Results of a pilot study to detect benefits to large-bodied invertebrates from sustained regular poisoning of rodents and possums at Karioi, Ohakune

SCIENCE FOR CONSERVATION: 102

Maree Hunt, Greg Sherley and Mike Wakelin

Published by
Department of Conservation
P.O. Box 10-420
Wellington, New Zealand

Science for Conservation presents the results of investigations by DOC staff, and by contracted science providers outside the Department of Conservation. Publications in this series are internally and externally peer reviewed.

ISSN 1173–2946
ISBN 0–478–21781–1

This publication originated from work carried out by Maree Hunt, Greg Sherley and Mike Wakelin, Science & Research Unit, Department of Conservation. It was approved for publication by the Director, Science & Research Unit, Science Technology and Information Services, Department of Conservation, Wellington.

Cataloguing in Publication
Hunt, Maree Rachel.
Results of a pilot study to detect benefits to large-bodied invertebrates from sustained regular poisoning of rodents and possums at Karioi, Ohakune / Maree Hunt, Greg Sherley and Mike Wakelin. Wellington, N.Z. : Dept. of Conservation, 1998.
1 v. ; 30 cm. (Science for conservation, 1173-2946 ; 102.)
Cataloguing-in-Publication data.
ISBN 0478217811
1. Invertebrates—New Zealand—Effect of pesticides on 2. Rodents—Control—New Zealand. 3. Trichosurus vulpecula—Control—New Zealand. I. Sherley, Gregory H. (Gregory Howard), 1956- II.Wakelin, M. D. (Michael D.), 1968- III. Title. IV. Series: Science for conservation (Wellington, N.Z.) ; 102.
595.099352 20
zbn98-112764

CONTENTS

Abstract

This report describes a pilot study to test the methods that might be suitable for detecting gross changes in invertebrate abundance and diversity resulting from control of pest mammals with poison baits. The trial was carried out in forest at Karioi, central North Island. Tracking tunnels were used to estimate rodent numbers, and malaise and pitfall traps to sample invertebrates in a site where there has been regular animal control since 1993, and a control site where there has been no poisoning. Rodents were present at both sites, and no clear trends in invertebrate abundance at each site could be determined, but the study did indicate how sampling methods could be improved in future work.

1. Introduction

This report documents part of the third of a set of studies to investigate the costs and benefits to forest invertebrates from poisoning pest mammals in New Zealand lowland forests. The first described which species of invertebrates may be found on baits typically used for control operations (Wakelin *et al.* in press). In the second study the most common species found on baits were studied experimentally to see if there was any significant decline in their numbers with the application of sodium monofluoroacetate (1080) in pollard baits (Sherley and Wakelin in press). The aim of the third phase of research is to investigate possible benefits to forest invertebrate communities from the long-term reduction of pest mammals, especially rodents and possums.

This report describes a pilot study which tested the methods that might be suitable for detecting gross changes in invertebrate abundance and diversity resulting from pest mammal control. The experience gained from this pilot study will be used to design a larger experimental study which will include replicated sampling in control and treatment areas, before and after pest mammal numbers have been reduced. The comparisons prior to control measures will allow any changes due to the application of 1080 (or any other toxin) to be distinguished from natural differences between sites.

2. Study sites

Two sites were selected at the Karioi Rahui, near Lake Rotokuru, Ohakune (Fig. 1). At the treatment site (centred on NZMS260 S20 266 947) pest mammal control has been carried out regularly since 1993. For four years from 1993 to 1997, trapping and cyanide poisoning (gel based bait) maintained a residual possum trap catch of less than five percent. From August to December 1997 the

