Stoat captures in a year of heavy mountain beech seedfall

DOC SCIENCE INTERNAL SERIES 163

Andrea E. Byrom

Published by
Department of Conservation
PO Box 10-420
Wellington, New Zealand

DOC Science Internal Series is a published record of scientific research carried out, or advice given, by Department of Conservation staff or external contractors funded by DOC. It comprises reports and short communications that are peer-reviewed.

Individual contributions to the series are first released on the departmental website in pdf form. Hardcopy is printed, bound, and distributed at regular intervals. Titles are also listed in the DOC Science Publishing catalogue on the website, refer http://www.doc.govt.nz under Publications, then Science and Research.

ISSN 1175–6519

ISBN 0–478–22550–4

In the interest of forest conservation, DOC Science Publishing supports paperless electronic publishing. When printing, recycled paper is used wherever possible.

This report was prepared for publication by DOC Science Publishing, Science & Research Unit; editing by Geoff Gregory and layout by Helen O'Leary. Publication was approved by the Manager, Science & Research Unit, Science Technology and Information Services, Department of Conservation, Wellington.

CONTENTS

Stoat captures in a year of heavy mountain beech seedfall

Andrea Byrom

Landcare Research, PO Box 69, Lincoln 8152, New Zealand.
Email: byroma@landcareresearch.co.nz

ABSTRACT

Reinvasion by (primarily juvenile) stoats (*Mustela erminea*) into stoat control areas is a major problem for the Department of Conservation. To investigate dispersal and survival of juvenile stoats in South Island mountain beech forest at Craigieburn, baited traplines were set for adult females in late winter and for juveniles in spring of 2002. Despite a heavy seedfall of mountain beech in the preceeding autumn and an associated increase in rodent numbers, catches of stoats did not show a significant increase. The project was terminated in January 2003 because of the low catch of stoats. A summary of the numbers and sexes of stoats captured, as well as stoat capture rates, is provided for future reference.

Keywords: beech seedfall, Craigieburn, population dynamics, reinvasion, stoats, *Mustela ermina*, New Zealand.

Byrom, A.E. 2004: Stoat captures in a year of heavy mountain beech seedfall. *DOC Science Internal Series 163*. Department of Conservation, Wellington. 10 p.

1. Introduction

Reinvasion by (primarily juvenile) stoats (*Mustela erminea)* into stoat control areas is a major problem for the Department of Conservation (DOC). Predation by stoats is a continual impediment to enhancing the viability of populations of threatened native bird species. Stoat mobility probably plays a crucial role in their population responses to primary prey availability (and impacts on secondary prey). Young stoats are thought to be particularly mobile, yet their dispersal and survival patterns remain largely unquantified.

This project, to investigate the dispersal and survival patterns of juvenile stoats in South Island beech forest in July 2002, was initiated in response to a gap in our knowledge of dispersal and survival characteristics of juvenile stoats. Anecdotal evidence suggests that stoats may move long distances during dispersal, and there is some evidence for high juvenile mortality at high population density. An improved understanding of these aspects of stoat ecology is critical to making decisions about the frequency, seasonal timing and intensity of stoat control after the initial removal of resident stoats; and also about the size of control areas and buffers needed to protect indigenous wildlife. Potential compensatory increases in juvenile survival or immigration may offset expected benefits to indigenous species after a reduction in stoat population density (such as a large-scale control operation).

This project was carried out in mountain beech forest at Craigieburn (inland Canterbury), starting in August 2002. Mountain beech seeded heavily at Craigieburn in early 2002. Stoats were expected to respond indirectly to this seedfall during spring/summer 2002/03, by responding to a predicted increase in rodent numbers in winter/spring 2002. The aim of the project was to compare dispersal and survival patterns of juvenile stoats in a heavy seedfall year (2002/03) and a year of predicted low seedfall (2003/04) (i.e. at high and low population densities of stoats).

The project was terminated in January 2003 due to low catches of stoats. This report provides a brief summary of trapping effort and stoat captures to allow DOC and Landcare Research to access this information in the future if required.

2. Objectives

The original study objectives were to:

- Characterise the timing and distance of natal dispersal by juvenile stoats, and their survival, by intensively radio-tracking young stoats caught near their natal dens.
- Determine the relationship between natal dispersal of juvenile stoats (proportion dispersing and distance travelled) and population abundance of stoats by comparing dispersal and survival in a year of heavy seedfall (expected high density of stoats) and of low seedfall (expected low density).

3. Methods

Two approaches were used to find juvenile stoats for this study. First, adult females were trapped in late winter 2002. The aim was to capture and radio-collar adult females so that their nests and young could be found in spring, and juvenile stoats could be subsequently radio-collared. Second, juvenile stoats were targeted directly by trapping in late spring 2002.

