Changes in Possum Abundance in Waipoua Forest Sanctuary after 1080 Poisoning

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CONTENTS

1. Introduction

The Weeds and Pests Division, Manaaki Whenua–Landcare Research, Christchurch, monitored the change in possum abundance in the Waipoua Kauri Sanctuary for 3 years after a 1080 poisoning operation undertaken against possums in September 1990. Comparisons with pre-poison possum abundance were based on data collected between 1981 and 1990. The work was contracted by the Department of Conservation (DoC), Science and Research Division.

2. Background

In 1981, a monitoring programme and annual trapping were initiated to determine changes in population abundance in the Waipoua Forest Sanctuary (Thomas 1981-85, unpubl. FRI file note). This monitoring culminated in 1985 with a baiting trial to determine whether the possums would readily eat the cereal and/or carrot bait likely to be used in a poisoning programme. Both bait types were eaten by more than 90% of possums (Thomas 1985, unpubl. FRI file note), indicating that a control operation should achieve a high level of success. By 1989, DoC had become concerned about the noticeable increase in canopy damage in the Sanctuary, especially on rata (*Metrosideros robusta*), typically one of the first species to succumb to possum browse, and scheduled possum control for 1990.

In May 1990 a small area of the Sanctuary was treated with non-toxic bait to reconfirm the earlier palatability trial and to determine whether a lower sowing rate (5 kg/ha) from that normally used (10 kg/ha) would be adequate. This trial showed that 98% of the possums had eaten bait, indicating that a high level of success from a poisoning operation could be expected (Morgan 1990, unpubl. FRI contract report).

Control using cereal bait was undertaken in September 1990 and achieved a reduction in possum numbers of more than 80% (Thomas 1991, unpubl. FRI contract report). Since then browse levels on canopy species have decreased (L. Forester, unpubl. data) and some individual rata that had been almost completely defoliated have recovered (M. Thomas, pers. obs.).

Since poisoning in the Sanctuary DoC has undertaken an extensive programme of maintenance control using contracted hunters, with the aim of keeping possum populations at low levels. The continuation of this has recently come under review and this report will make recommendations on this based on the results obtained.

3. Objectives

- To measure possum abundance annually over 3 years after possums were controlled by aerial poisoning, then determine the population's rate of increase.
- To compare possum abundance from 1991 to 1993 after poisoning with that measured in 1981, 1982, 1985 and 1990 before poisoning.
- To determine the level of success of post-poison maintenance control achieved by ground hunters.
- To use a measure of possum abundance as an indicator to determine when control should be repeated.