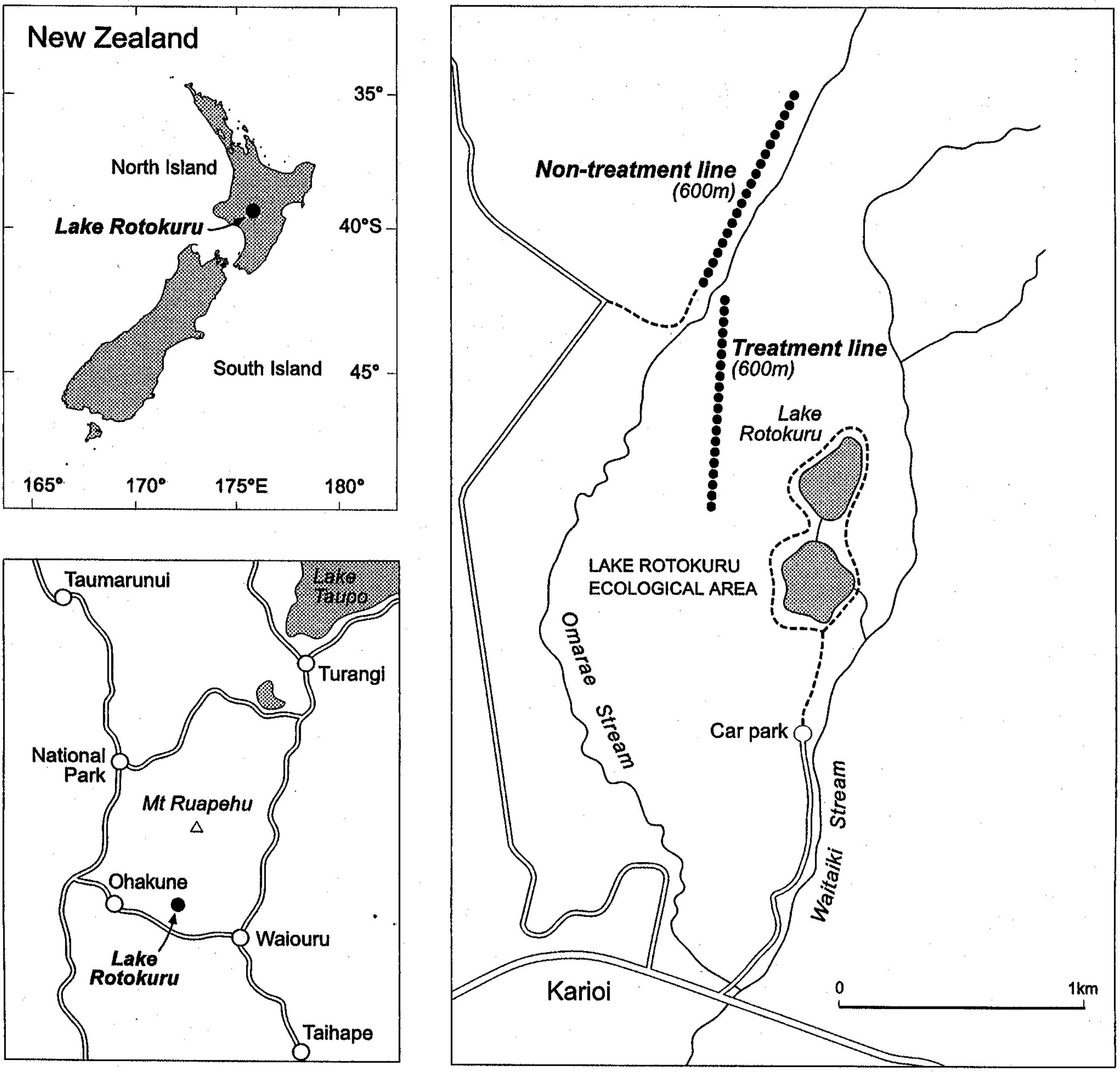

FIGURE 1. STUDY AREA AND LOCATION OF TREATMENT AND NON-TREATMENT TRANSECT LINES AT KARIOI, LAKE ROROKURU ECOLOGICAL AREA, OHAKUNE. NOTE: THE TREATMENT TRANSECT IS LOCATED APPROXIMATELY IN THE MIDDLE OF THE POISONED AREA.

following methods of control reduced possum numbers to a residual trap catch of 1.3 %: (1) bait stations filled each month with 300 g of "Talon" (Brodifacoum 0.02 % w/w), (2) trapping and "Feratox" (encapsulated cyanide) bait stations along streams and, (3) on 30 August 1997 an aerial drop of 1080 (0.15 % w/w Wanganui No.7 pollard baits) was carried out. The current bait station grid of permanent "Philproof" bait stations has been in operation since January 1998. Bait stations are stocked every 4–6 weeks with 300 g per station of "Pestoff" (Brodifacoum 0.02 % w/w in waxed cereal pollard, dyed green).

The non-treatment site (centred on NZMS260 S20 266 956) was chosen because topography and aspect were almost identical to that of the treatment site. No variation in climate was expected between the treatment and non-treatment area because the sites were no more than 2 km apart at the furthest points. Treatment and non-treatment sites are separated by the Omarae Stream.

