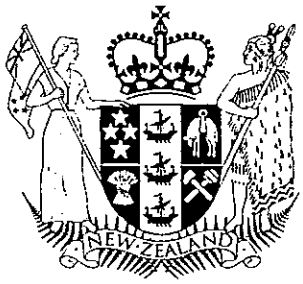

DEPARTMENT OF CONSERVATION

POSSUM CONTROL ON

MOUNT KARIOI, RAGLAN

Office of the
PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT
Te Kaitiaki Taiao a Te Whare Pāremata

P.O. Box 10-241 Wellington

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1.0 INTRODUCTION

1.1 Involvement of the Parliamentary Commissioner for the Environment

On 26 May 1994, the Parliamentary Commissioner for the Environment tabled the report *Possum Management in New Zealand* in the House of Representatives. Included in her major findings were (a) that in very difficult and inaccessible terrain there was currently no more cost-effective control method than aerial-1080, and (b) that over accessible terrain 70-80% reductions in possum populations had been achieved by both ground control and aerial-1080 with similar costs per hectare.

In the weeks that followed, she had requests from local residents in Raglan (Mt Karioi), Marlborough (Tennyson Inlet), and Kaitaia (Maungataniwha Range) to investigate proposals by the Department of Conservation to aerially drop 1080 in areas the residents considered adequately accessible for ground control methods.

In the Raglan case, a resolution from a public meeting convened by the MP for Raglan requested the Commissioner's involvement, and the Department of Conservation agreed to postpone the proposed aerial-1080 operation until the Commissioner had reported her findings.

The Commissioner undertook to review the Department of Conservation's Karioi proposal in light of the findings and recommendations in her May 1994 report, under section 16(1)(b) of the Environment Act 1986, in the hope that some generic guidelines could be provided to assist in similar cases throughout New Zealand.

The Commissioner and her team reviewed documentation on Mt Karioi possum control proposals by the Department and local groups, and visited with tangata whenua at Te Whaingaroa ki te Whenua Trust, the Raglan Community Board, the Friends of Karioi[1], a group of Raglan farmers, local representatives of TANNZ (Ten-eighty Action Network of New Zealand), the Waikato Conservation Board, the Department, and the Regional Council on 6 and 7 July 1994.

1.2 Overview of possum control on Karioi

Possums have been on Mt Karioi for about 40 years, and have caused significant damage to the canopy of tree species most vulnerable to possum browsing. During times of high skin prices private hunters could apply for licences to trap possums, but this ceased to be financially viable in the late 1980s. Local hunters believe that in earlier years trapping adequately controlled possum damage in the forest. Research has shown that commercial trapping can hold possum populations at lower levels than that which would occur naturally, but this level is still ecologically damaging.

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[1] This organisation is also known as Friends of Mount Karioi, Friends of Karioi Mountain, and Friends of Karioi Sacred Mountain.

The Department planned to control possums from November 1992 and discussed trapping and 1080 alternatives with adjacent landholders (including tangata whenua). Control was attempted in early 1993 with a trapping contract and adjacent landholders were advised of the trapping operation and the risks from cyanide and traps. By June 1993 it was apparent that the trapping contract (for a variety of reasons) had not been successful.

The proposal to use 1080 was discussed with adjacent landholders in person over September - December 1993 (including tangata whenua). Trapping in adjacent privately-owned forest lands was arranged by DOC where the use of 1080 was not agreed to by the forest owner. Where boundary fencing was inadequate to keep stock out of 1080 treated areas of the forest, temporary electric fencing or agreements to hold stock in lower paddocks were arranged. Muzzles and emetics were provided to assist in protecting dogs from 1080 poisoning.

DOC staff made visual presentations to the Raglan Community Board and the Whaanga ratepayers association in October and November 1993, explaining the need for possum control and the control options available.

Public meetings organised by anti-1080 campaigners in May 1994 generated concern about possible non-target risks and calls for alternative control. The Friends of Karioi group was formed to look at alternatives, and residents organised a survey to determine potential safety risks and community awareness and views. Despite very tight deadlines, both volunteer efforts covered considerable ground, indicating the strength of concern and interest.

The Commissioner visited with interested parties on 6-7 July, and released her report on 22 July 1994.

DOC has taken the initiative to meet with community representatives to discuss control options for Karioi, and the initial meeting was scheduled for 21 July 1994.

A chronology of the Department's actions 1992-94 is listed in the appendix.

2.0 RISK ASSESSMENT

2.1 Risk of damage to Karioi forest

The coastal mountain forest on Mt Karioi includes species such as kohekohe, puriri, karaka, northern rata and kamahi. This type of forest is now rare on the North Island west coast, and the Karioi forest is recognised as of "outstanding value" on a national scale.

The Karioi forest has suffered significant damage from goats, livestock, and possums, and is subject to continuing stress from a variety of environmental factors. The risk from

goat damage has now been largely controlled with spectacular recovery of the understorey. Livestock fencing has been half completed, with possums remaining as the next major threat to be addressed.

In 1975 it was noted that possums 'had only caused severe damage to trees around the forest margin and open areas'[2]. DOC staff noted possum damage to the forest was becoming severe in 1988 and damage was recorded as widespread and severe in 1991.[3] Without the use of standardised methods for pre- and post- monitoring of control, the actual possum density on Mt Karioi has not been able to be verified. However, all estimates show the population to be vastly greater than the 1 possum per hectare threshold that appears to be necessary for effective native forest protection.[4]

Historical vegetation damage on Mt Karioi cannot be fully understood because of the limited resources dedicated to vegetation monitoring in previous years. In November 1992 DOC established two indicator species monitoring lines (of 102 trees) on the northern and western sides of the mountain (indicator species are those particularly susceptible to possum browsing). An assessment of these lines in November 1993 showed that 9% of the trees on the line had died during the year and defoliation of the other trees was widespread. A further monitoring line of 18 possum palatable trees has since been established by DOC on the eastern side of Mt Karioi.

