





# Tools and techniques for measuring results of your predator control

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Result monitoring

Outline

In this workshop I will focus on result monitoring techniques of our most common and most devastating invasive predators

I will briefly go through why it is important to monitor your efforts and then talk about two effective monitoring techniques to do this with.

I want to retain some of our precious time for questions at the end of the presentation.



## Most wanted



The most wanted

stoats  
rats  
and possums

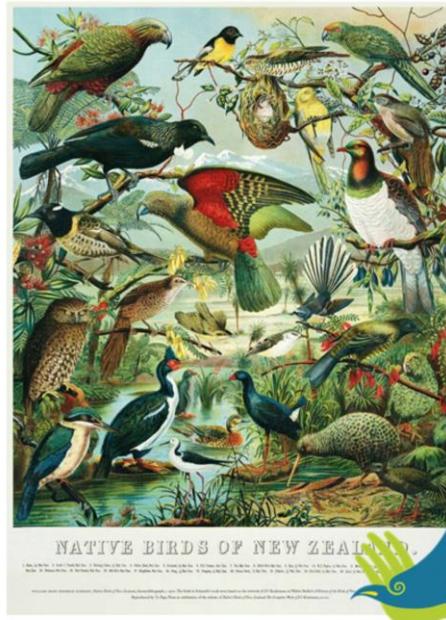
One could argue which one is the worst (I would say the ship rat) but the reality is that you would want to control all of them at the same time (multi-species control). You certainly would not want to target just rats or stoats on their own.

These are NZ's three when it comes to restoring forest and other ecosystems



## Reasons for result monitoring

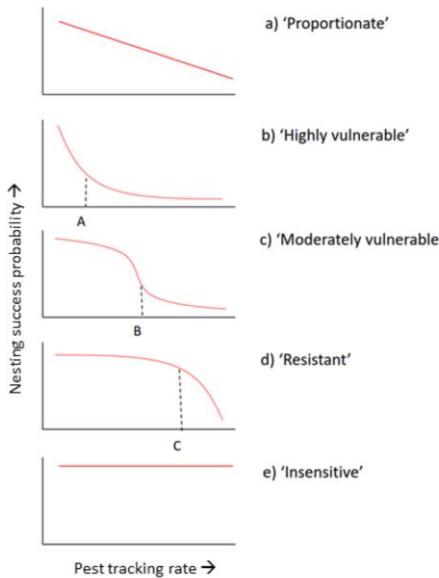
- Is our effort making a difference?
- Just killing a few pests won't
- Need a defined goal
- Pre- / post-control result monitoring
- To compare our results with others'
- The lower the better – maximum 5%



Number one reason for monitoring the results of your pest control is usually to find out whether your efforts are making a difference on the pest populations that you are controlling. Just counting the number of rats or possums caught over the last so and so many years will not tell you whether you are making a difference.

You could be for example just taking the 'cream of the top' of the rat population present. Or there could be so much reinvasion from the outside of the area that you are controlling that you simply cannot keep up with.

You really want to know whether you putting a big enough dent in to the pest numbers to make a difference.



Norbury 2014 (modified)



But how much pest control is enough?

Generally spoken a sustained rat and stoat tracking rate of < 5% is a ballpark figure to aim for to achieve some positive benefits for common (bellbird) and medium vulnerable (SI robins) native forest birds. To achieve < 5% can be quite hard, especially in small reserves with constant reinvasion.

The lower the better!

Kokako needs 2% or less and Saddleback cannot withstand any predators (requires 0%)



## Options



These are some of the most commonly used options for result monitoring of pest control efforts. There are a few other methods but these are the most commonly used to monitor the one or more of the big 3.

Just as with control tools each option comes with pros and cons. Camera trapping for example is very sensitive in detecting animals but it is not practical as they are very expensive and checking all the footage would be very laboursome.

But I really want to talk about the two most effective methods currently used to monitor small mammal abundance



## Tracking tunnels and chew tracking cards (CTCs)

### Advantages

- Allow multi species monitoring
- Cost effective
- Proven and tested methods producing indices that are comparable & meaningful