Trapping for adult females commenced on 1 August 2002 (for 1 week), and was repeated on 12 August 2002 (for 2 weeks) and 4 October 2002 (for 6 days). Trapping for juvenile stoats commenced on 26 November 2002 (for 2 weeks). All trapping sessions used a combination of Edgar traps, Elliot traps, Holden plastic treadle traps and plywood treadle traps. In total, about 250 traps were available for use. These were spaced along roads and tracks at 100-m intervals, to provide an effective trapping area of approximately 1700 ha in total, although the area trapped varied between trapping sessions (Table 1).

Trapping was carried out initially on the Craigieburn Valley skifield road (from State Highway 73 to the lockable gate), Broken River skifield road (from State Highway 73 to the skifield carpark), the Lyndon Saddle walking track loop, Camp Gully track, the walking track from Jacks Pass to Dracophyllum Flat, the Cheeseman skifield road (from State Highway 73 to the beech forest bushline at 1200 m altitude), and the area west of the Hogs Back (off the Cheeseman skifield road). Further trapping was also done at Thomas Bush, near Castle Hill Village, in November and December 2002. Locations of the Craigieburn Forest traplines are shown in Figure 1.

Traps were baited primarily with fresh dead rabbit, or laboratory rats. During the 26 November 2002 trapping session, traps were pre-fed for at least 5 nights before being set, to reduce trap-shyness of stoats. Thirty-four tracking tunnels were also laid on the Broken River and Cheeseman roads during this trapping session. In addition, during some trapping sessions, DOC was testing tracking tunnels at Craigieburn. If tracking tunnels contained stoat prints, efforts were

TABLE 1. DETAILS OF STOATS AND NON-TARGET SPECIES CAPTURED AT CRAIGIEBURN FROM AUGUST TO DECEMBER 2002 (M = ADULT MALE; F = ADULT FEMALE; m = JUVENILE MALE; f = JUVENILE FEMALE; * = RADIO-COLLARED, ( ) = STOAT RECAPTURE).

DATES OF TRAPPING	NO. TRAP NIGHTS	NO. STOATS CAPTURED	SEX	NO. TRAPS USED (APPROX AREA)	NON-TARGET SPECIES CAPTURED
1–8 Aug 2002	751	1	F*	108 (900 ha)	3 mice,1 weasel
12–22 Aug 2002	1688	2	M, M	242 (1200 ha)	14 mice
4–9 Oct 2002	192	(1)	(F)*	28 (300 ha)	none
26 Nov–5 Dec 2002	324	3	M, m*, f*	48 (500 ha)	1 weasel
TOTALS	**2955**	**6**	**1F, 3M, 1f, 1m**	**1700 ha trapped[1]**	**17 mice, 2 weasels**

[1] There was some overlap of trapping areas between sessions.

