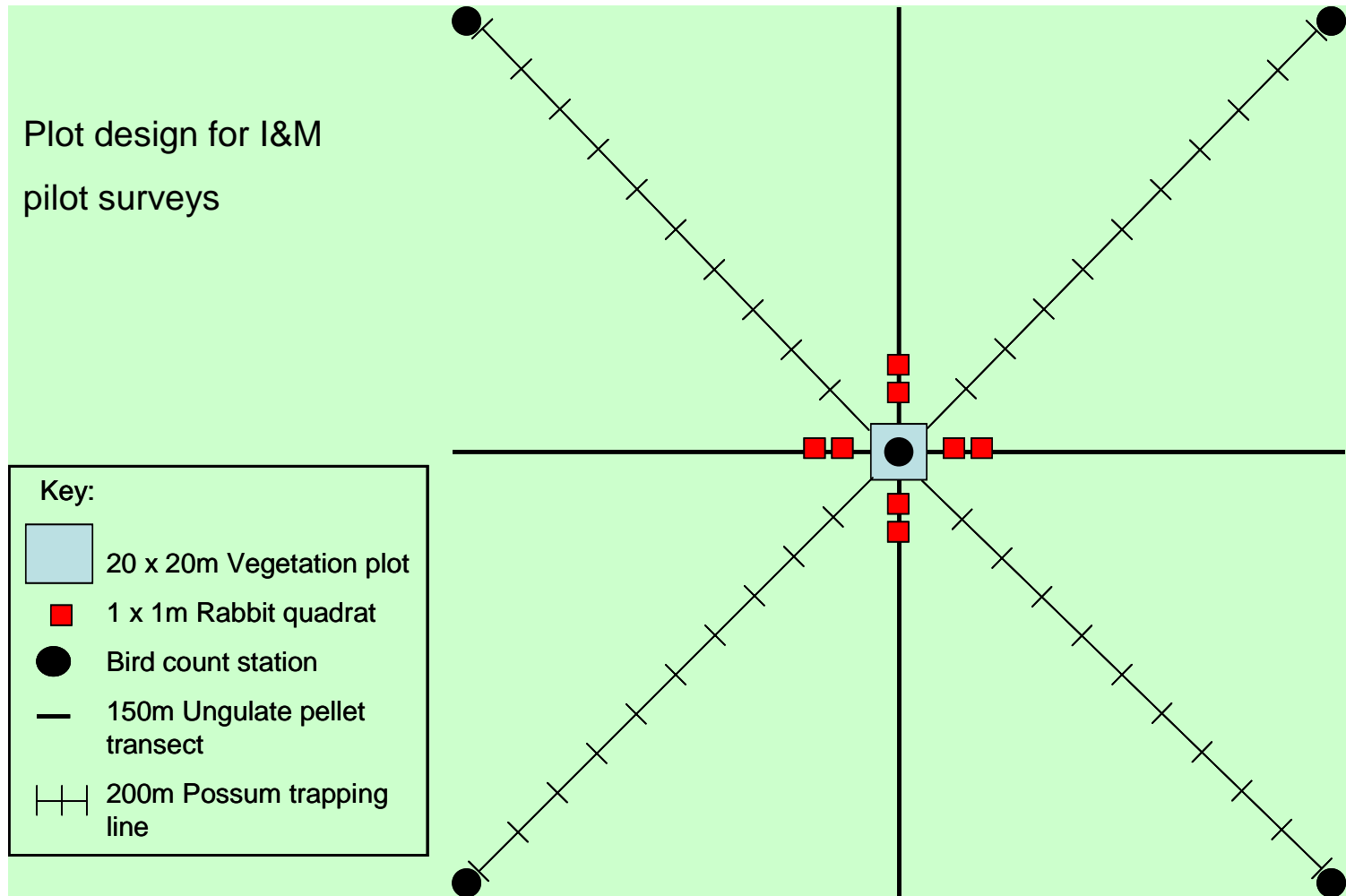
Tier 1

- Unbiased, regular sampling frameworks derived from models in Scandinavia (especially Finland), Austria, and France (and to a lesser extent the USA).
- Began in July 2011.
- Measures maintenance of plant canopy dominants, representation of plant functional types, and proportion of non-native plants.
- Non-native mammal abundance and occupancy
- Bird occupancy and abundance.
- Non-vascular plants may also be useful indicators.
- Provided key information to DOC's 2012 Annual Report
- Material for DOC's 2013 Annual Report now in review