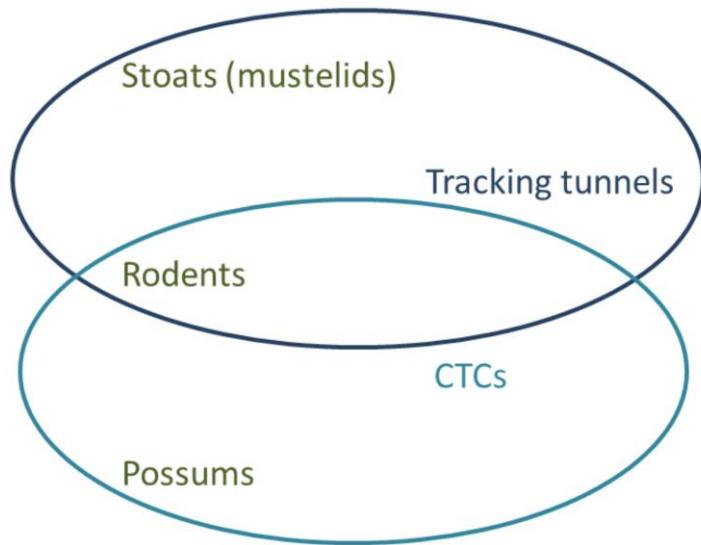


Tracking tunnels and chew tracking cards are both proven methods that produce meaningful tracking rates. When established protocols are used these results can then be used to compare the results with those of others and we can establish whether our pest control efforts are achieving enough to – for example – increase the nesting success of robins.

The key point of an index is not that it is as big as possible. The key thing is that it is IDENTICAL wherever you use it. Repeat: IDENTICAL.



## Tracking tunnels and chew tracking cards (CTCs)



However non of the two methods are suitable to monitor all three pest species; so if you are particular interested in stoats, Tracking tunnels are the way to go. And if you are particular interested in possums, you have no choice but to use chew tracking cards.

The good news is that both methods are suitable to monitor your success on controlling the most difficult pest, rats.



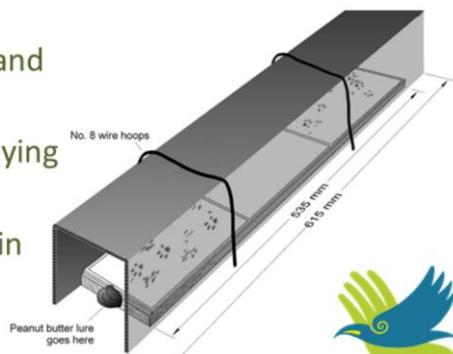
## Tracking tunnels

### Advantages

- Also good for hedgehogs
- Detects invertebrates & lizards

### Disadvantages

- Interference by possums and weka
- Relatively expensive, if buying pre-inked cards
- Devices permanently left in field



Show tracking tunnel with selection of printed cards

Cards are \$1.50 each

### **Rat tracking - bait at the ends or the middle?**

I was interested to hear at the 2011 Sanctuaries Workshop at Nelson that some folks were still confused about whether they should bait tracking tunnels for rodents (mainly ship rats) at the ends or the middle. It seems to me that there is no substantial real issue here, and it may help to explain why.

The key matter to resolve is: why are you undertaking the tracking in the first place? IF you want to use best practice SOP (Standard Operating Procedure) so that your results can be compared reliably with other folks' published work, then you must follow the protocol. Simple as that. That is, if for example you wish to verify that you have <5% tracking to help kokako, then you should use the protocol verbatim because that's how the correlation with kokako nesting success was derived and published. The protocol clearly says "This [bait] is smeared on the vertical face of the wooden base at each end of the tunnel". These days, the base may not be wooden, but you should still put bait on the vertical face at each end of the tunnel. The key point of an index is not that it is as big as possible. The key thing is that it is IDENTICAL wherever you use it. Repeat: IDENTICAL.

IF you want to just compare pre- with post- results in your own trial, but not

necessarily compare with anyone else's results, then you should use the same technique at all your sites, regardless of what it is. So if you want to bait in the middle rather than the ends, that will work fine, but the results strictly cannot be compared with the SOP results. That is, a 5% index derived from baiting in the middle of the tunnel cannot be expected to deliver the benefits calculated for kokako by using tunnels baited at the ends. There may be better results, or worse. If you are not deriving an index at all, but are for example, trying to detect reinvaded rats in a pest-free sanctuary, then again you need not follow the SOP but should use the technique that has the highest probability of detecting an animal. The problem at the moment is that nobody has actually done the research required to show whether baiting at ends or middle affects the detection rate at all. Until the work is done, then practitioners have to make their own educated guesses about which technique is best.

The main conclusion is clear: if you want to 'plug in' your rat outcomes to published accounts of benefits, such as kokako nesting success, then you should use the current DOC protocol verbatim, ie bait at the ends.