The forest in the treatment and non-treatment areas is predominantly beech with hardwood understorey and occasional podocarps. Selective logging of timber for building the main trunk railway occurred throughout the area around 75 years ago (c. 1920–30) (John Luff, Dept Conservation, Pers. Comm.).

3. Methods

One transect line was set up in the treatment area and one in the non-treatment area. In the treatment area the transect followed a bait station line ("E") in the centre of the bait station grid, running approximately north-south (Fig. 1). The transect line in the non-treatment area followed a bearing to keep it approximately parallel to the stream.

Rodent tracking tunnels were placed along each transect line at 50 m intervals (Fig. 2). Fifteen tunnels were set in each study area. Tunnels were baited with peanut butter at each end of the tunnel and red food colouring was applied to 5 mm thick foam sponge tracking pads in the middle of the tunnel. Rodent footprints were recorded as ink marks on brown paper strips which were placed at each end of the tracking tunnel. Three tracking tunnel trials were completed as part of the pilot study concurrently in treatment and non-treatment areas. Two trials ran for two nights each and one trial took three nights.

Five malaise traps and 25 pitfall traps were set up in the treatment and non-treatment areas. Sampling took place in early autumn (March 1998) when invertebrate activity should have been high (Moeed & Meads, 1986). All traps were set continuously for one month, and contents were collected after periods of 14 days.

Malaise traps were set along the transect lines in the treatment and non-treatment areas, at 150 m intervals (Fig. 2). Malaise traps were erected at ground level with the high end of the trap (supporting the collecting bottle) to the North. The traps were set touching the leaf litter, in order to collect invertebrates emerging from the ground. Collection bottles contained 70% isopropyl alcohol.

Pitfall traps were set in groups of five within 10 m of each malaise trap, in a 5 m square with the fifth trap in the centre (Fig. 2). Traps were set so that container tops were slightly lower than the surface of the ground litter. Caps (plastic dinner plates supported by two wire pegs) prevented rainwater or litter falling into the pitfall traps. Pitfall traps were 10 cm in diameter and filled to a depth of 3 cm with saturated sodium chloride solution.

