Controlling pests in New Zealand sanctuaries: Varying the spatial distribution of the standard grid system in a mainland conservation project.

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Andrew Donald Warneford

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Abstract

A toxin reduction study was carried out in the Waitakere Ranges, west of Auckland City, New Zealand. The Auckland Council (previously called the Auckland Regional Council) manage more than 20, 000 hectares (ha) of native ecosystems within the Waitakere ranges using varying pest control methods and regimes. The 'Ark in the Park' (AiP) is part of this 20,000 ha protected habitat and it is intensely managed as a conservation reserve. AiP employs volunteers, Auckland Council staff, researchers, contractors and a full time project manager to monitor both pest and native species densities, deploy baits and traps, and inform the public of the importance of active pest management. The use of toxins to control pests can be controversial and decreasing poison usage and thereby reducing potential by catch of non-target species is an important and under studied aspect of conservation biology. In this study I tested the ability of pest control to meet targeted rodent densities when the density of bait stations was significantly reduced.

The study area was a 333 ha block of native forest adjoining the existing AiP conservation reserve, which at the time of the study represented 1200 ha of the Waitakere Ranges under pest control. The aim of the study was to replicate the standard AiP pest control methodology but reduce the density of poison bait stations. I then compared the density of rodents achieved within this reduced toxin study area with two control sites, one without rodent control and one with the standard rodent control methods used within AiP.

The existing AiP rat control methodology employs a 100 X 50 metre (m) grid of Philproof® bait stations, baited with pre-bagged Brodifacoum bait. In conjunction with this, mustelid (*Mustela spp*) and feral cat (*Felis catus*) control is carried out utilising existing track networks managed by the Auckland Council. In the current study this pest control programme was altered by increasing the distance between stations from 50m to 100m giving a control grid of 100 X 100m. Along the perimeter of this research grid, a

150m wide buffer was installed where bait stations are placed in a 100 X 50m pattern to reduce reinvasion of rats from non-pest controlled areas adjacent.

This study showed that at 100 X 100 m spacing overall rat density could be, as measured by baited tracking cards, controlled to 3%, with 10% density at the perimeter and 0% in the core of the area. As a direct result of this project additional areas under pest control have now been added to AiP with a current total pest controlled area of 2500 ha. In conclusion, this study has resulted in an additional 1200 ha of successfully pest controlled area in the Waitakere Ranges using significantly less toxin for the initial knockdown, lower costs, and less equipment and effort. It is recommended that future investigations examine whether the required rodent control is able to be sustained over much longer periods of time using the study technique trialled here.

Preface

Thesis outline.

The overall aim of this thesis was to examine whether an alternative baiting technique could be applied to an area that had not previously received pest control. An area adjacent to an existing pest control project was chosen, so that direct comparisons could be made, and the methods used for this existing area replicated, with only one variable changing. That variable forms the basis of the study for this thesis and enables me to ask the question: "Can we use a lower density of poison bait stations, and still achieve the low rodent densities necessary to meet conservation targets?" In brief, this is achieved by changing the standard pest control grid pattern of 100 X 50 m spacing, to 100 X 100 m spacing while keeping all other pest control processes the same. Rodent densities were then measured over time within the study area using baited tracking cards and compared with densities of rodents in areas with 100 X 50 m bait stations.

Thesis structure.

The thesis includes four chapters. The first chapter is a review of current literature on pest control in New Zealand and provides the background and justification for this study. The second chapter gives an overview of the existing pest control project, known as the 'Ark in the Park'. This project's pest control methodology is briefly described. The third chapter describes the experimental study with detailed methodology of how toxins were reduced. Chapter three also includes the main results from this research. In the final chapter I discuss the suitability of using reduced toxins to achieve rodent densities that not only provide native fauna with the opportunity to grow and maintain viable populations but also significantly reduce the costs of pest control. I make recommendations based on those findings and suggest areas of future research on this topic.

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