

The effects of compound 1080 on populations of specific non-target species, Waihaha Ecological Area, Pureora Forest Park, winter 1994

SCIENCE FOR CONSERVATION: 69

T.C. Greene

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

© January 1998, Department of Conservation

ISSN 1173-2946
ISBN 0-478-01984-X

This publication originated from work done by T.C. Greene, Science and Research Division, Department of Conservation, Auckland. It was approved for publication by the Director, Science and Research Division, Department of Conservation, Wellington.

Cataloguing-in-Publication data

Greene, Terry C.

The effects of compound 1080 on populations of specific non-target species, Waihaha Ecological Area, Pureora Forest Park, winter 1994 / T.C. Greene. Wellington, N.Z. : Dept. of Conservation, 1998.

1 v. ; 38 cm. (Science for conservation, 1173-2946 ; 69.)

Includes bibliographical references.

ISBN 047801984X

1. Sodium fluoroacetate. 2. Pests--Control--New Zealand--Pureora Forest Park. 3. Birds--New Zealand--Effect of pesticides on.

4. Waihaha Ecological Area (N.Z.). I. Title. II Series: Science for conservation (Wellington, N.Z.) ; 69.

632.951099338 20

zbn98-011260

CONTENTS

Abstract	5
1. Introduction	5
2. Site description	6
2.1 Location and topography	6
2.2 Vegetation	7
2.3 The study area	9
3. Methods	9
3.1 Species monitored	9
3.2 Pre-poison methods	9
3.2.1 The capture of kaka and blue duck	9
3.2.2 Other non-target species	14
3.2.3 Invertebrates	14
3.3 Bait preparation and application	15
3.4 Pre-poison monitoring of kaka and blue duck	15
3.5 Post-poison monitoring of kaka and blue duck	16
3.5.1 Ground based monitoring	16
3.5.2 Aerial monitoring	18
4. Results	18
4.1 Pre-poison monitoring	18
4.2 Post-poison monitoring	19
4.2.1 Ground based observations — kaka	19
4.2.2 Ground based observations — blue duck	19
4.3 Aerial monitoring	26
4.3.1 Aerial observations — kaka	26
4.3.2 Aerial observations — blue duck	26
4.4 Monitoring the effects of 1080 on other non-target species	30
4.4.1 New Zealand bats	30
4.4.2 New Zealand falcon	30
4.4.3 Kakariki (yellow-crowned parakeet)	30
4.5 Non-target species deaths	30
5. Discussion	32
5.1 Carrot baits and the potential for non-target species deaths	32
5.1.1 Lethal dose	32
5.1.2 Bait size and availability	32
5.1.3 Carrot consumption by kaka	33
5.1.4 Exposure to non-toxic prefeed	33
5.1.5 Variations in toxic bait quality	33
5.1.6 Availability of natural food sources	33
5.2 Carrot baits as a novel food source	34
5.3 Indirect effects of compound 1080	34
5.3.1 Kaka	34

5.3.2	Blue duck	35
5.4	Bait preparation and quality control	35
5.5	Other non-target species deaths	35
6.	Conclusions	36
7.	Recommendations	37
8.	Acknowledgements	38
9.	References	39
Appendix 1.	Birds and mammals of the Waihaha Ecological Area	41
Appendix 2.	Kaka capture, banding and transmitter details	42
Appendix 3.	Blue duck capture, banding and transmitter details	43
Appendix 4.	Aerial survey techniques	44
Appendix 5.	Kaka capture, banding and transmitter details	47
Appendix 6.	Blue duck recaptures and notes on transmitters	53

Abstract

21 kaka (18 males and 3 females) and 19 blue ducks (6 pairs and 7 single males) were caught and radio-tagged within the Waihaha Ecological Area. Of these, 20 kaka (17 males and 3 females) and 18 blue ducks (6 pairs and 6 single males) were monitored from the air and from the ground prior to and following a 1080 possum control operation using carrot baits during June and August 1994.

Significant movements were recorded for all kaka and blue duck monitored for up to 4 weeks following the application of toxic baits. All birds are therefore assumed to have survived. Further study is required to determine whether or not indirect effects, such as prey switching, occur.