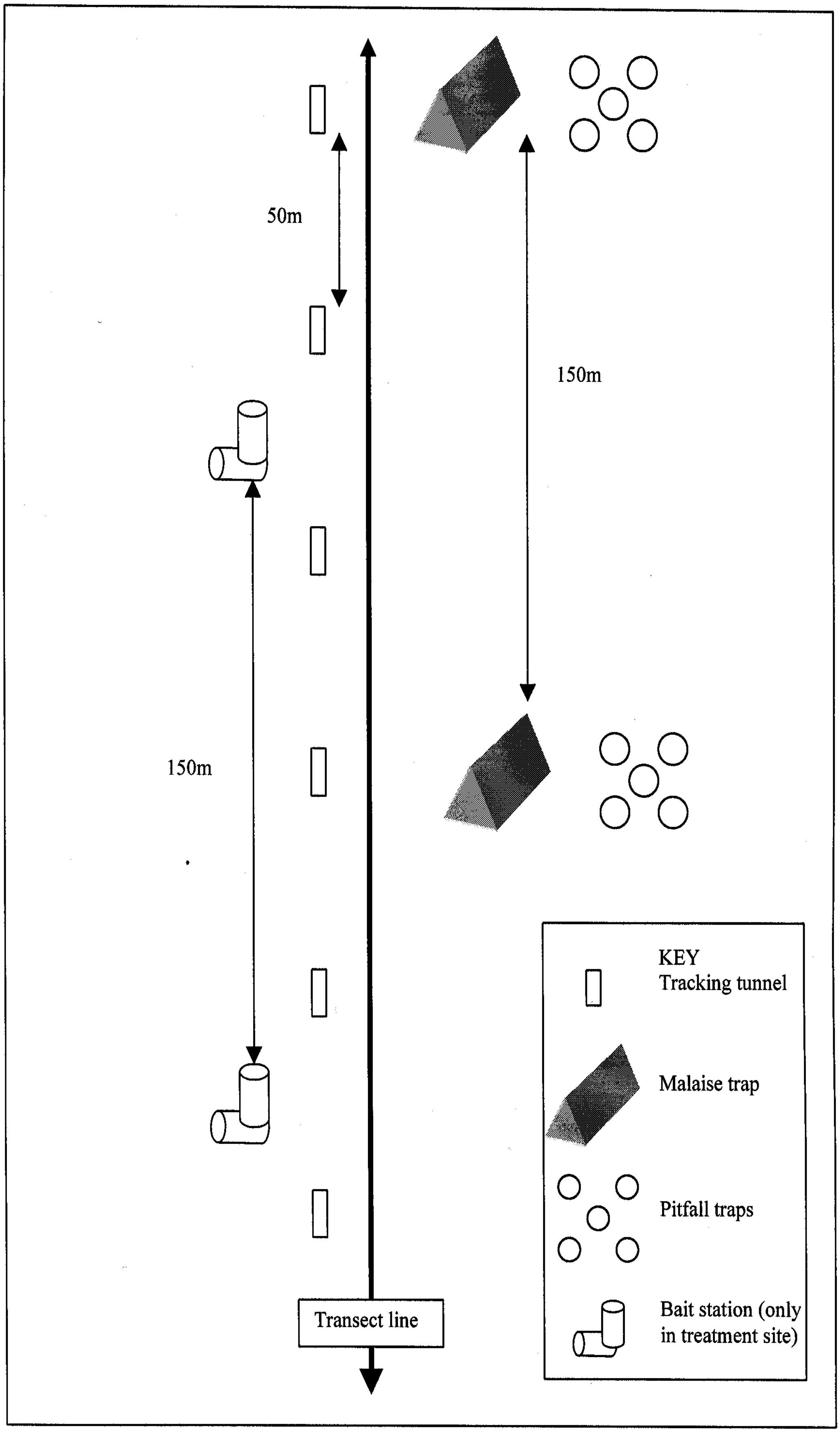

FIGURE 2. DIAGRAM SHOWING THE POSITION OF TRACKING TUNNELS, MALAISE AND PITFALL TRAPS, AND POISON BAIT STATIONS IN RELATION TO THE CENTRAL TRANSECT LINE, AS SET OUT IN TREATMENT AND NON-TREATMENT SITES AT KARIOI RAHUI, OHAKUNE.

Invertebrate samples were sorted into recognisable taxonomic units (RTUs), and frequencies of occurrence scored. Voucher specimens were sent to specialists for identification and RTUs retained, to be sorted and classified further in the future, if required. From the sorted invertebrates, the RTUs which were likely to be taken by rodents (deemed to be those over 5 mm in length) were identified and grouped.

4. Results

4.1 PITFALL AND MALAISE TRAP SAMPLING

The frequency at which RTUs that were likely to be taken by rodents occurred was graphed for both malaise trap (Fig. 3) and pitfall trap samples (Fig. 4). Original frequency scores are given in Appendix 1 and Appendix 2.

In the malaise trap samples, eight groups of taxa were more frequent in the non-treatment samples: Araneae, Opilionidae, Blattodea, Coleoptera >5 mm, larvae (Coleoptera and Lepidoptera), Hemiptera, Ephemeroptera and Tipulidae. Three groups, Orthoptera, Staphylinidae and adult Lepidoptera, were more frequently scored in malaise traps from the treatment site. Six out of eleven groups were scored in low frequencies (less than five individuals); Orthoptera in the treatment sample, and Opilionidae, Blattodea, larvae and Ephemeroptera in the non-treatment site. Neuroptera occurred twice in each site. A Chi-squared test identified a significant difference in the samples from the treatment and non-treatment sites (c^2=25.12, df=11, p>0.001, two-tailed test).

In the pitfall trap samples, six groups showed greater numbers of invertebrates in the non-treatment site (Araneae, Staphylinidae, Larvae, Orthoptera, Neuroptera and Coleoptera >5 mm) although fewer than five individuals occurred in the latter two groups. In the treatment area more Endodontidae, Amphipoda, Isopoda and Chilopoda, Opilionidae, Carabidae, Blattodea and adult Lepidoptera were caught compared with the non-treatment area. A Chi Square analysis comparing these frequencies was significant (c^2=67.30, df=13, p<0.001, two-tailed test).

4.2 RODENT TRACKING TUNNELS

Comparisons were made between the results gathered concurrently in the treatment and non-treatment sites, but not between the three tracking episodes, to avoid confounding comparisons with any changes that might have occurred with the advancing season or differences due to the period of time tracking tunnels were set.

Rat tracks were identified more frequently in tunnels in the non-treatment site than in the treatment site, although rats were recorded in both sites. Mouse prints occurred in similar frequencies in the two sites (Fig. 5).

Continue to next file: Sfc102a.pdf