The Mt Karioi forest is a dynamic system in a continuous state of change. Other factors in combination with goats, livestock, and possums that influence the forest include:

- *Extreme climatic events*. The forest is exposed to natural storm damage and the vegetation (particularly the crowns of canopy trees) is affected by wind carried salt spray. Although native tree species have a tremendous potential to regenerate, storm damage combined with selective browsing by possums on new shoots, will not allow naturally stressed trees to regenerate.

- *Insects*. An increase in dead wood from other impacts can cause a corresponding increase in the number of detritus feeding insects on the mountain and these insects can cause damage to trees stressed from other factors.

- *Bush clearance*. The fragmented margin has affected and continues to affect the sustainability of the forest, with increased exposure to climatic and browsing influences. On the eastern side of the mountain the pasture extends to a high altitude. Continued access of livestock prevents regeneration.

- *Fire*. Long-time residents report that some of the dead rata trees date from a fire on the mountain several decades ago. Fire can be a very serious risk to a forest,

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[2] Clayton-Greene and Wilson, 1985, p545.

[3] Department of Conservation, 1994c, 7b.

[4] Giddy and Broome 1993, p2; Department of Conservation 1994a, p26; K. Broome, pers.comm., 1994.

but it appears that the extent of fire damage on Karioi was limited to an area in the northeast.

The possum damage is progressive and destructive, however caution is required before definitive statements can be made attributing the cause of damage to one influence or the probable time period for death. What seems certain is that without substantial possum control in the short term, canopy dieback will occur and ultimately a lower canopy/shrubby forest will result with a corresponding reduction in species diversity.

2.2 Risks associated with possum control

The risks that must be considered in the context of deciding on possum control measures in the Conservation estate include:

1. Known and unknown risks to native ecosystems if possums and other threats are not controlled.

2. Known and unknown risks to non-target species from the possum control methods chosen.

3. Risks to community cooperation and goodwill through imposing actions not fully supported by persons who feel they will be affected.

4. Risks to other areas of the Conservancy if more expensive methods of possum control are chosen to meet community aspirations, decreasing funds available for wild animal control elsewhere.

The findings of the Commissioner's 1994 report *Possum Management in New Zealand* included the following (pp. 125-128):

1. With our current state of scientific knowledge, the evidence on the environmental effects of 1080 can prove neither cause for immediate alarm nor absolute safety.

2. Compound 1080 poses known and unknown risks that must be compared with the known risks posed by possums.

3. Compound 1080 is biodegradable over time.

4. Loss of individuals of non-target species is likely from 1080 use (especially dogs), but all control methods pose risks to other species. The long-term risks to ecosystems and populations of native species from large-scale possum control by 1080 (or any other method) are unknown.

5. The risk of significant contamination of human water supply from aerial 1080 use is very low.

6. All possum control poisons (e.g. 1080, cyanide, brodifacoum, phosphorus) can be considered *'contaminants'* under the Resource Management Act, as they are capable of changing the physical, chemical or biological condition of the land, water or air.

7. When baits are delivered by air, it is impossible to avoid small watercourses and therefore aerial-1080 operations can be considered to discharge a contaminant to water. However, whether this discharge is considered to cause a *significant* impact is a separate issue, which will determine how it is dealt with in plans and rules, and/or by resource consents.

8. Public opposition to 'indiscriminate' poisoning by air is not likely to go away, and widespread use of 1080 may not be viewed as 'clean and green' by our trading partners.

9. For possum control over very difficult terrain, a more cost-effective control than aerial-1080 is not available at the present time. Research into biological controls or other breakthroughs in technology might offer alternatives over the long term.

10. Cost-effective reduction of possum populations by 70-80% *can* be achieved by possum hunters operating under *performance contracts* over considerable areas of accessible terrain. For this option to be viable over a significant part of New Zealand for the medium to long-term, more adequately trained hunters are required, more site-specific paired trials (comparing hunting and 1080 poisoning) need to be initiated, and a code of practice needs to be developed. (Also see section 3.3 of this report for new information).

11. Possum hunting using traps and cyanide also involve non-target risks. Cyanide is a humane poison, but it has killed at least 11 people in New Zealand, traps as presently used are viewed by some as inhumane, and both methods can kill or injure individuals of non-target species.

12. Landholders should be allowed to control possums in their own way if 1080 or other methods preferred by control agencies are unacceptable, as long as required levels of control are achieved. The inability to prevent the imposition of unwanted pesticides may affect mental if not physical health, certification for organic growers, and the ability of tangata whenua to exercise *kaitiakitanga*.

13. Continuing heavy reliance on 1080 is not advisable over the long term. Even if other environmental risks of 1080 use are not felt on balance to be significant, the risk of developing bait and poison shy populations must be considered.

2.3 Perception of risks

All parties spoken to by the Commissioner agreed that the native forest on Karioi was important, that (at least in places) it was seriously damaged by possums, and that possum

control was necessary. Where opinions differed related to the urgency for control, and the acceptability of control methods. All parties also have a shared concern for public health and safety, but in some cases differ on interpretation of the scientific evidence available.

Some of the claims by TANNZ (both locally and nationally) about the scientific evidence on the risks of using 1080 cannot be substantiated. The Commissioner's 1994 report to Parliament provides an objective evaluation of scientific data.

The Department of Conservation has a legal obligation to protect the Conservation estate from threats such as possums, but it had a limited budget allocated to it to do this. It must therefore prioritise areas for wild animal control, and find the most cost-effective methods available. No long-term negative effects of 1080 use on the Conservation estate have been demonstrated, but the risk from uncontrolled possums is very real and extremely serious. Over a decade of experience in possum control using trappers has led the Waikato Conservancy to believe that while trapping can be effective, the costs per hectare are significantly higher for trapping than for aerial-1080, and a choice to use trapping therefore reduces the amount of funding available to control possums elsewhere. Dedicated estate protection staff are therefore very concerned about the risks from *not* using 1080, particularly in areas where they perceive the need for control to be urgent such as Karioi.