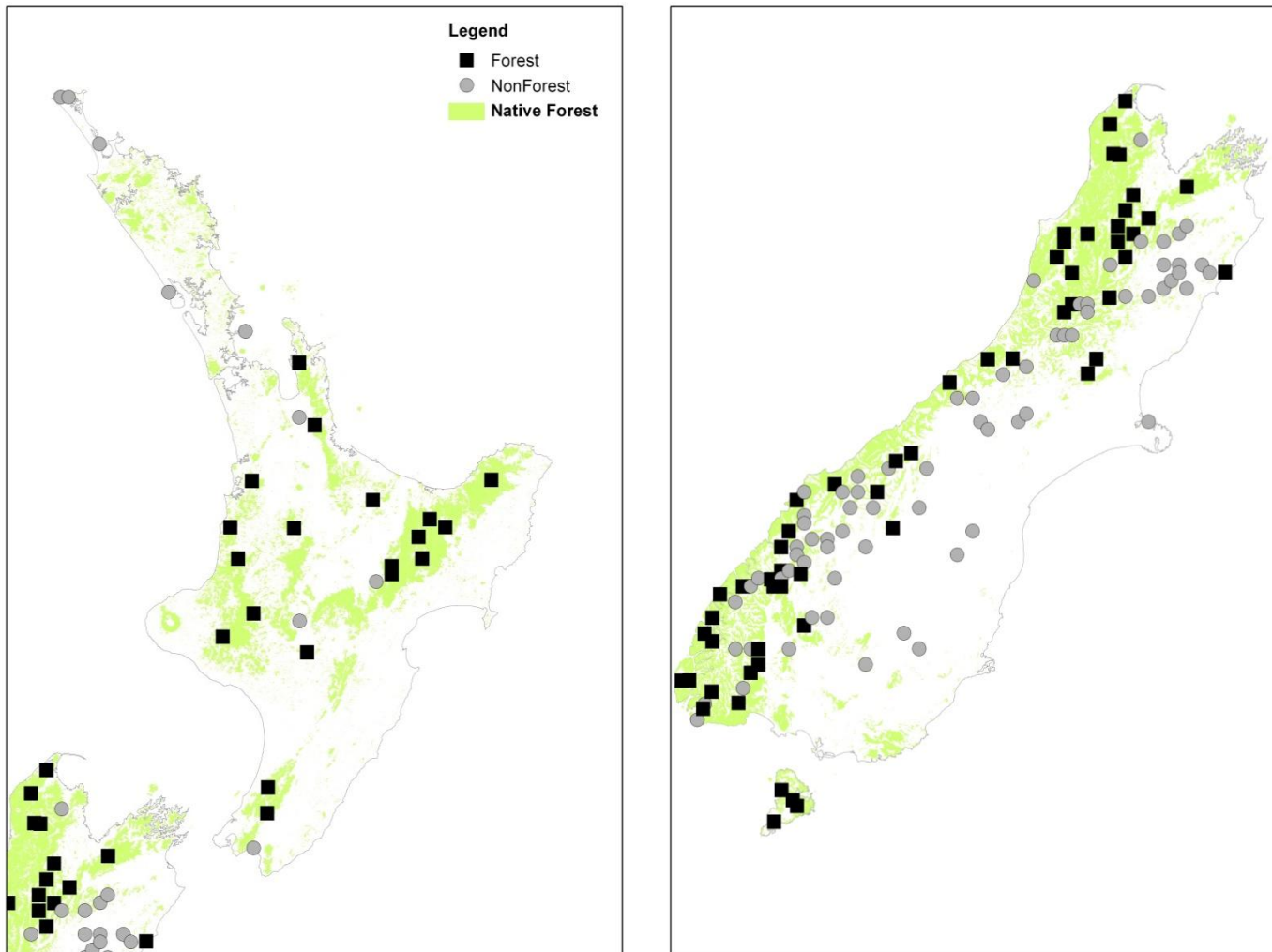
Tier 1 monitoring: a nationally unbiased assessment



Sampling vegetation, introduced mammals and birds



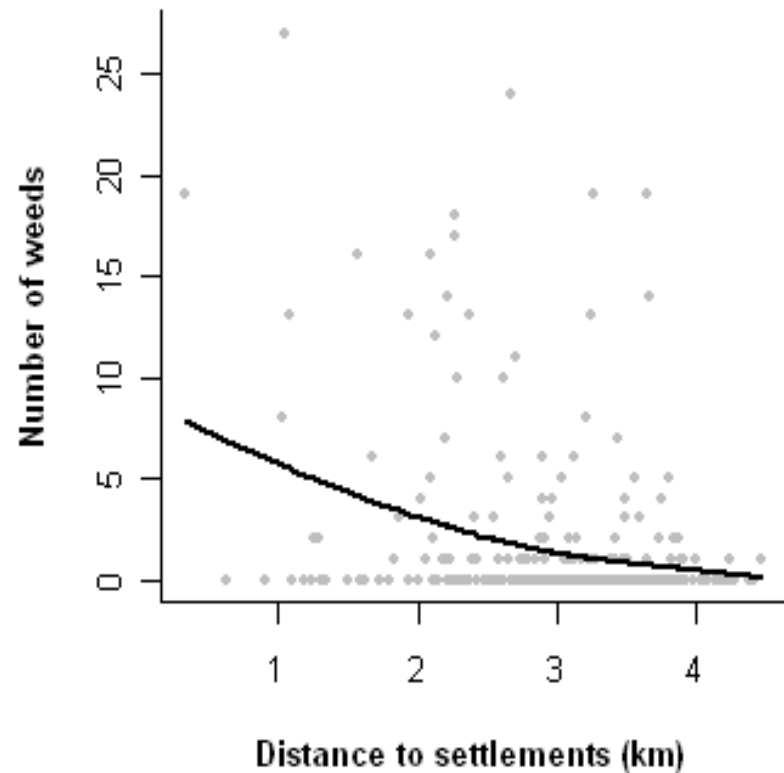
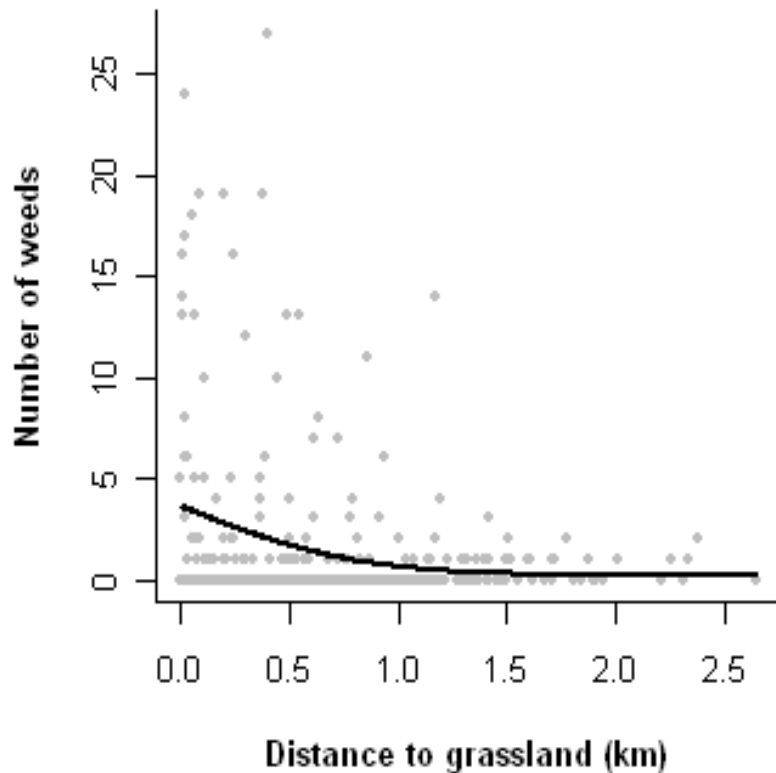
Sample points: 2011–13