1. Introduction

Between June and August 1994, a possum (*Trichosurus vulpecula*) control operation using Compound 1080 (sodium monofluoroacetate) on carrot baits was carried out over a 24 600 hectare area east of the Hauhungaroa Range. This control operation was conducted at the request of the Animal Health Board and Department of Conservation by Environment Waikato to prevent the further spread of bovine tuberculosis in livestock within the area and to protect the nationally significant conservation values of the Waihaha Ecological Area (Leigh and Clegg 1989). Continued heavy browsing by possums is considered to not only threaten the floristic diversity and integrity of the area, but has the potential to have major detrimental effects on the overall ecosystem (Leigh and Clegg 1989).

There have been four 1080 operations for Bovine Tb control in parts of the Waihaha Ecological Area since 1983 (Broome and Krzystyniak 1985). This is the first time, however, that the whole of the ecological area has been poisoned.

Compound 1080 (sodium monofluoroacetate) has been used to control possum numbers in New Zealand since the late 1950s (Spurr 1991). The level of control achieved is generally considered sufficient to limit possum damage to a number of tree species. Providing this level of control can be sustained, long term improvements in habitat quality are possible (Pekelharing and Batcheler 1990). Forest bird populations are assumed to benefit from the improving condition of the forest, the reduction in competition for food, and a reduction in the predation pressure exerted by the possums themselves (J. Innes pers. comm.) as well as by other predators (such as rats) which are also susceptible to 1080 (Murphy and Bradfield 1992). On the other hand, the widespread use of 1080 (and any other toxin-based control operation) may result in the poisoning of non-target species such as birds and invertebrates.

Previous studies have raised concerns about the vulnerability of kaka (*Nestor meridionalis*) in particular to poison operations using carrot baits. Residues of

1080 have been found in carcasses of the North Island kaka (*N. m. septentrionalis*) following possum control operations, although it is not known whether this resulted from the birds feeding directly on toxic baits (Spurr 1979). Trials using captive kaka have shown carrot baits to be readily acceptable (Spurr 1992), and study of a non toxic drop of carrots on Kapiti Island have indicated that juveniles may be particularly vulnerable (Lloyd and Hackwell 1993).

Blue duck (*Hymenolaimus malacorhynchos*) have never been monitored during 1080 operations. It is unlikely that blue ducks would be directly affected by 1080 poison. If, however, as has been observed elsewhere, the reduction in rodent numbers following 1080 operations results in prey switching by predators such as stoats (*Mustela erminea*) and cats, (*Felis catus*) then blue ducks are potentially at risk (D. Cunningham pers. comm.).

Non-government conservation organisations and other sections of the public are insisting that such questions about non-target species be answered before 1080 is used in areas where such species could be at risk.

The Science and Research Division of the Department of Conservation selected a group of non-target species to be monitored during and after possum control operations using carrot baits within the Waihaha Ecological Area, Pureora Forest Park during winter 1994. The species selected were New Zealand falcon (*Falco novaeseelandiae*), kaka, kakariki (*Cyanoramphus auriceps*), blue duck, short-tailed bats (*Mystacina tuberculata*) and a selection of invertebrates. All of the bird species have been identified as being at medium to high risk of non-recovery if their numbers are suddenly reduced (Spurr 1979), and all of the species are considered to have been inadequately monitored to determine the impacts, direct or indirect, of 1080 poisoning operations on their populations (Spurr 1993).

2. Site description

2.1 LOCATION AND TOPOGRAPHY

The Rangitoto and Hauhungaroa Ranges dominate Pureora Forest Park and together form an ecologically distinctive and extensive tract of native forest dividing the Maniapoto District from the Taupo Basin (Leigh and Clegg 1989).

The Hauhungaroa Range is an uplifted Jurassic greywacke block tilted toward the west. The eastern flanks of the range are generally rolling hill country comprising of eroded volcanic pumice breccia flow deposits formed by the eruption of Taupo approximately 1800 years ago. Headwater streams and minor tributaries are numerous and are generally steep, relatively shallow, fast-flowing and deeply incised within the underlying ignimbrite flows. The region's climate is cool, wet and humid. Frosts are common and winters on the main ranges can be severe (Leigh and Clegg 1989).