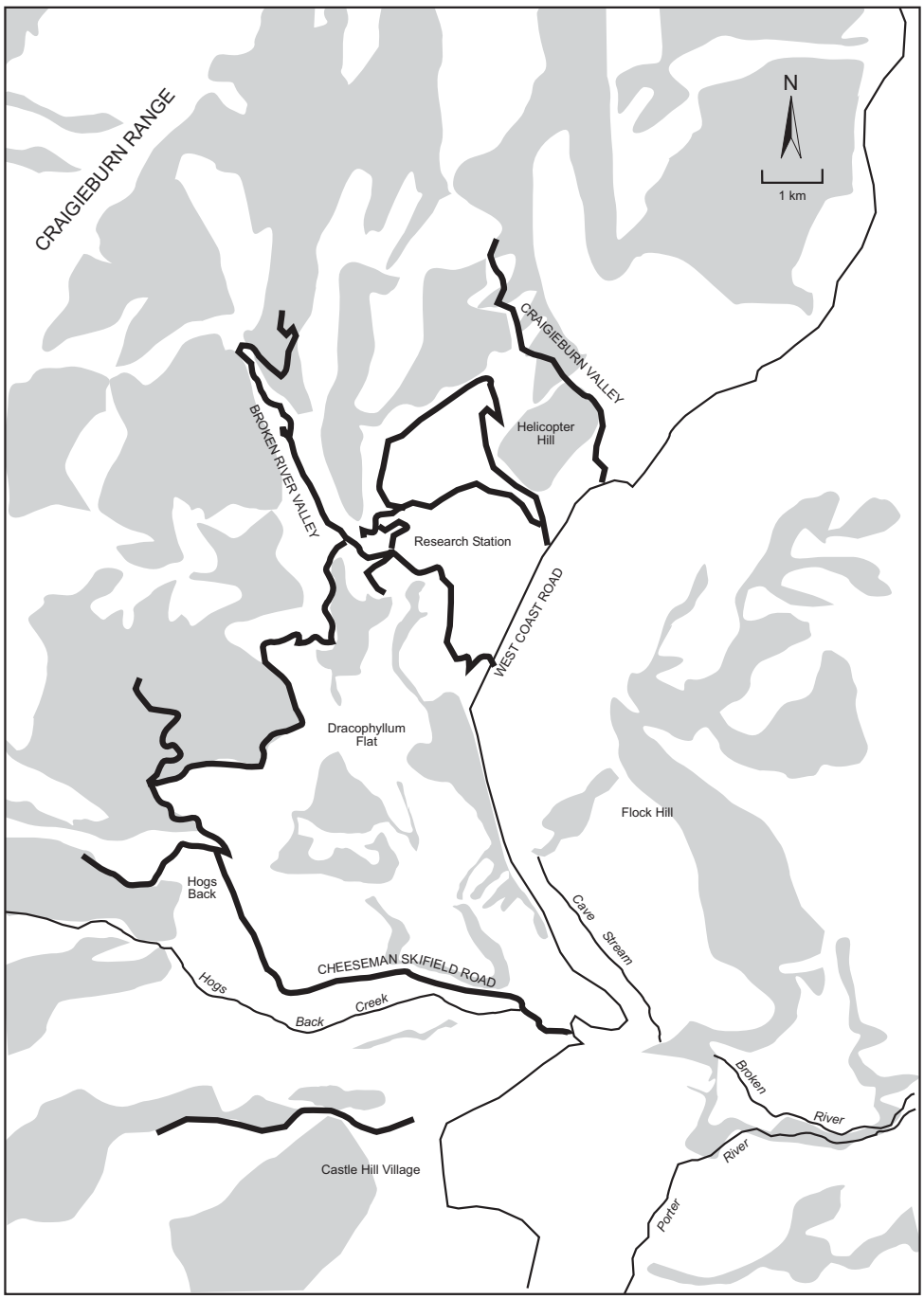

Fig. 1. Location of stoat trapping areas at Craigieburn Forest and Thomas Bush. (Thick, dark lines indicate trap lines.)

made to concentrate extra traps around those sites. All stoats captured were ear-tagged for individual identification. Adult females, and juveniles of both sexes, were radio-collared with Sirtrack stoat transmitters (these transmitters have a field life of about 2.5 months on continuous pulsing, but were fitted with a 'duty cycling' option to increase their life in the field). Adult male stoats were not radio-collared.

4. Results

Six individual stoats (two females and four males) were trapped, of which one adult female was recaptured, at Craigieburn between August and December 2002 (Table 1). Stoats were captured on sites close to where stoat prints were observed in tracking tunnels, which suggests that the traps were catching most of the stoats available at Craigieburn. Trapping rates of stoats at Craigieburn were very low during late winter and spring 2002 (Table 1).

Soon after the two juvenile stoats were radio-collared during the November–December trapping trip, a decision was made to terminate the project because of low sample sizes of stoats. These two juveniles were still alive in late December 2002, and though their collars were not removed it was not possible to determine their fate after that time. Nor was it possible to discern the fate of the radio-collared adult female. She survived from August to October at least, but her transmitter was not heard during the November 2002 trapping session, and she was not trapped at that time. As trapping was fairly intensive around her home range, it is possible that she died or left the study site.

5. Discussion

Despite the fact that mountain beech at Craigieburn seeded moderately at all altitudes in autumn 2002 (R. Allen, pers comm.), and that rodents (primarily mice) responded numerically to this seedfall (up to 34 captures per 100 trap nights; W. Ruscoe pers comm), stoat catches did not increase as expected in spring 2002. Only one adult female and two juvenile stoats (one of each sex) were radio-collared. It is not possible to draw any conclusions about dispersal or survival patterns of juvenile stoats based on these small sample sizes, which are too small to be regarded as even a 'low stoat density' year.

The fact that the stoat catch did not reflect to the increase in rodent numbers at Craigieburn is surprising. However, stoat catchability is not necessarily correlated with stoat numbers. For example, in the Eglinton Valley during the stoat plague of 1995/96, stoat catchability and tracking rates were low (J. Christie, pers. comm.). A similar decline in stoat numbers was observed at the Tasman River in the Mackenzie Basin in 2002, where a dispersal project on stoats was also conducted (J. Dowding, pers. comm.). One possibility is that very cold temperatures for several weeks after a heavy wet snowfall in mid June 2002 may have reduced the stoat population, either directly (from hypothermia of individuals) or indirectly by restricting access to mice under the snow. Another possibility is that a pathogen may have caused the decline in the stoat population at both the Craigieburn and Tasman River sites. Stoats often respond numerically to rodent numbers in beech forest (Alterio et al. 1999)

6. Acknowledgements

Funding was provided by DOC (investigation no. 3649) and the Foundation for Research, Science and Technology. Caroline Thomson and Paul Horton did most of the fieldwork for this project. Fraser Maddigan (DOC) was always willing to share information on locations of stoats based on prints in tracking tunnels. Wendy Ruscoe, Phil Lyver and one anonymous reviewer commented on a previous draft. Christine Bezar and Wendy Weller made helpful editorial changes.

7. References

Alterio, N; Moller, H; Brown, K. 1999: Trapability and densities of stoats (*Mustela erminea*) and ship rats (*Rattus rattus*) in a South Island Nothofagus forest, New Zealand. *New Zealand Journal of Ecology 23*: 95–100.