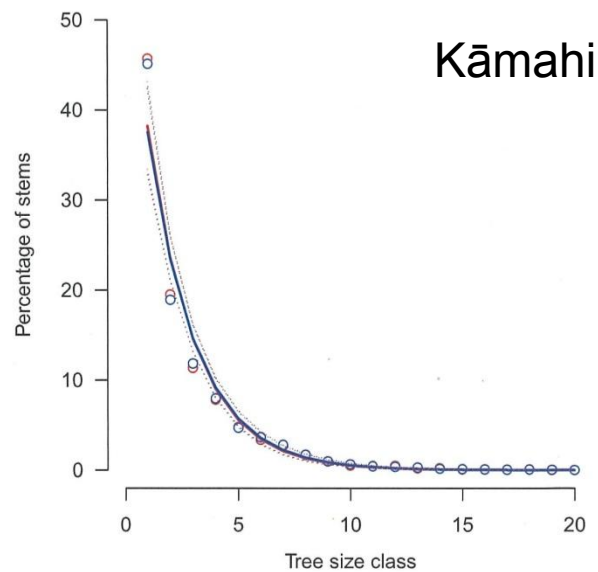
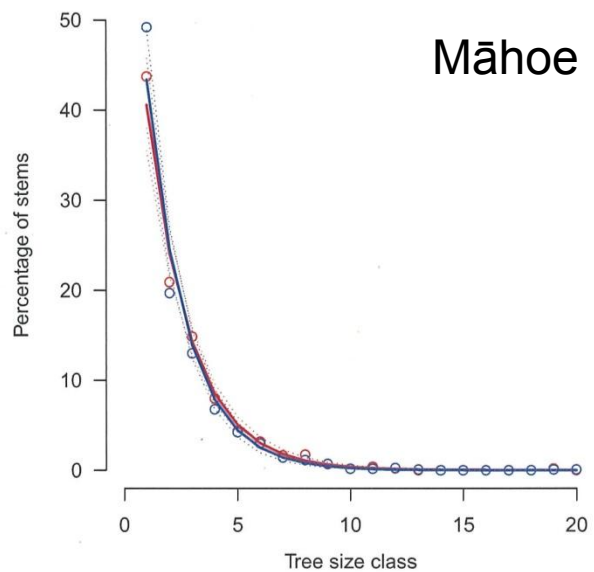
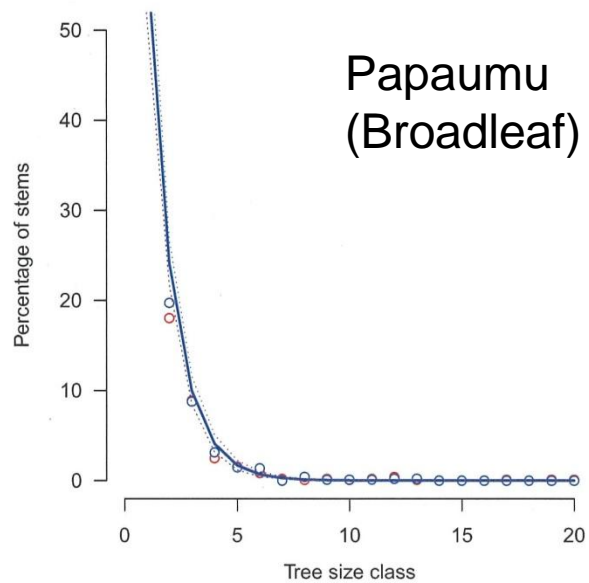
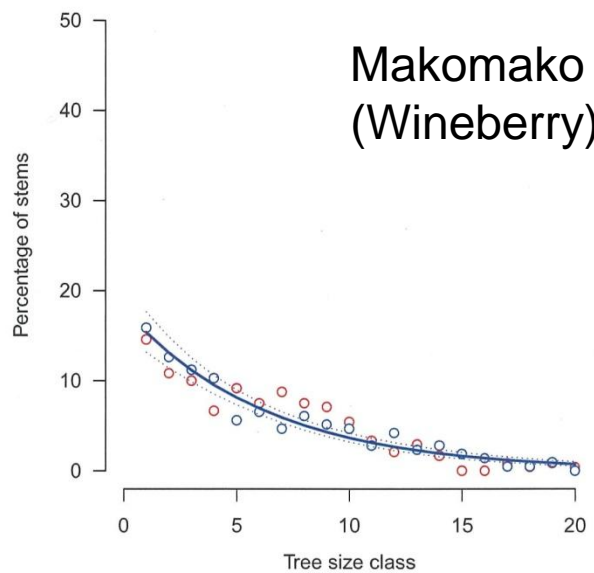


- 155 sampling locations: 76 forested, 79 non-forested
- c. 1310 sampling locations on 8-km grid