The community on the other hand are more concerned with having control over impacts to their sources of livelihood and the quality of their environment. They seek guarantees of public safety, finding ways of reducing local unemployment, and full involvement in decisions that they believe affect their community. Historical events in both New Zealand and overseas have also contributed to a certain general distrust of the long-term unknown effects of using synthetic chemicals in the environment, and a distrust of agencies and scientific data. The absolute safety of 1080 (or any other chemical) cannot be guaranteed, and assurances of low risk come from authorities which (whether justifiably or not) no longer command full public trust. Naturally, there is a strong local interest in possum control measures which minimise the use of poisons, maximise the employment of people, and involve the local community in decision-making. While the community agrees possums on Karioi must be controlled, they do not believe it is so urgent that it can't wait another six months or a year to enable ground control to take place.

Given these differences in priorities and concerns, it is understandable that there has been some disagreement and controversy in Raglan. However, given that there is agreement on the important bottom line that possums on Karioi must be controlled and that DOC and the people of Raglan both will benefit from an amicable and cooperative relationship over the long-term, a mutually satisfactory compromise should be possible. The first step, however, is mutual acknowledgement and understanding of concerns.

3.0 ADEQUACY OF AGENCY RESPONSE

In this section, the Waikato Conservancy's actions in relation to Karioi are compared against the criteria in the Commissioner's 1994 report to Parliament, *Possum Management in New Zealand*. The Findings and Recommendations referred to may be found on pages 125 through 137 of that report.

3.1 Transparency of decision-making

[Recommendation 11]

As required by internal DOC protocol, the Waikato Conservancy prepared an Environmental Impact Assessment (EIA) for the proposed possum control on Mt Karioi. This EIA looked at alternative methods of control, and concluded that aerial-1080 was the most cost-effective method for Mt Karioi. The reasons for making this decision were clear in the report.

The EIA was dated April 1994, and the permission from Head Office (based on acceptance of EIA) was dated 13 May 1994. The EIA was mentioned at public meetings in May, and copies were to be given out if requested. However, members of the groups that met with the Commissioner in early July 1994 (the Community Board, tangata whenua, adjacent landholders, Friends of Karioi, and TANNZ) had not yet seen the EIA. One member of Friends of Karioi and the local Federated Farmers representative received copies in June.

Therefore, although the EIA explained the reasons for the decision, the community was not sufficiently aware of the contents. The decision was presented as a fait accompli, rather than involving the community throughout the process. The Department in hindsight agree that the EIA could have been released to the community earlier.

3.2 Transparency of costings

[Recommendation 7]

Costings were included in the EIA to assess alternative control options. However the costings only included the actual operational costs of control (aircraft, bait, transport, storage of bait, staff time, weather forecasts), and did not include Conservancy overheads. The reason given for this was that in the Conservancy's opinion, 'overheads are similar for all types of operations' and overheads for certain ground control operations may even be higher because multiple monitoring of hunters is required (to quantify the control achieved).[5] It is further noted that the cost of a ground control contract is often not the actual cost but a negotiated rate that results from a tender.

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[5] Department of Conservation, 1994c, 1a.

As no distinction between direct and indirect costs has been made by the Conservancy in its comparison of costs for alternative control options, the true cost of any operation to the Department is difficult to calculate. Costings for all possum control operations need to explicitly include all direct and indirect costs (e.g. operational, administration, consultation, the provision of information, monitoring, compensation, meeting safety requirements and any other cost) to enable a true comparison of the cost of alternative methods. Where staff time is being spent on multiple outputs (e.g. discussing a control operation which includes the promotion of conservation objectives) a percentage of the cost could be allocated towards the cost of a control operation.

There are also intangible costs of any control operation which may not be able to be explicitly valued but they can be listed and should be considered in the decision-making process. For example, where there is considerable community dissatisfaction regarding the selected control option the cost of lost goodwill to the Department and a possible decrease in support for conservation goals need to be considered.

3.3 Costing of operations

[Findings 10, 13]

In the Parliamentary Commissioner for the Environment's 1994 report, an analysis of the costs of ground and aerial operations was undertaken using available results at that time. The finding from this analysis was that 'given accessible terrain, ground control could be as cost effective as aerial-1080 in achieving 70-80% reductions of possum populations'.

However for the Mt Karioi operation a target of a 5% residual catch rate has been proposed rather than a 70-80% reduction to better protect at-risk conservation values. It is assumed by the Waikato Conservancy that a 5% residual catch rate (5 possums per 100 trap nights or approximately 1 possum per hectare) is required as a possum population threshold to allow the recovery of endangered species. This threshold is however a best estimate based on limited data and requires further research to validate the possum density which poses acceptable risk to endangered plant and animal species.

It is recognised that an increase in effort (which will increase the cost) may be required for ground control to achieve a 5% residual catch rate compared to a 70-80% population reduction. The 1993 trapping operation failed to meet this target (for various reasons) and based on recent control operations the Waikato Conservancy considers that ground control would be more expensive than aerial-1080 to obtain a 5% threshold.

Paired trials of ground trapping with bait stations and aerial-1080 need to be undertaken (in different types of terrain, vegetation cover and possum density) to assess which method is the most cost-effective in obtaining a 5% residual catch rate.[6]

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[6] Parliamentary Commissioner for the Environment, 1994, Finding 13, p127.

To calculate the percentage catch rate from monitoring line data, the number of interfered traps (non-target species and sprung traps) is partially deducted from the total number of trap nights (half a trap night per interfered trap). In present catch rate calculations there may be an inherent bias against trapping in any comparison with aerial-1080, as 1080 also lowers the rat population which may be caught in traps. Refinement of the calculation of residual catch rates from trap catch monitoring data (to account for sprung traps and non-target species that have been caught in a monitoring line) is currently being researched by Landcare Research.[7]

3.4 Monitoring

[Findings 7, 8; Recommendations 8]

Monitoring of relative possum densities and the damage to indicator plant species has occurred. Funding is available for post control trap-catch monitoring of possum densities, annual monitoring of indicator species, and possum density monitoring prior to maintenance in subsequent years. Annual monitoring of possum densities to correlate with the damage to indicator species will be dependent on the success of the initial control operation.

The calculation and interpretation of the possum density figures has led to misunderstanding between the Department and the community. Information provided to the public did not include baseline monitoring data. Because a standardised pre-monitoring method was not used on Mt Karioi, several assumptions have to be made in order to calculate the possum density. The methodology used for monitoring, any departures from the standard approach, the location and catch rate of trap lines, and the method and formula used to calculate the possum density need to be transparent.