4. Methods

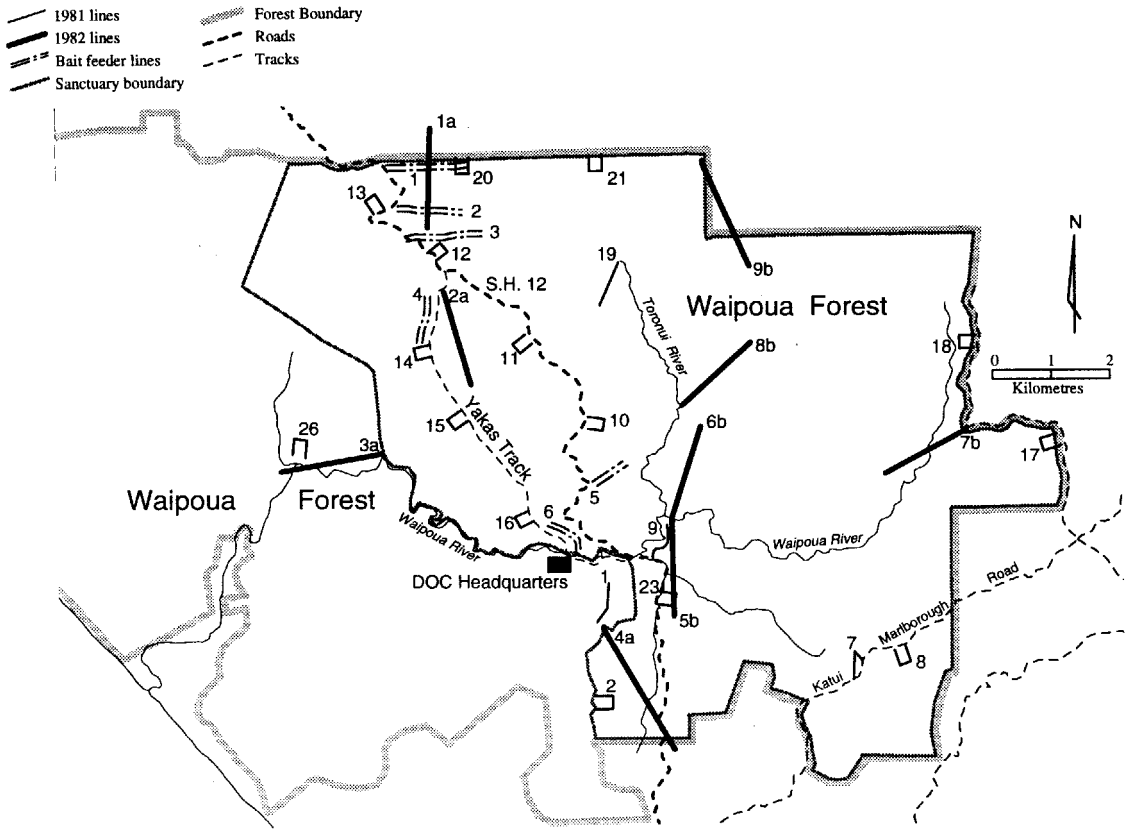
4.1 TRAP LINES

Trap lines containing 20-60 traps were established in the Waipoua Forest Sanctuary in 1981 and 1982 (Fig. 1), and were retrapped annually until 1985. Trapping resumed in 1990. All trapping was done in April apart from the pre-poison trapping in June 1990 and the post-poison trapping in February 1991. Traps were set for 3 consecutive nights at 20-30 m intervals, and flour containing a fruit essence was placed adjacent to traps to attract possums. Trap lines were not located in exactly the same place each year so that any reduction in the population caused by 1 year's trapping did not affect the following year's catch. Trap data collected in 1983 and 1984 were excluded because trap lines were set in the same place as the previous year. Catch is presented as percent catch ± 95% C.I. and is used as a comparative measure of possum abundance.

4.2 BAIT FEEDERS

A total of 60 bait feeders were established in 1991 on six lines (10 per line, Fig. 1) and possums were pre-fed non-toxic bait for approximately 2 weeks before measuring non-toxic bait consumption over 3 nights. The bait eaten is presented as the mean bait consumption per feeder ± 95% C.I. and is used as a measure of possum abundance.

FIG. 1 THE STUDY AREAS SHOWING THE LOCATION OF NUMBERED TRAP LINES AND BAIT FEEDER LINES.



5. Results

5.1 TRAP CATCH

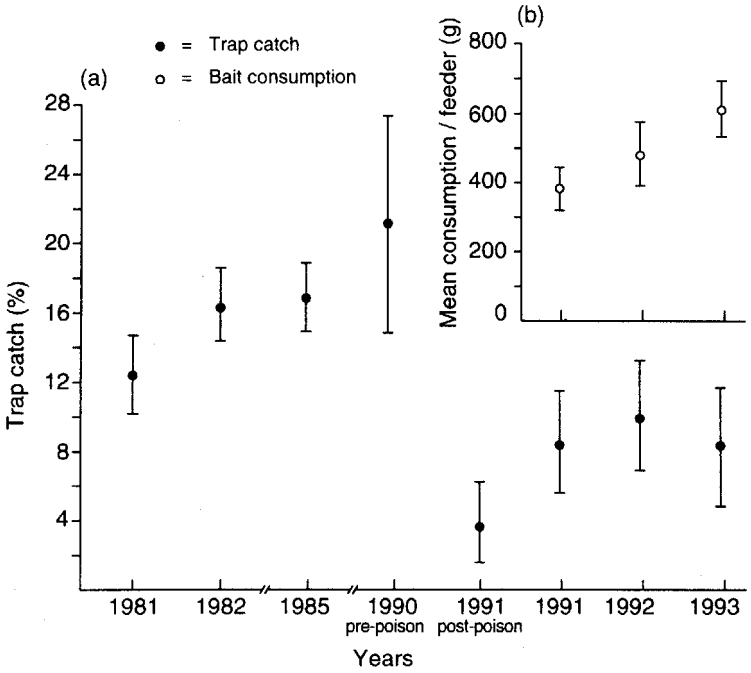
Trap-catch frequencies ranged from 21.2% immediately before poisoning to 3.8% immediately after poisoning (Fig. 2). Trap-catches recorded after poisoning have remained lower than those recorded in the early 1980s and the population has not increased significantly. Catches per line are shown in Appendices 11.1, 11.2, and 11.3.

5.2 BAIT CONSUMPTION FROM FEEDERS

Mean bait consumption per feeder increased steadily from 1991 to 1993 (Fig. 2). Some of this increase may have been caused by an increase in the number of rats taking baits as no attempt was made to excluded them from the feeders. Previous trapping data (Thomas 1981-198_5, unpubl. FRI file notes) indicated that rats occur in the forest at high densities in some years. Also as possums learnt that an artificial food was available, the numbers attracted to the feeders

may have increased over time. Mean bait consumption per feeder is shown in Appendix 10.4.