Weeds in forests nationally

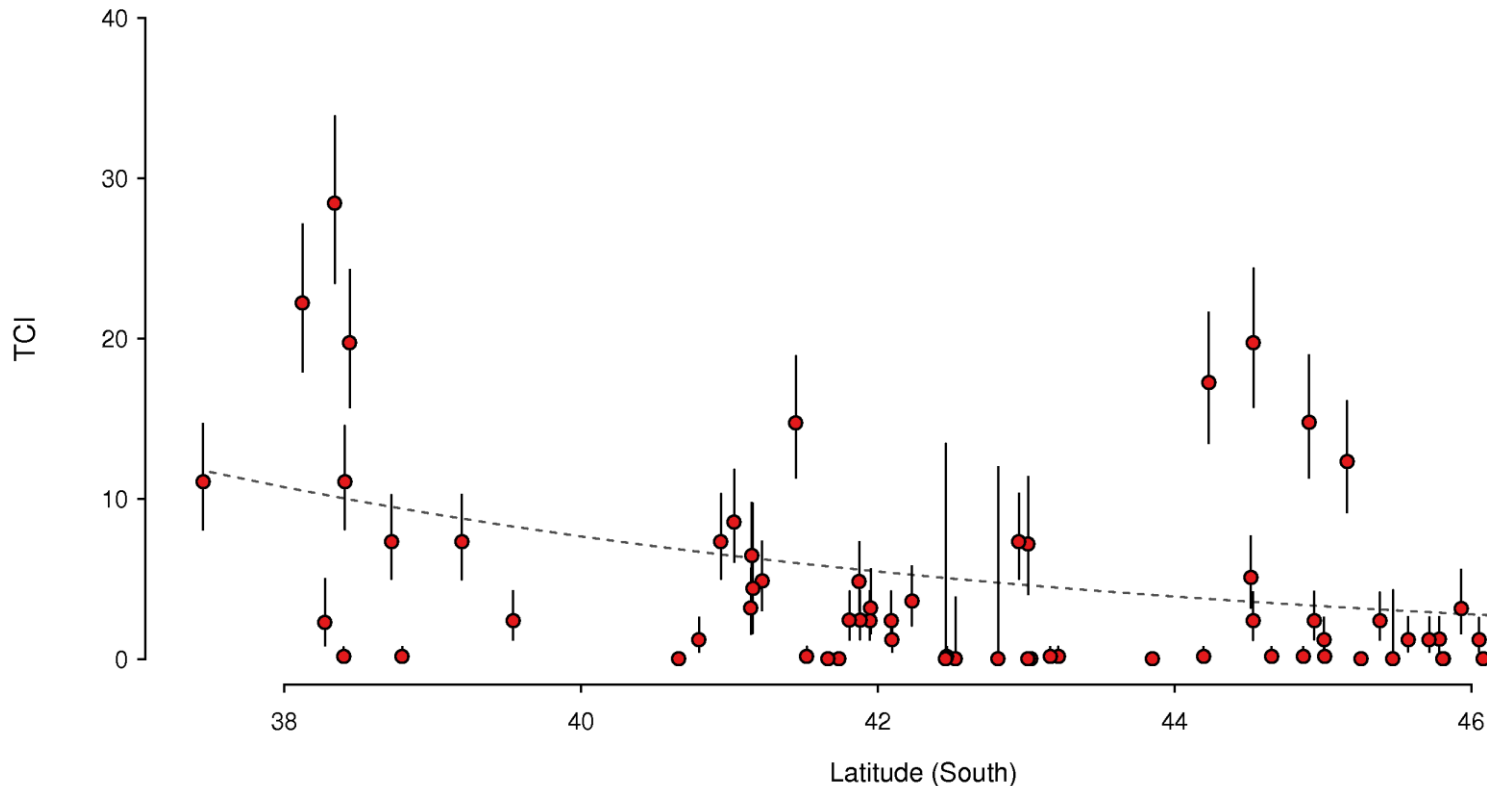
More weed species closer to forest edges
and closer to human settlements
(confirms various studies at local scales)