Formal monitoring of the native animal species is not planned as they are not considered to be at risk. The Department is planning water quality monitoring but has yet to finalise this with the Medical Officer of Health. Members of a local ornithological society have volunteered to assist in informal bird surveys.

The data demonstrating risk to the forest and assessment of urgency for control is discussed in more detail in section 2.1. The Department attempted to provide information to the community but did not fully explain monitoring data or respond seriously to community observations about other risks. This seems to have contributed to misunderstanding and mistrust of DOC's arguments for urgent possum control. A more detailed explanation of monitoring data and involvement of community volunteers in monitoring may improve understanding.

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[7] Dr C Frampton, Lincoln University, pers. comm., 1994.

3.5 Reducing dependency on 1080

[Findings 4, 12, 13, 16; Recommendation 10]

The long term reliance on any one technique for possum control is unwise because possum bait, poison or trap avoidance may result. Biological control may be an alternative in the future but until it is developed the use of a range of control methods is required.

The use of performance contracts for ground control can increase the effectiveness and efficiency of ground control operations. The Waikato Conservancy is using ground control methods for possums (e.g. Pureora and the Coromandel) but the more difficult the terrain the greater the cost of ground control. The Conservancy has analysed the problems with the 1993 ground control contract on Mt Karioi but it is of the opinion that although 'most of the reasons for its failure could be remedied', the cost to obtain the target would still be extremely high.[8]

The results of various trials of ground control (by skilled hunters working to performance contracts) of different possum population densities in various types of terrain, vegetation, and weather need to be analysed and reported. Until this occurs definitive statements on the level and cost of control given difficult terrain and access, along with high densities cannot be validated. Research is also required into the techniques used by hunters, such as the identification and targeting of high possum densities and the luring of possums to traplines.

3.6 Other threats to the Conservation estate

[Finding 5]

Other major threats to the Karioi forest besides possums include livestock and contributing factors to tree mortality such as fire, wind borne salt spray, and insects. Goat populations constitute a potential threat if hunting pressure is not maintained.

In 1982, the then Forest Service began intensive goat control on Karioi, which was taken over by the Department of Conservation from 1987. This has resulted in a dramatic recovery of understorey plants (which also reduces accessability for possum control), including the return of some species thought to be virtually extinct in the area such as the Mountain Cabbage Tree. The community recognises this and has praised DOC for goat control. However, some of community does not appear to understand that possum damage to forests is selective with possums targeting vulnerable species, and there is a mistaken belief that the regrowth of the understorey proves that possums are not so numerous as DOC says they are.

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[8] Department of Conservation, 1994c, 3.

Livestock cause significant damage to the lower areas of forest approximately half of the forest perimeter having boundary fencing which is inadequate. The adjacent landholders with inadequate fencing therefore are contributing to the destruction of the Karioi forest, and there does not appear to be peer pressure from the wider community to improve this situation. The Department inherited a policy of failing to enforce boundary fencing, but has begun working actively on cooperative agreements and was successful in seeing an additional 4,870 metres of permanent fencing installed in 1993. The construction of fencing is a two way process although some landholders have not fenced their properties despite the Department supplying the materials.

Uncontrolled dogs in Karioi forest which were mentioned by residents may be causing native bird mortalities.

The community has mentioned fire as a source of tree mortality on Karioi pre-dating possum damage, assuming that DOC has attributed such tree mortality wrongly to possums. These trees were not included by DOC in the assessment of possum damage, but the public were not aware of this.

DOC is aware of but has not fully responded to community concern about insect damage ("little green and black" insect) on the mountain. The Commissioner has been advised that detritus-feeding insects will increase as browsing damage kills and weakens trees. The insect the residents have described is the native Manuka beetle which has co-evolved with native vegetation. Periodic irruptions of this insect are part of its natural cycle and they are believed to be host specific.

The community has also expressed concern about herbicide spraydrift from adjacent farmland as a factor in canopy decline, and noted that wind borne salt spray during storms may contribute too. While these influences are difficult to measure, in combination with persistent possum browsing they may be contributing factors (see section 2.1).

3.7 Safety measures

[Findings 11, 21, Recommendations 9, 12, 13]

The Department has assured the Commissioner that Differential Global Positioning System (DGPS) navigation will be used for all aerial-1080 work on Karioi, which will minimise the risk of misapplication of poison baits. Tight security is planned over bait storage and transport.

In order to meet the conditions of the permission from the Medical Officer of Health, the Department plans also include the following provisions:

a. Water supply intakes in the drop zone will be marked on the map and with bright flagging tape on the ground, staff familiar with these locations will be with the pilot, and a ground check will be made afterwards.

b. The public track and nearby areas will be cleared of baits and possum carcasses the day after the drop.
c. Baits will be regularly tested for toxicity after the drop and rainfall records kept.
d. All known access points and the beginning of tracks will be signposted.

It is not proposed to use 1080 jam paste baits, so there is no risk of 1080 poisoning to bee colonies of 1080 residue in honey. The fact that bees are not attracted to cereal pellet baits (such as proposed for Karioi) was not understood by some residents, occasioning unnecessary concern.

Dogs are at risk from 1080 poisoning operations, and DOC has issued dog control instructions, muzzles, and emetic pills to adjacent landholders. Some adjacent farmers have complained to the Commissioner that muzzles and "training dogs not to scavenge" are useless protection measures. While it may be argued that dogs can be controlled on a leash, chained up, or put in kennels, this is not practical for dogs out working on the farm which can get out of muzzles and find a 1080-killed possum that wandered outside DOC lands. DOC's agreement to reimburse owners for lost dogs (but only where it can be proven that 1080 baits fell on the farmer's land) is an attempt to address this situation, but from the point of view of some local farmers it is inadequate. If possum control is going to be an ongoing operation in many areas, enlisting the assistance of Federated Farmers by landholders with at-risk dogs is advocated.

Dogs are prohibited on the Conservation lands of Karioi without a permit. Local people who take their dogs for walks or let their dogs wander in these areas are breaking the law, and if as a consequence their dog is poisoned by 1080 they should not expect a sympathetic response from DOC. DOC has however noted that better publicity about the regulations may be required.