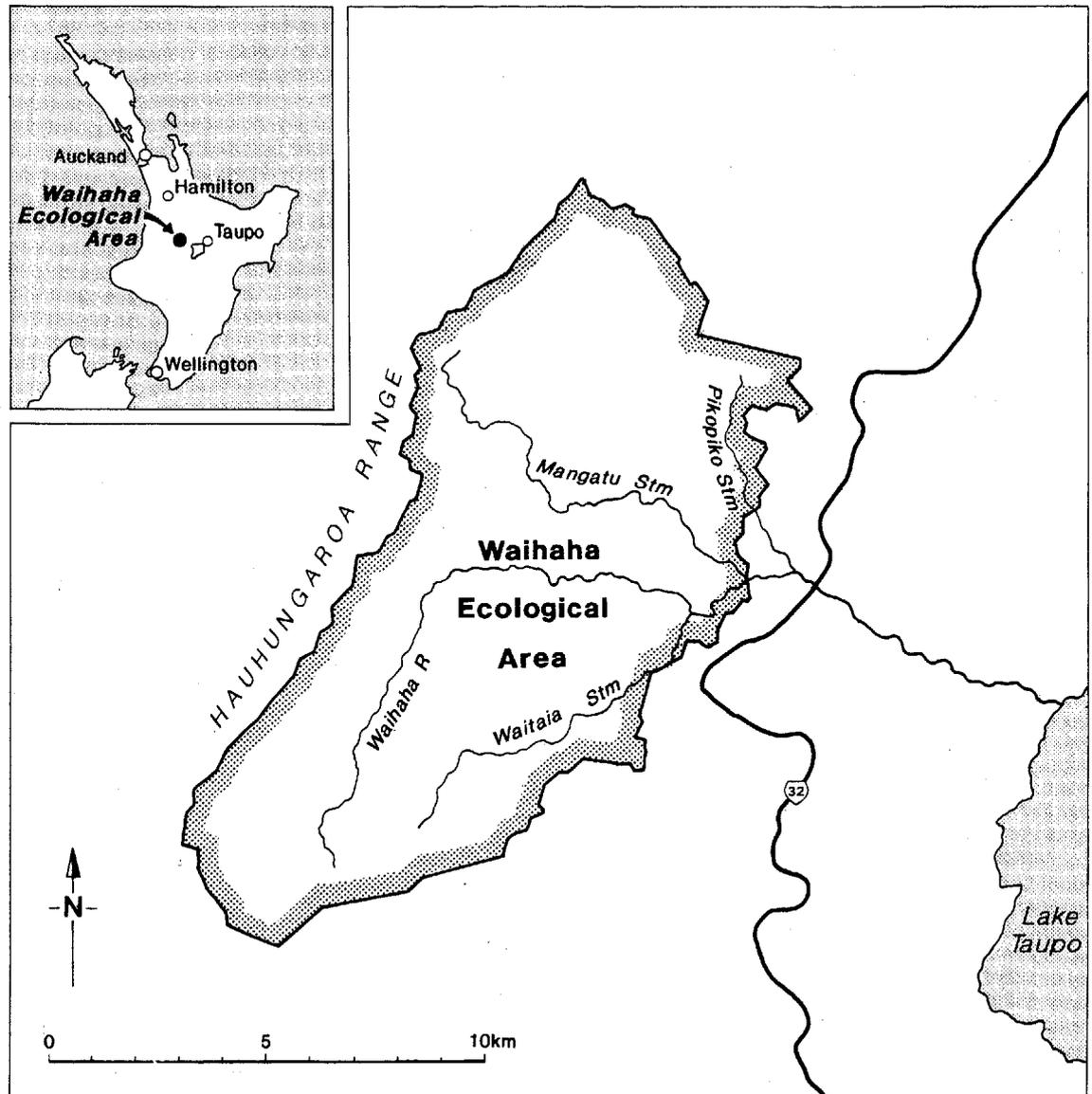


FIGURE 1. LOCATION MAP.

2.2 VEGETATION

The Waihaha Ecological Area (Fig. 1) covers a significant portion of the forested area east of the main range and has been identified as one of the finest areas of dense virgin podocarp forest remaining in the North Island (Leigh and Clegg 1989).

The dense lowland podocarp stands are dominated by matai (*Prumnopitys taxifolia*), together with miro (*Prumnopitys ferruginea*) and totara (*Podocarpus totara*) growing as straight and generally small canopied trees. Matai is dominant in depressions where frosts are severe. On the more rolling terrain and steeper slopes where the pumice soils are thinner, rimu (*Dacrydium cupressinum*) is more common. Other common trees include kahikatea (*Dacrycarpus dacrydioides*) and, locally, tanekaha (*Phyllocladus trichomanoides*) and toatoa (*Phyllocladus glaucus*). The subcanopy is mainly kamahi (*Weinmannia racemosa*) with tawa (*Beilschmiedia tawa*) locally