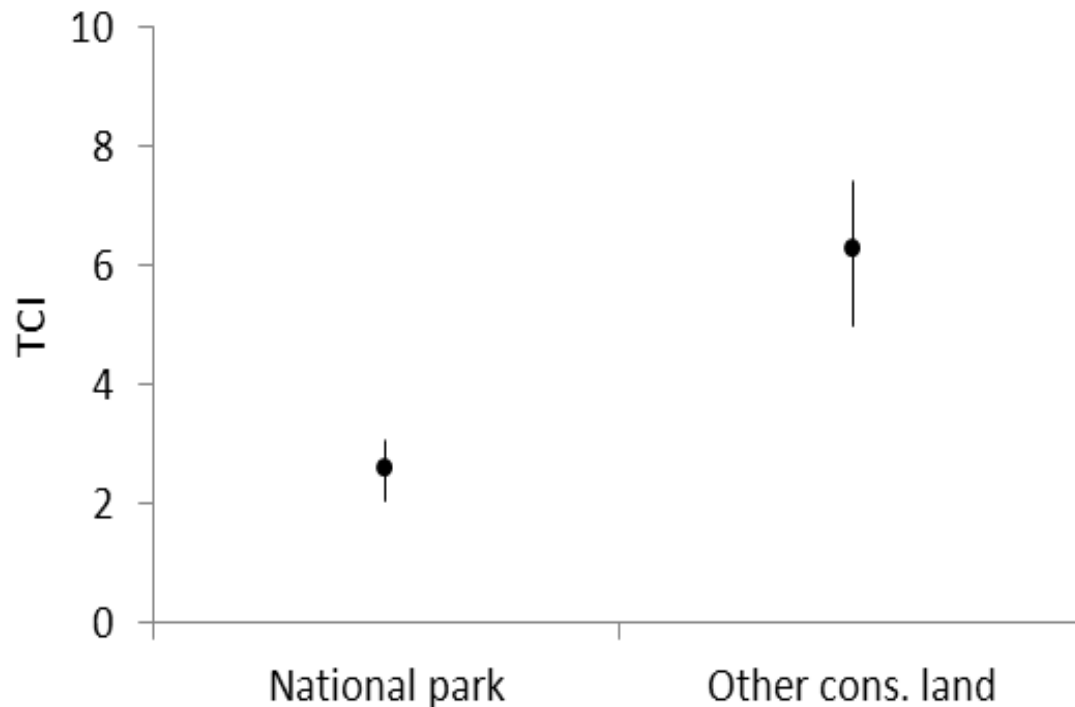
Possums in forests nationally

Possum abundance (assessed using trap catch index, TCI) declines from north to south in New Zealand



Possums in forests nationally

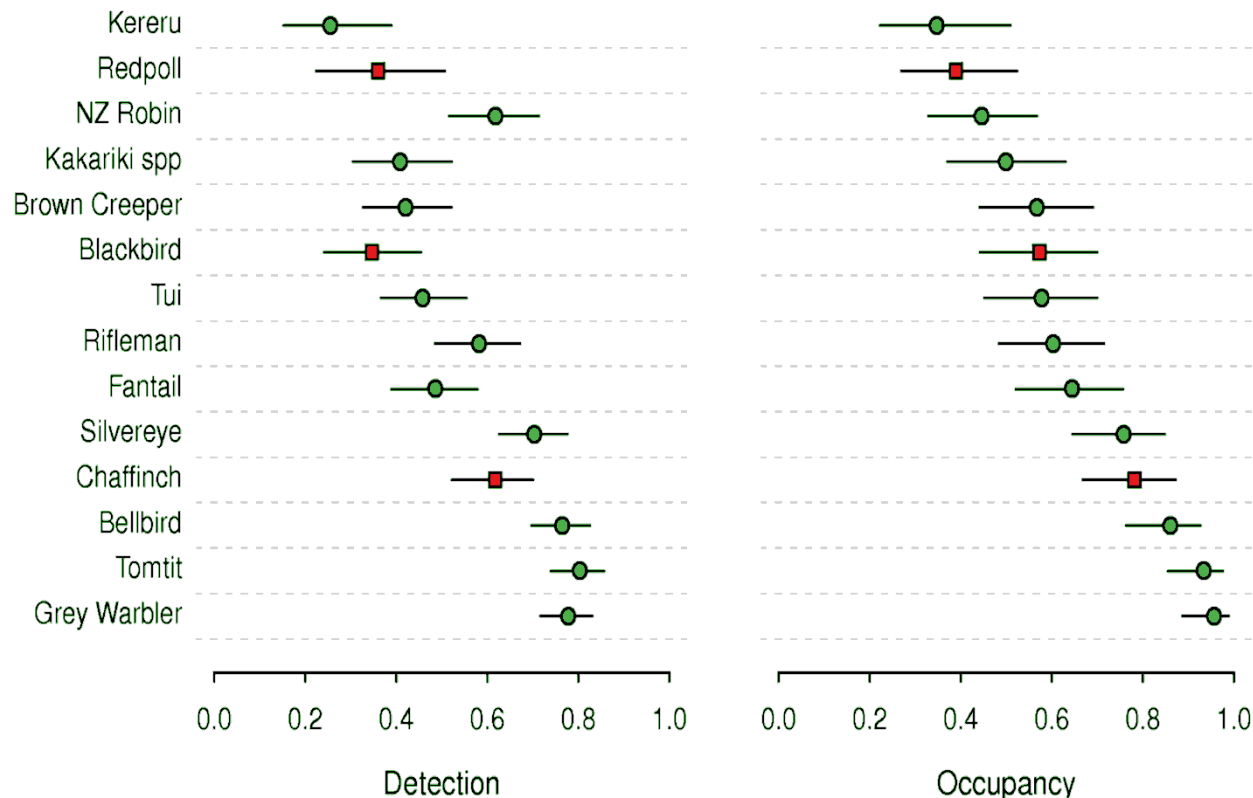
Possum abundance (assessed using trap catch index, TCI) is significantly lower in National Parks than in forests on other conservation land