The preliminary safety report prepared from a survey of local residents suggests that better publicity about precautions that can be taken with 1080 is essential for the residents of Raglan community. DOC appear to have focused their initial efforts on adjacent landholders. The wider community had misconceptions and unanswered questions about the risk to dogs and livestock and the safety of water supplies[9]

3.8 Consultation with tangata whenua

[Recommendation 16]

Subsequent to consultation in 1992 in connection with the unsuccessful 1993 control by contract trapping, the Department met with tangata whenua in December 1993 and March 1994, as a large segment of Maori-owned forest land is adjacent to the DOC land. Tangata whenua opinions were divided on the best way to control the block, some agreeing to trapping over the majority with 1080 allowable for a small segment of inaccessible Maori land as well as on DOC lands, and some agreeing to trapping only

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[9] Baer-Doyle & Gilgren, 1994.

(no poisons, either 1080 or cyanide) and opposed 1080 in DOC land. The Department agreed to apply for Task Force Green funding to facilitate trapping efforts on Maori lands, but received only half the funding required.

Subsequent to public meetings and opposition to the aerial-1080 proposal and the Commissioner's visit, DOC was to hold discussions with community representatives on 21 July 1994 to discuss control options for Karioi, and tangata whenua representatives are included.

4.0 INVOLVEMENT OF THE LOCAL COMMUNITY

4.1 Legal framework

Legally, DOC is not required to consult with the public in the day-to-day management of the Conservation estate, except in the formation of a Conservation Management Strategy (CMS) or Conservation Management Plan (CMP). Karioi is part of the draft Waikato Conservancy CMS, but the CMS is not explicit about pest control methods. There is no CMP for Karioi.

Even though the Conservation Act does not explicitly require wider consultation, DOC does recognise the value of cooperative relationships with host communities and the public in sustaining effective conservation management over the long-term. Generally, DOC has acknowledged a moral obligation to be a "good neighbour", and the community liaison efforts in the Raglan case have been made in this context. However, problems arise when the proponent agency has limited control, legislative mandate, or funding for the areas of concern raised by the public.

Under statute, the place for consideration of community concerns about the discharge of contaminants into the environment and protection of human health is under the Resource Management Act 1991 and the 1983 Vertebrate Pest Control Regulations of the Pesticides Act 1979.[10] Permission for the proposed Karioi 1080 operation was obtained from the Medical Officer of Health, but a consent to discharge contaminants was not required by the regional council. Environment Waikato (Waikato Regional Council) proposes to issue a discussion document on regional policy for 1080 and other pesticides in early 1995.[11]

The community is also very concerned to encourage greater employment and training in ground control methods. While DOC may act as a sponsor for training programmes, the principal Government agencies responsible for the areas of employment and training are the Department of Labour, the Ministry of Youth Affairs (re: Conservation Corps), the

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[10] Parliamentary Commissioner for the Environment 1994, pp. sections 4.2.1, 4.4, 4.5.1, Table B.3. The Biosecurity Act 1993 also has provisions for assessment of impacts to third parties, but DOC possum control is undertaken under the Wildlife Act 1953 and the Wild Animal Control Act 1977, and operation under the Biosecurity Act is optional.

[11] B. Harris, pers.comm. 1994.

Ministry of Education, the New Zealand Qualifications Authority. Other participants would include training establishments, and iwi and community groups seeking to sponsor training programmes.

In summary, the Department of Conservation has a primary statutory obligation to protect the conservation estate. The Department's legal obligation to consult is limited, and they have more than met their statutory obligations in the Karioi case. However, the statute does not prevent the exercise of a "good neighbour" policy, and the Environmental Protection and Enhancement Procedures still apply for Government actions not covered by the Resource Management Act.[12] However, at some stage DOC must make a decision and act where threats such as possums are serious, even if full community support cannot be obtained or wider community aspirations fulfilled.

4.2 Generation of options with community input

As a general principle, communities are more supportive of programmes that they have been involved in developing than those they feel have been imposed without consideration of their concerns.

In 1992, DOC discussed alternative controls with adjacent landholders on Mt Karioi, and in response to concerns about 1080 agreed to attempt trapping over the area. In 1993 the ground control contract for a variety of reasons did not achieve its targets. DOC experience in that case and at Mt Moehau demonstrated to the Conservancy that ground control is more expensive than aerial-1080 when a one possum per hectare target is sought, and 1080 was then pursued as an option for the conservation lands on Karioi. In late 1993, adjacent landholders were advised of this, and alternative controls for private forests and boundary fencing to keep stock out of the operational area were negotiated.

Reasons given for choosing trapping over aerial-1080 in 1993 were as follows:

a. the community would be fully supportive of this option;
b. the accepted tender price ($21 GST excl/ha.) compared favourably with aerial-1080;
c. not dependent on all the boundary fences being intact;
d. would provide data on actual possum density;
e. it would be a difficult aerial-1080 operation because Karioi is subject to high rainfall and strong winds on the western side.[13]

The price can no longer be argued as comparable, boundary fencing has been addressed (permanent, temporary, or agreements to move stock), and possum density data is now available. However, points (a) and (e) are still relevant (community support and weather).

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[12] Parliamentary Commissioner for the Environment 1994, p.37.

[13] Department of Conservation 1994b, p.3.

It is unfair to expect field staff who already have a full workload of operational tasks to also be able to undertake thorough communication with the wider community. Working with communities requires specialist skills that field staff should not reasonably be expected to have. The Waikato Conservancy have employed staff with public relations and conservancy advocacy skills specifically to address issues with the community and senior staff have had major involvement with public communication. In the Karioi case, however, field staff primarily consulted with adjacent landholders and DOC misjudged the need for early consultation with the wider community.

DOC did make early presentations to two community groups, but the Commissioner has received complaints that DOC information on 1080 and trapping options did not adequately address their concerns. DOC feel that they have seriously addressed public concerns, but despite their efforts those concerns were not allayed. DOC's letter of 18 May 1994 to people who had attended a public meeting did accurately answer questions about 1080 raised at the meeting, but unfortunately it came too late to allay the concern and distrust generated by anti-1080 campaigners pointing out facts that DOC had not mentioned earlier.