I should note though, that the widespread use of the 5% target for rats and possums for *ecosystem* recovery is just a somewhat wild stab in the dark as a target. That is, the benefit of this target cf any other is as yet unpublished, as far as I know. It's as good as any other smallish number, and it is substantially smaller than what you will get if you do no population control, but it has no published relationship with ecosystem health at present. So violating the SOP tracking measure in ecosystem restoration is just adding a bit more uncertainty to an already uncertain relationship between index and outcome.

John Innes  
Landcare Research, Hamilton  
6 September 2011.



## Cheat tracking cards

### Advantages

- Highly sensitive to rodents and possums\*
- Especially good for monitoring low density populations
- Very cost effective
- Lightweight and easy to deploy

### Disadvantages

- Are unlikely to detect any other species
- Small plastic gnawings produced



\*Sweetapple & Nugent 2010, NZ J Ecol

\*Burge et al. 2016, Austral Ecol



Cheat tracking cards are a more recently developed detection method and was mainly driven by finding a tool that is cheap and easy to deploy even in the most difficult tiger country

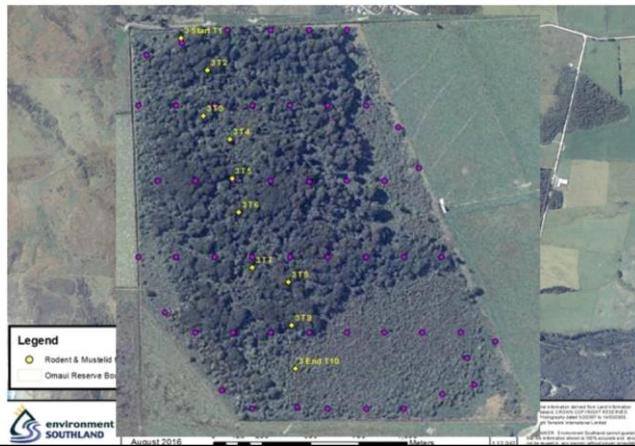
Show CTCs and how to attach them on post; show example of gnawings (mice, rats, possums)

Only \$0.35 each baited



## Monitoring design

Approximate area to be surveyed	≤ 300 ha	300–600 ha	600–900 ha	900–1200 ha
Suggested number of tracking tunnel lines for rodents	6–8	8–10	10–12	12–15



DOC has produced a couple of documents that can be found on their website that explain in detail how to set-up monitoring lines, how many are enough and where to place them.

- DOC tracking tunnel guide v2.5.2: using tracking tunnels to monitor rodents and mustelids
- Animal pests: tracking tunnel indices of small mammal abundance

Explain briefly with these examples how to design and set up a monitoring programme.

200 ha Omaui Reserve – halfway between Invercargill and Bluff

20 ha Sterling Block in the Lower Mataura River, also in Southland

To my best knowledge no established protocol for chew tracking cards has been produced yet but research has been carried out that shows that there is a strong correlation between tracking tunnel and chew card indices. It's a bit tricky though since the conversion is not that straight forward. But watch this space...



# Thank you



Thank you - this is the end of the presentation part – any questions?



# Links to helpful documents

*Copy and paste links into your browser*

## Trapping Tunnels

- <http://www.doc.govt.nz/Documents/science-and-technical/inventory-monitoring/im-toolbox-animal-pests-using-tracking-tunnels-to-monitor-rodents-and-mustelids.pdf>
- <http://www.doc.govt.nz/Documents/science-and-technical/inventory-monitoring/im-toolbox-animal-pests-tracking-tunnel-indices-of-small-mammal-abundance.pdf>
- [https://www.landcareresearch.co.nz/\\_data/assets/pdf\\_file/0005/127472/22\\_How-to-read-prints-from-tracking-tunnels.pdf](https://www.landcareresearch.co.nz/_data/assets/pdf_file/0005/127472/22_How-to-read-prints-from-tracking-tunnels.pdf)

## Chew Tracking Cards

- <http://newzealandecology.org/nzje/2945.pdf>
- [https://www.landcareresearch.co.nz/\\_data/assets/pdf\\_file/0011/151598/chew-track-card-interpretation.pdf](https://www.landcareresearch.co.nz/_data/assets/pdf_file/0011/151598/chew-track-card-interpretation.pdf)



## Links to helpful documents

*Copy and paste links into your browser*

### Monitoring devices suppliers

Chew tracking cards & tracking tunnel cards

- <http://www.pestcontrolsolutions.co.nz/monitoring.html>
- <https://www.traps.co.nz/pest-monitoring>
- <http://gotchatraps.co.nz/ordering/>



## Tracking tunnels