FIG. 2 TRAP CATCH (% PER TRAP ± 95% C.I.) AND BAIT CONSUMPTION (MEAN PER FEEDER ± 95% C.I.)



5. 3 DETERMINATION FOR THE NEED FOR CONTROL

Because of the likely biases associated with measures of abundance based on consumption of non-toxic bait, trap-catch only should be used to determine population increase at Waipoua. Damage to the forest canopy became noticeable between 1985 and 1990 when catch rates of 17-21% were recorded. It can be assumed that catch rates of over 15% could be associated with high enough possum abundance to cause noticeable damage to the forest. Therefore, when catch rates exceed this level possum control should be considered. Decisions to instigate further control should also be based on the measures of canopy browse being undertaken by DoC Northland.

6. Conclusions

There was no evidence that possum abundance was increasing significantly at Waipoua after poisoning, and the DoC maintenance trapping seems to be slowing population increase. Catch rates achieved by the contract hunters, who trapped on best possum sign rather than on set trap spacings as in this study, declined from 28% in 1990-91, to 19% in 1991-92 and 16% in 1992-93 (D. McKenzie pers. comm.), which supports this conclusion.

There is some doubt about the validity of using non-toxic bait consumption to measure population increase. Therefore further measures of population increase should be based on trap catch only using the methods outlined in this report. Catch rates of more than 15% probably indicate that possum control is needed to prevent canopy damage.

In March 1993, DoC reassessed the need to continue maintenance control at Waipoua. The lack of data on population growth rates in areas that had no maintenance control following poisoning make informed decision making difficult. Therefore, rates of population increase after poisoning with no maintenance control need to be determined so that the best suited strategy can

be applied. Factors such as the effect of different population growth rates on forest health, and the cost of the two strategies need to be compared. Meanwhile, the present data suggests that maintenance control at Waipoua is achieving the desired effect, i.e., maintaining the population below the level where canopy species are threatened, and it would be prudent for this control to continue.

7. Recommendations

- The possum population at Waipoua should continue to be monitored, but at 2-year intervals using the trap-catch method described in this report.
- Catch rates of >15% as measured in this study can be used to indicate that further control is needed. This should be confirmed by measures of canopy browse.
- Possum population increase should be measured in an area that has not had maintenance control so that comparisons of maintenance control vs no maintenance control can be made.

8. Acknowledgements

I would like to thank D. McKenzie (DoC) for his support and enthusiasm during this project and B. Parker for assisting with the bait feeder measurements. Thanks to J. Orwin and J. Coleman for critically reading the manuscript, and to C. Frampton for statistical analysis.

9. References

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10. Appendices

10.1 POSSUM CATCH ON LINES 1A-9A

	1982		1983		1984		1985	
TRAP LINE	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH
1a	180	19	180	27			180	20
2a	180	17	180	14			174	31
3a	180	52	180	27			180	22
4a	178	19	180	12			177	26
5a	179	35	177	16			175	39
6a	180	33	180	8	180	19	120	36
7a	180	41	177	25			179	23
8a	179	31	177	4	171	7	180	52
9a	158	16	180	15			180	24
Total	1594	263	1611	148			1545	273

10.2 POSSUM CATCH ON LINES 1-26, 1981-1985

	1981		1984		1985	
TRAP LINE	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH
1	75	9			66	15
2	75	4			75	9
7	69	9				
8	72	11			75	11
9	75	10			75	10
10	75	12	75	8		
11	75	2	75	6		
12	75	8	75	0		
13	75	6	75	7		
14	75	6			75	10
15	75	13			75	18
16	75	12				
17	50	6			75	10
18	50	5				
19	75	9				
20	75	5			75	12
21	75	4				
23	75	8			75	7
26	75	32			75	12
Total	1366	171	756	21	741	144

10.3 POSSUM CATCH ON LINES 1-26, 1990 TO 1993

	1990 PRE-POISON		1991 POST-POISON		1991		1992		1993	
TRAP LINE	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH	TRAP NIGHTS	CATCH
2					60	6			60	4
7					60	5	60	5		
8					60	3	60	9		
9	52	11	60	2			60	8	60	7
10	60	12	60	2			60	10	60	4
11	60	16	60	2			60	2	60	2
12	60	13	40	0			60	7	60	3
13	60	11	40	4			60	6	60	7
14					60	1	60	3		
16					60	6				
17					60	7	60	4		
18					60	5				
20					53	6				
Total	292	63	260	10	473	39				

10.4 MEAN BAIT CONSUMPTION PER FEEDER (G) FOR 3 NIGHTS

LINE NUMBER	1991	1992	1993
1	217	640	664
2	235	225	816
3	314	127	675
4	464	593	522
5	400	452	501
6	592	865	616
Mean	381	484	612