Aerial application of 1080 is likely to remain a controversial subject. Public disquiet about aerial application of poison and demands for employment-generating alternatives are unlikely to go away, and adequate resources need to be allocated to work with host communities. However, as noted in section 4.1, DOC does not have an obligation to meet all community aspirations.

4.3 Fostering "ownership" of problems and solutions

Possums do not respect property boundaries, and DOC and adjacent landholders need to cooperate in possum control, be it for conservation, Tb control, or both.

As noted above, DOC has made particular efforts to arrange possum control in adjacent forested areas, but has paid full costs rather than obtaining a landholder contribution to encourage "ownership" of the problem. Landholders spoken to by the Commissioner expressed a wish to control possums on their farmland to complement the DOC operation, but were uncertain how this should be done or coordinated.

Landholders and members of the wider community expressed an interest in assisting with monitoring of possum numbers and forest health, and if DOC could incorporate this goodwill as part of its monitoring programme it would both improve community understanding and "ownership" of possum control on "their" mountain. If local people are also involved in training for performance contract trapping for maintenance control of possums, ongoing community interest and expertise may be fostered. There may be the prospect of forming a "Landcare" group, in cooperation with agencies and charitable organisations that fund community initiatives.

4.4 Adequacy of agency resources to meet community aspirations

Waikato Conservancy data suggests that ground control is significantly more expensive than aerial-1080 (if a one possum per hectare threshold is the goal in order to protect the forest), and funding has not been provided to cover this additional cost. Diverting funds from another area will jeopardise possum control there.

The Commissioner has previously noted the need to foster community skills in performance contract trapping to reduce dependency on 1080 over the long term, especially for maintenance control.[14] Possum control funding as presently provided to DOC conservancies allows for project-specific operational costs, but not long-term development of alternatives.

DOC has correctly argued that its primary job under statute is estate protection, not training of the community workforce. Possum control training funds have been sought from Task Force Green (Vote:Labour) and Conservation Corps (Vote:Youth Affairs), but in the Karioi case the funds granted have been insufficient to allow effective trapping over even the Maori block, let alone the whole of the proposed 1080 control area.

If Government is serious about developing viable alternatives to 1080 over the medium to long term in areas accessible for trapping and where the host community is uncomfortable about 1080 use and wants to encourage greater employment, then the questions of adequate funding, appropriate sources of funding, and consideration of intangible costs and benefits must be addressed.

5.0 CONCLUSIONS

5.1 Findings

1. The risk posed by possums to the native forest on Mt Karioi is serious, and available data suggests that reduction to very low levels (e.g. one possum per hectare) over the next 12 months is required to protect and enhance conservation values rated 'outstanding' on a national scale.

2. In the Waikato Conservancy's experience, ground control is more expensive than aerial-1080 when a one possum per hectare target is sought. However, development of monitoring methods and improved transparency of cost comparisons between ground control and aerial-1080 are required.

3. The Waikato Conservancy has promoted ground control in limited areas as an alternative to aerial-1080 for possum control in seven areas in the conservancy, including DOC lands on Karioi in 1993 and adjacent private forests on Karioi in 1994. However, possum control funding allocated to the Conservancy is

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[14] Parliamentary Commissioner for the Environment 1994, p. 127 (Findings 12,13) and p. 131 (Recommendation 10).

inadequate to fund ground control in all accessible forests requiring possum control.

4. The Conservancy attempted in good faith to fully liaise with adjacent landholders in a proactive manner, and explain possum control proposals to the wider public on request. Staff are to be congratulated on the efforts they made, within the Conservancy's resource constraints. Unfortunately, the level of genuine community concern about 1080 and desire to be involved in the decision-making process was underestimated.

5. The Department of Conservation has a primary statutory obligation to protect the conservation estate. The Department's legal obligation to consult is limited, and they have more than met their statutory obligations in the Karioi case. However, the statute does not prevent the exercise of a "good neighbour" policy, and the Environmental Protection and Enhancement Procedures still apply for Government actions not covered by the Resource Management Act.[15] However, at some stage DOC must make a decision and act where threats such as possums are serious, even if full community support cannot be obtained or wider community aspirations fulfilled.

6. The Conservancy prepared an environmental impact assessment explaining the reasons for possum control decisions on Karioi. This document was made available to the public, but unfortunately too late in the decision-making process and few people in the local community received it.

7. The local people associated with Friends of Karioi are to be congratulated on their efforts under tight deadline and limited resources to clarify some of the local concerns and explore possum control options. It is hoped that the Conservancy's subsequent initiative to further consult on possum control options for Karioi will build on this energy and goodwill in a way that not only works within the possum control funding available, but insofar as possible accommodates community concerns and involves the residents in long-term stewardship of the mountain.

8. It appears that the possum control funding allocated to Waikato Conservancy by Government inadequately acknowledges intangible costs of using 1080 with an apprehensive host community, the need to foster community skills in trapping to reduce dependency on 1080 over the long term (especially for maintenance control), and the implications for national conservation objectives if wider community concerns are addressed in some areas at the expense of possum control in other areas.

9. Some of the allegations by groups such as TANNZ concerning the scientific evidence on the risks of using 1080 cannot be substantiated.

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[15] Parliamentary Commissioner for the Environment 1994, p.37.

5.2 Suggested guidelines for improved community liaison

These guidelines will hopefully assist DOC conservancies and other agencies in working together with local communities on possum control. It is realised that these guidelines may go beyond present statutory limits. However a policy of "beyond requirements", where possible, could ensure that community support for all methods of possum control can be maintained.

1. Involve the local community from the beginning in planning for possum control; both adjacent landholders and other people who take water from the catchment or regularly visit the forest in question. Information sharing needs to be proactive (don't wait for them to come to you) and balanced (e.g. both risks and benefits of 1080 and other options).

2. Be frank with the community about the funding available for possum control and the estimated costs per hectare for alternative control methods. Provide this information as early as possible, so as not to raise unrealistic expectations, and to allow adequate lead time if the community wishes to pursue supplementary funding.

3. Release information and consult with the community before the EIA is finalised, and invite local community comment on the EIA *before* final decisions are made. Appointing an independent panel to review the EIA is one technique that may be considered in cases of strong controversy.

