More Birds in the Bush

The following questions were asked during our live webinar with Susan Walker and Adrian Monks but due to time restrictions, we were unable to answer these in the session.

1080 to zero with "barriers" to prevent reinvasion would avoid the rat bounce, correct?

From the very few examples, '1080 to zero' has provided results no better than standard operations (or slightly worse results; see recent paper by Tess O'Malley and others on the Taranaki outcomes https://www.mdpi.com/2076-2615/12/3/309). From the emerging results we have seen in the Perth, barriers didn't work for rats unfortunately - perhaps ask Maggie Nichols for their data?

If rats were the primary concern, what frequency of toxic bait operations might be appropriate to maintain smaller bird populations in warm forests?

Good question. For small birds, we have a suggestion via robin breeding success (recent NZJE paper 'The effects of beech masts and 1080 pest control on South Island robins' which showed one good year, one average, and then poor). The problem then becomes which toxic bait? (as Josh Kemp's analysis showed, and as we'd expect 'the same bait used repeatedly puts our rat kills all at sea' see https://youtu.be/5LJrYaXAFSs in our recent 2-day workshop). A new rat toxin on the horizon would be a good tool in the arsenal, to mix up those toxins in repeat ops, e.g. to sneak in a second good breeding season in a row, and perhaps introduce regimes that maintain or even increase populations, as has been done for kokako. But you would likely still face the problem of declining effectiveness over time.

It seems like we need to catch the bounce before it happens, like what the ZIP guys are doing in South Westland.

Yes. Several studies in NZJAR. Many of these older ones are now freely available at: https://www.tandfonline.com/loi/tnza20. Even if that was true (you may want to ask Maggie Nichols for the ZIP data from the Perth), the problem will likely still be that 'the same dope used repeatedly puts our rat kills all at sea'. (See Josh Kemp's recent analysis, https://youtu.be/5LJrYaXAFSs in our recent 2-day workshop). It may be that a new rat toxin on the horizon makes it more possible to do this effectively, or at least gives more than one option for what to use (or perhaps more than 2 options if aerial brodifacoum is in the arsenal, as we understand it is in the Perth). More nuanced timing of operations in the first instance (e.g. not when there is heaps of food around and rat populations are growing, to achieve higher kill rates) may be part of the answer.

If you can control high altitude rat populations at high altitude by targeting the low altitude source populations, what impact might that have on the high altitude stoat populations?

Interesting question. There are still mice in the system, and obviously mice are a key resource for stoats in the alpine environment, as mice irrupt following masting in snow tussocks. Stoats showed no sign of decline by the end of the study in Nov 2020 at the high sites, even though they were beginning to decline at low- and mid-elevations. My unproven suspicion is that the high sites were being boosted by alpine stoats dipping into the forest. So without also controlling mice at high elevations there will still be high elevation stoats, even if some are secondarily poisoned by control at low elevations.

Is the research showing that no management is better in a podocarp broadleaved forest than management due to rat bounce in keeping rat density down?

Answered in the webinar, but here too. It depends very much on which bird species are being targeted for protection, and research is showing that a nuanced and species-outcome-focussed response is required. Larger bird species benefit greatly from the stoat control afforded by aerial management, and NI kokako (both rat and possum sensitive) would probably not be around now without that tool in the toolbox. But you would not choose long-interval aerial management for small, rat-sensitive bird species in podocarp-broadleaved forest unless complemented by another tool. Many of those smaller species are already absent from podocarp-broadleaved forests, but in places where they are being reintroduced (as in Taranaki) this does becomes an issue to consider and resolve; there they have a big network of traps in the site where they reintroduced NI robin.

Did you track mice? To what extent are mice a key feed resource?

Yes mice were tracked. Mice stayed at higher densities for longer than rats at Alabaster. Rats do occasionally eat mice, but apparently not enough to stave off the decline.

Does temperature have an impact on high elevation rat population (i.e. warmer in summer at higher elevations = increase in density?).

It could impact them indirectly. Rat irruptions are driven by food. Good food years lead to more breeding, better survival and more rats. A good year for food may be associated with warmer summers if that impacts, for example, invertebrate productivity.

There was a lot of damage to the Pyke area with the Feb 2020 storms - Did you find any indication that would suggest the rising water / flood damage could've also increased the decline rate / beech fruit reductions after mast?

Nearby seed rain data indicated that all species masted during the 2019 mega mast. While we might expect a delay in seedfall of 3-4 weeks between the lowest site and the highest site

Which beech species are present at Alabaster, and does this change with altitude?

My apologies for failing to give a better description of the study site. From Carpenter et al 2022 Biological Invasions: "The valley floor is approximately 20 m above sea level (asl), and is comprised predominantly of silver (Lophozonia menziesii) and red beech (Fuscospora fusca), rimu (Dacrydium cupressinum), miro (Prumnopitys ferruginea), thin-barked totara (Podocarpus laetus) and kamahi (Weinmannia racemosa) (Mark and Sanderson 1962). At around 500 m this mixed beech-podocarp-kamahi forest grades to species-poor upland silver beech forest, with some southern rata

(Metrosideros umbellata) and totara (Podocarpus totara). The treeline is at approximately 1100 m." Nearby seed rain data indicated that all species seeded during the 2019 megamast at all elevations. While there probably was a lag of 4 weeks or so between seedfall at the lowest elevation compared to the highest, this could not have explained why rats at the highest site had not responded at all to the mast by our first sample period in July, given that the earliest seedfall happened in March.