Birds in forests nationally

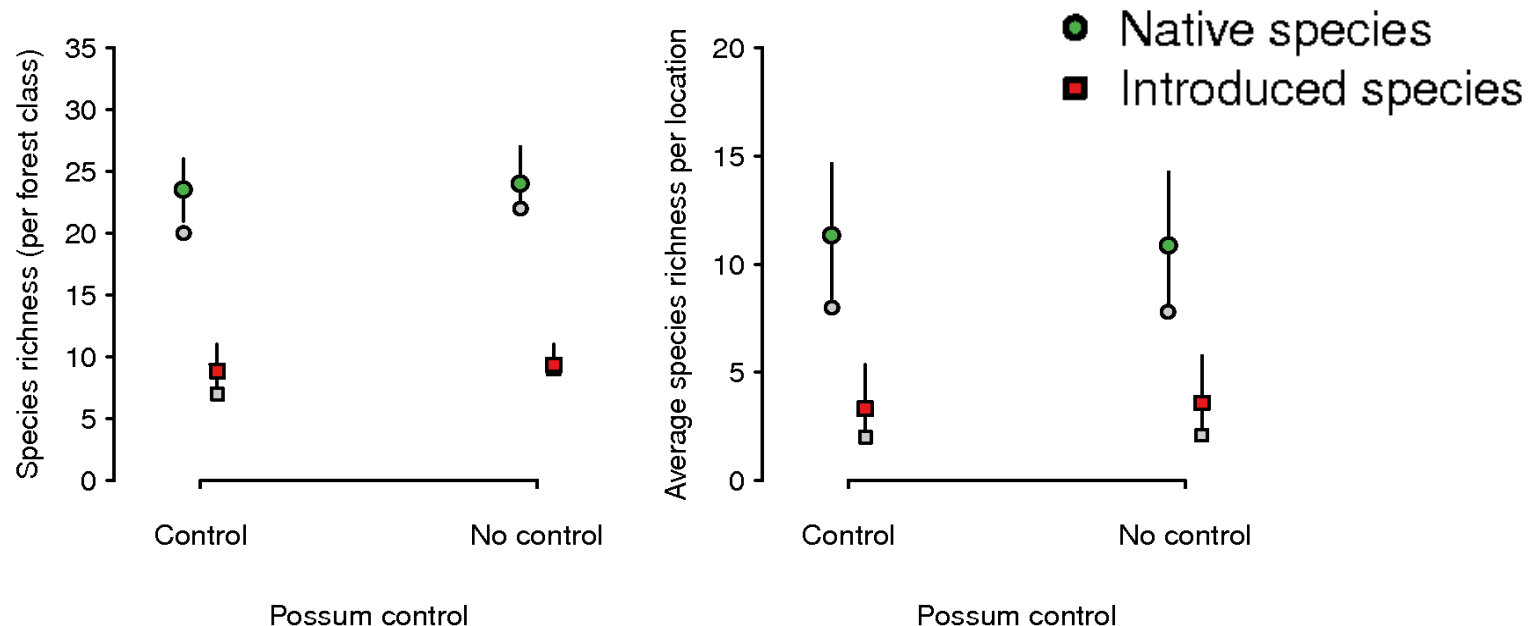
The fourteen most frequent birds:

Four native species (grey warbler, tomtit, bellbird, silvereye) and one introduced (chaffinch) are in three-quarters or more of sampled plots



Possum control in forests nationally: effect on birds

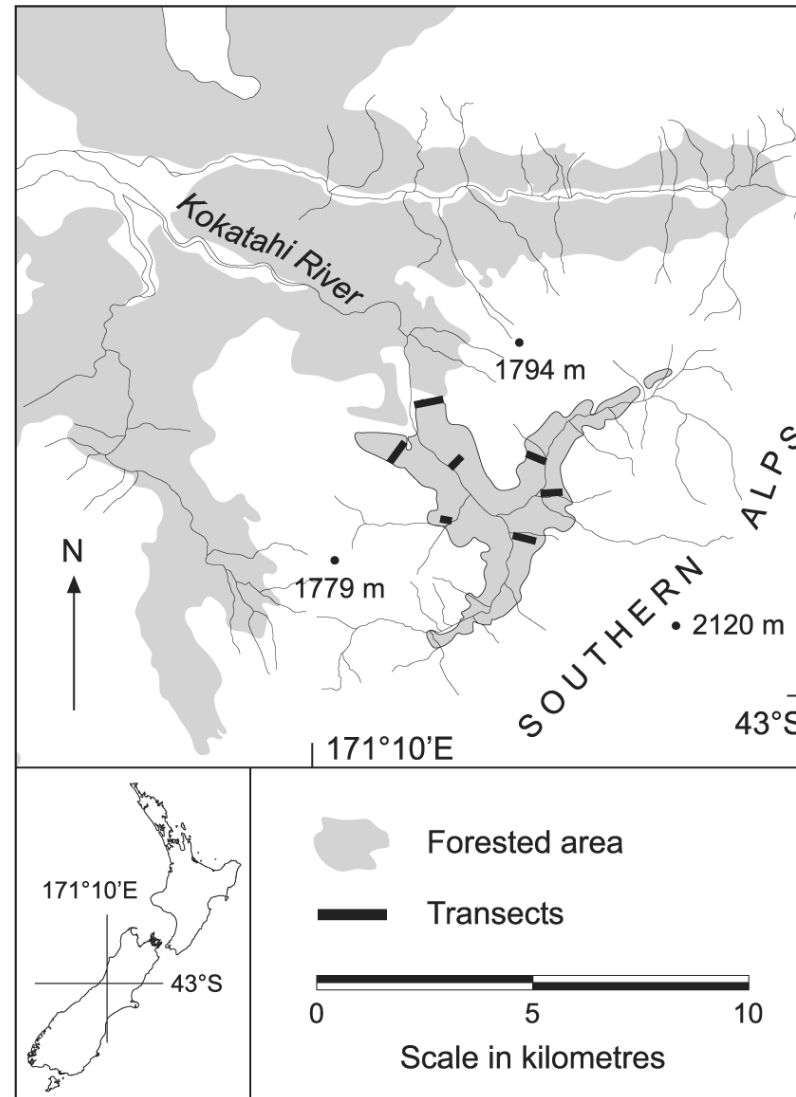
Possum control had no effect on the species richness of bird communities (native or introduced) in 75 plots in New Zealand forests (at two scales)