4. Acknowledge opposing views and fears, and where possible find ways to lessen concern within the available funding.

5. Involve local volunteers and adjacent landholders in monitoring both with present operations and over the long-term. Keep the community informed of documentation on possum damage and other threats to the ecosystem, the response of the forest to possum control, the numbers of possums present, and "safe" threshold versus present possum levels.

6. Ensure that monitoring occurs both before and after possum control, not just of possum numbers, but indicators of forest health, and for 1080 operations, water supply and native species populations. Ensure that the data and methodology for calculation of possum densities is made explicit.

7. Encourage "ownership" of possum control on adjacent lands, including cooperation, cost-sharing (but *not* full subsidy), and training in methods.

8. Ensure that ground control expertise is available in the Conservancy to ensure that alternatives to aerial-1080 are available over the long-term, especially for maintenance control.

9. Include all costs (direct and indirect) in comparisons between possum control methods, as well as intangible costs and benefits of any particular control option.

5.3 Recommendation to Ministers

Recommendation to the Ministers of Conservation, Labour, Education, Youth Affairs: and Finance;

NOTE that:

a. New Zealand's present heavy reliance on 1080 for possum control is unwise over the long-term (potential development of bait and toxin avoidance, perceptions of trading partners, continuing public opposition to aerial application, unknowns about environmental effects) (PCE report to Parliament May 1994, pp.126-127);

b. Present funding available for possum control is not adequate to accommodate intangible costs of using 1080 or the need to foster community skills in performance contract trapping to reduce dependency on 1080 over the long term and enhance local employment. The questions of appropriate amounts and sources of funding and the consideration of intangible costs and benefits have not been adequately addressed (section 4.3).

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APPENDIX CS.242-1

Department of Conservation
Te Papa Atawhai

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Our Ref: ANI 038

23 June 1994

Dana Peterson
Parliamentary Commission for the Environment
PO Box 10241
WELLINGTON

Dear Dana

KARIOI POSSUM CONTROL OPERATION

Mt Karioi is a nationally important area of coastal forest and for a number of years now, intensive goat control operations have successfully been undertaken by the Department.

Unfortunately this approach has only achieved half the job. Keeping goats to very low numbers has allowed excellent regeneration of the understorey, but the possums have had a dramatic impact on the canopy. If no intensive possum control is undertaken in the next few years, dominant possum palatable plant species such as kohekohe and kamahi could well become extinct on Karioi, thereby dramatically altering the natural ecosystem.

Photo's taken in 1993, Karioi, on pages 9, 10 and 11 show possum damage to individual possum palatable trees.
Aerial photo's taken in 1994, on page 12, show the damage caused by possums to the kohekohe and kamahi sections of the Karioi forest.

The following outlines the process followed re-assessing the level of possums, their impact on the palatable plant species, and the measures taken/ proposed to control possum's on Karioi.

November 1992
To assess the impact of possums on palatable trees, two indicator species scoring lines were put in place. These lines consisted of 102 individually trees and were established on the western and northern sides of Karioi.
For information on indicator scoring see Appendix C in Environmental Impact Report (EIA).

November 1992
Finance was made available, via a lumpy item bid, for the 1992/1993 financial year for possum control on Karioi.
Operating $40,000, Wages $3,000, Total $43,000.

December 1992
Adjoining landowners to the Karioi block were visited individually and were informed of the reasons for possum control and the positive and negative aspects of each method that is currently available.
A meeting was also held with local iwi at this time to discuss these issues.

December 1992
Two public notices were placed in the Waikato Times inviting professional possum hunters to register their interest in a possum control operation at Karioi.

December 1992
Letters were sent to Martin Foote and Malcom Moore, both members of the NZ Opossum Fur Producers Association (NZOFPA), to see if they were interested in taking on this possum control operation. The letters also covered relevant points such as the objective required, how performance would be monitored, terrain, access and advising them to make themselves familiar with the block.

January 1993
The Department received two replies in response to the advertisements, re a performance based contract for hunting possums on Karioi. Those interested were Gavin Schmidt, an individual from the Hamilton area and Malcom Moore representing the NZOFPA.

Malcom Moore wrote in with a preliminary offer to the department, stating that they understood that the NZOFPA would be responsible for the selection of hunters and for the management of the operation.

January 1993
Department of Conservation staff, Simon Kelton and myself, met with Gavin Schmidt, and three representatives from NZOFPA at Rotorua, to discuss the feasibility of using ground hunters in this area.
Two members of the NZOFPA, Martin Foote and Malcom Moore, informed us that they had inspected Karioi over the Christmas break to familiarise themselves with the block and assess the degree of difficulty involved in hunting it on foot. They indicated that they would be willing to tender for the operation and stated that given the size of the block (1865 ha privately owned forest included) and the degree of difficulty (topography/vegetation), estimated that a team of up to eight hunters would be required for up to four months.

February 1993
With the objective being to reduce possum numbers to about one per hectare, the department decided to mount a ground hunting operation on Karioi, based on hunters using leg hold traps and cyanide poison.

The reasons for this decision was:

. The community would be fully supportive of this option.
. The accepted tendered price ($21.00, GST excl, per hectare) for completing the objective compared favourably with an aerial 1080 operation.
. Not dependant upon all the boundary fences being intact.
. Would provide data on actual possum population density.
. It would be a difficult aerial 1080 operation because Karioi is subject to a high rainfall and strong winds on the western side.

February 1993
A contract was drawn up and signed by Malcom Moore on behalf of the NZOFPA and the protection manager, John Greenwood, on behalf of the Regional Conservator.
Gavin Schmidt became part of the NZOFPA team that worked on Karioi.

The contract stated that the operation had to be completed by the 15 June 1993 and that the aim was to achieve a 5% or less trap occupancy rate. The Regional Conservator agreed to make interim and final payments providing no single assessment line had a greater than 10% occupancy rate.

For copy of contract see report: 1993 possum control on Mt Karioi by contract trapping.

February 1993
A letter, as attached (Appendix 1), was sent to all landowners adjoining the Karioi block stating the reasons for the operation and the methods that were being used.