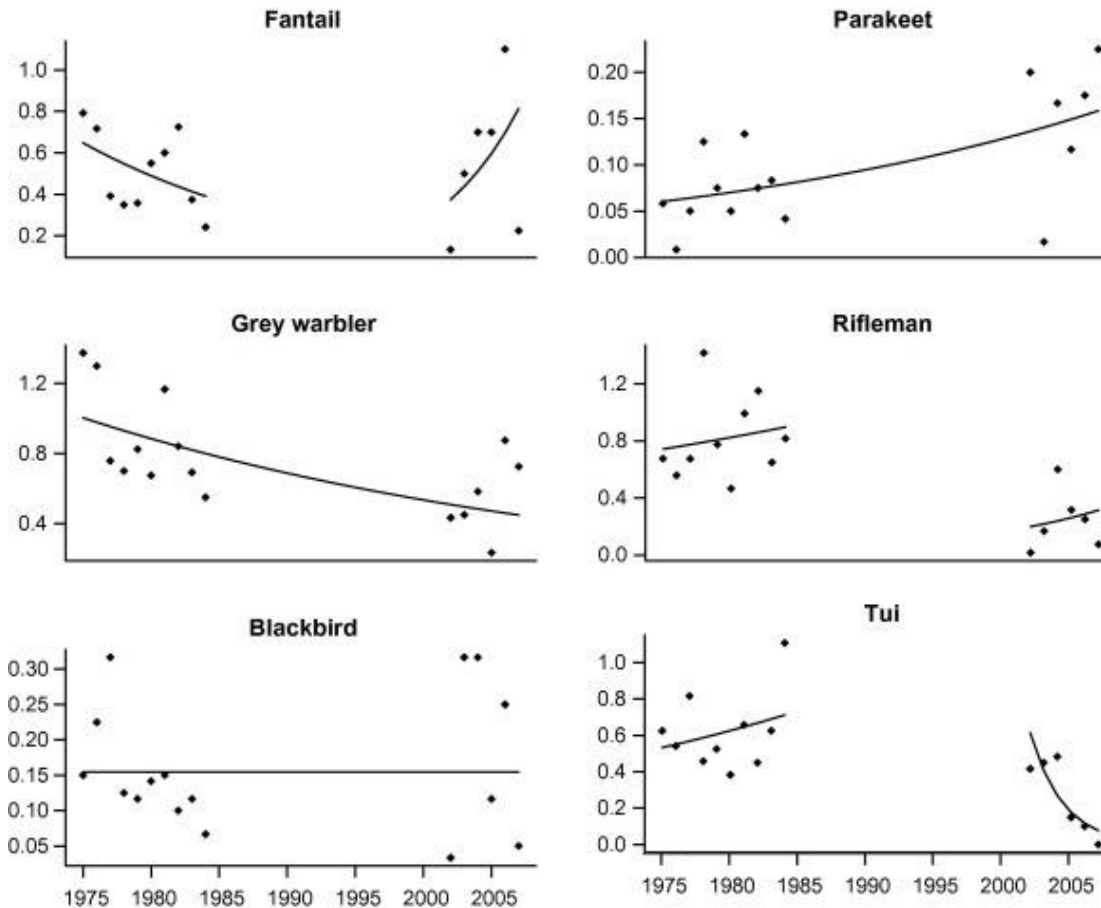
Tier 2 - Regional

- Studies are context-devoid. Without an unbiased national evaluation we don't know whether these are typical or whether the trends they show are 'generalisable'.
- Tier 2 does have the local history and replication ability that Tier 1 cannot to show whether an unusually high or low value is typical.
- Tier 3 (detailed local networks) have experimental focuses and multi-disciplinary studies. Expensive but will enable correlative analysis rather than mechanistic interpretations of status and trend. Limited studies so far (Craigieburn, Orongorongo)

Tier 2 monitoring: local plot networks building on histories of repeated measurements



Long histories of change in biodiversity at local sites throughout New Zealand



*Some declines, some increases
in widespread forest birds in a
wasp-invaded beech forest
(Nelson Lakes National Park)
over 30 years*

*Elliott and others
Biological Conservation (2010)*

Tier 2 - Regional

- For rare species (especially birds, frogs, some reptiles) and some plants, these are amongst DOC's outstanding data
- If rare species are on different trajectories from the less rare species, we can ask what are the features of their biology that cause this

Regional Councils

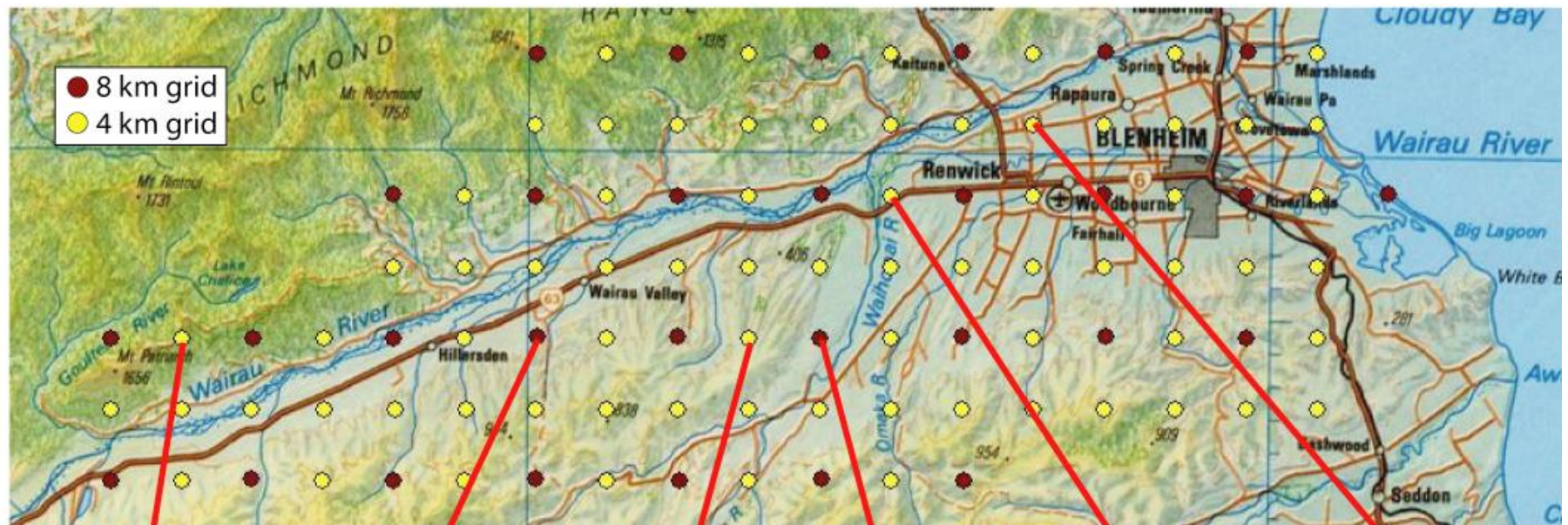
- Chief executives signed up to development of 18 biodiversity indicators

Indicators and measures to evaluate:

- State and condition
- Threats and pressures
- Effectiveness of policy and management
- Community engagement

Maximising overlap in process and measures with DOC

Next generation biodiversity assessment (2012–2014)



Native forest



Low productivity
agriculture



Plantation forest



Irrigated
agriculture



Viticulture



Peri-urban
development

Sanctuaries: how formalised monitoring could add value

- Most sanctuaries are interested in *birds*
- Standardised measures, that are the same as used by DOC and by regional councils, could be used within some sanctuaries and across sanctuaries
- An outcome of a greater richness and abundance within sanctuaries could be a common goal

Sanctuaries: how formalised monitoring could add value

Monitoring for birds

Use within sanctuaries

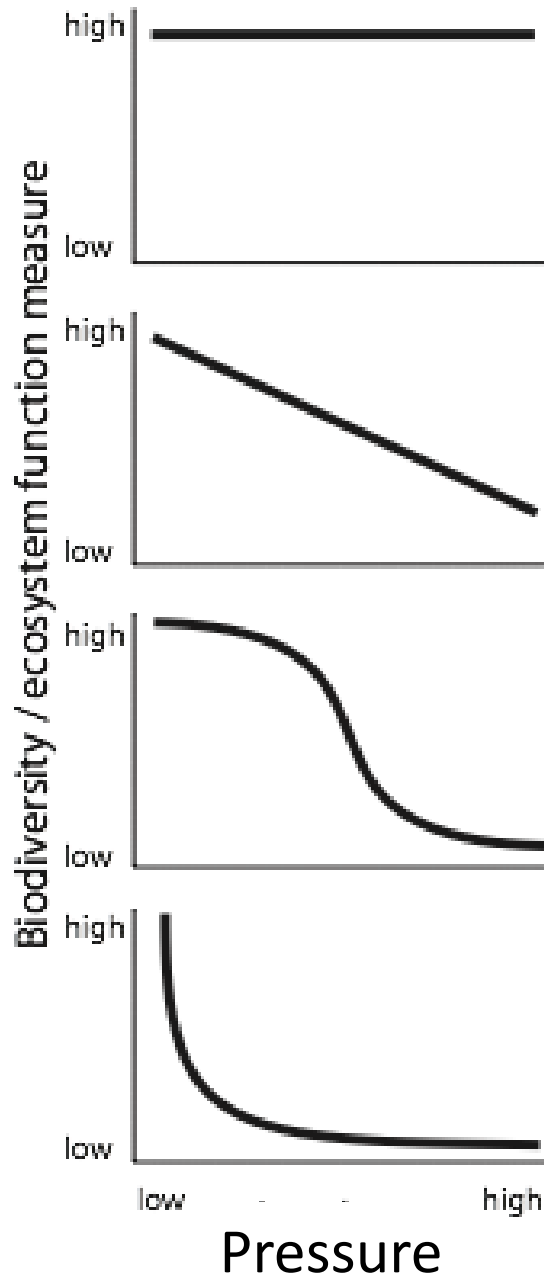
- Multiple sample points within sanctuaries can reveal trends in bird communities
- Comparison with trends at national scales (DOC's Tier 1) and some local scales (e.g. DOC's Tier 2) can give a context to interpret data
- For example, climatic trends (fantails), links to changing forest structure, etc.

Sanctuaries: how formalised monitoring could add value

Monitoring for birds

Use across sanctuaries

- A story would emerge bigger than any single sanctuary
- The single datum (or handful) within a given sanctuary would gain statistical power as part of a whole
- Generalities are likely to emerge that are defensible
- An opportunity to learn from others' experiences in a formal way



Insensitive (no management required)

Linear

Critical threshold – key indicator of threshold or limit

Highly sensitive (can only be managed in reserves)



Sanctuaries: how formalised monitoring could add value

Monitoring for birds

Use across sanctuaries

- Comparisons could be drawn among sanctuaries that employ different management techniques (e.g. fences vs. no fences)
- Quantifying bird communities could reveal interactions among species as reintroductions take place
- Assembly history might reveal the best order in which introductions should occur

Sanctuaries: how formalised monitoring could add value

Monitoring for birds

Use across sanctuaries

- For this to work, there'd be a need for a formal, centralised repository for the data
- Associated data will add value for any site (climate, soils, vegetation structure, composition)
- Research institutes, universities, students will be eager to analyse the data for you

Sanctuaries: how formalised monitoring could add value

Monitoring for birds

- Comparisons could be drawn among sanctuaries that employ different management techniques (e.g. fences vs. no fences)
- Quantifying bird communities could reveal interactions among species as reintroductions take place
- Assembly history might reveal the best order in which introductions should occur

Sanctuaries: how less formalised monitoring could add value

Monitoring for birds

- The role of ***citizen science*** – e.g. eBird, Nature Space (recording bird presence, dated, at point, on the web)
- Adding value inside sanctuaries
- Adding value beyond the sanctuaries (demonstrating spill-over benefits), in real time, and over time
- Building the base of public engagement

Thanks

- Elaine Wright, Meredith McKay, Benno Kappers, Richard Earle, Dave Forsyth and others (DOC)
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Questions?