February 1993
Contract possum hunters started work on Karioi.

May 1993
Contractors submitted about half the block (924 ha) for interim payment.

Both parties were in agreement with the trap catch assessment being completed by an independent experienced possum hunter, Don McClunie.

An average catch rate of 33% was the result from these two monitoring transects. With less than a month available to complete the contract (ie the full 1862 Ha to less than a 10% catch rate) the contractor finished work.

For further details on this operation see the report: 1993 possum control on Mt Karioi by contract trapping.

June 1993
The department employed Don McClunie to put in a further 10 possum monitoring lines to assess the possum density and location of possum populations over the whole of Karioi.

The results of all 12 transect monitoring lines are as follows:

Line	Trap nights	Possums killed	Percentage catch rate (possum caught only)
1	150	35	23
2	150	48	32
3	150	40	27
4	150	41	27
5	150	96	64
6	150	23	15
7	150	37	25
8	150	52	35
9	150	58	39
10	150	40	27
11	150	38	25
12	150	40	27
Total	**1800**	**548**	**30**

For location of transect monitoring lines see Map 2 on the Mt Karioi contract trapping report.

September - December 1993
Met individually with the 11 farmers who own 90% of the land adjoining the Karioi area of land administered by DOC. The purpose being to discuss boundary fencing, the results of the contract possum hunting operation and any concerns they may have had about the proposed aerial application of 1080 cereal baits on the land administered by DOC on Karioi.
Of these individuals, eight were supportive of a 1080 aerial operation, two did not want to be committed either way and one individual was against this type of possum control method.

September - December 1993
Met individually with the owners or guardians (13 total) who either adjoin the remaining 10% of Karioi block administered by DOC or who are owners/caretakers of the private area of forest (434 ha) to the north west of Mt Karioi. Discussed with these individuals the results of the contract possum hunting operation, any concerns they may have about the aerial application of 1080 cereal bait on the land administered by DOC, and possum control methods for their own private area of forest.
Of these nine were supportive of a aerial 1080 operation, two did not want to be committed either way and one was against this type of possum control operation.
Since this time one of the landowners has been known to rescinder his support for the aerial 1080 operation.

September 1993 to June 1994
Provided any concerned members of the Raglan Community with information as requested.

October - November 1993
Gave two visual presentations, one to the Raglan Community Board and the other to the Whaanga ratepayers association. Both these presentations covered possum control methods available, the positive and negative aspects of each method, the environmental impact of possums, and the possum control proposal for Karioi.
Olive Gallagher (Councillor community board) invited Raglan residents to attend the Community board presentation.

November 1993
Completed the re-assessment of individual tagged trees on the indicator species scoring lines which were established in November 1992. During a 12 month period 9% of these tagged trees had died, while most of the other showed signs of deterioration.
One more indicator species scoring line, consisting of 18 individual possum palatable trees was established on the eastern side of Karioi.

October 1993 to June 1994
The department constructed or maintained 4870 metres of Karioi boundary fences on a 50/50 basis with adjoining landowners. This was vital to prevent stock intrusion into the operational area.

December 1993
Meeting was held with Raglan iwi to discuss possum control Karioi. Those in attendance generally accepted the aerially applying 1080 cereal pellets to control possums over the area of land administered by DOC. A working party was formed to administer, assess and organise a trapping proposal for the private area of forest to the northwest of Karioi (See appendix 2 for copy of minutes).

March 1994
Invited four members of the iwi possum control working party to be involved in a physical inspection the upper section of the private forest to the northwest of Mt Karioi. The objective being to look at the feasibility of trapping this area.
Of those invited, Tex Rickard was the only individual that turned up. Tex and myself spent six hours walking through this section of forest.

March 1994
Held a meeting with the Raglan iwi working party on possum control (Minutes appendix 3).
Tex Rickard informed the group present that he did believe a ground trapping operation was a feasible option in all of the private forest (434 ha) to the NW of Mt Karioi.
C Giddy put forward a proposal to use trappers in the lower end of the block (257 ha) and to aerially apply 1080 cereal baits over the upper less accessible area (177 ha).
Those in attendance generally supported this proposal, however a decision on this proposal would be made at the next meeting.

April 1994
Environmental impact assessment report for Karioi completed.

May 1994
DOC submitted a project to the NZ Employment Services, to reduce the possum population to a set level in the lower end of the private forest (257 ha) to the NW of Mt Karioi and in a number of small protected areas of forest on the bottom flanks of Karioi.

The project was to finance five task force green workers, and the equipment required for 52 weeks.

This project was partially accepted with the NZ Employment Service providing enough finance for five task force green workers and the equipment required for 25 weeks.

May 1994
Public meeting, Raglan, which the 1080 Action network also attended.
Visual presentation given by DOC which covered the different possum control techniques available, the positive and negative aspects of each method and the impacts that possums have on the natural forest ecosystem.

Questions raised at the meeting were followed up with a letter (Appendix 4). This letter was forwarded to those who attended the meeting, iwi and all adjoining landowners.

In this letter DOC invited any individual or group to participate in a field inspection of Mt Karioi to investigate the feasibility of trapping and observe the possum damage.
Only one individual took DOC up on this offer.

May 1994
Received approval (Appendix 5) for the operation from the Medical Officer of Health.

Received approval (Appendix 6) for the operation from DOC Head Office.
Note: The size of operational area is different from that shown in the EIA which is correct. The reduction in size of the operational area is due to the last meeting with the iwi.

Informed Raglan police, veterinary clinic and Environment Waikato of the proposed possum control operation on Karioi.

May 1994
1080 Action Network arranged a public meeting at Raglan. DOC staff attended and answered questions from the public.

May 1994
Report (Appendix 7) sent to Hon Simon Upton stating the inadequacies of a trapping proposal for Karioi, as submitted by the 1080 Action Network.

June 1994
Three professional possum hunters contracted to reduce possum numbers on two easily accessible areas of private forest (163.5 hectares total).
Possums have been targeted for control in these areas because of the reinvasion factor.
Contract trapping was the method chosen because farmers cannot prevent stock obtaining access to these sites.
A payment of $60 (GST excl) will be made to the contractor providing no single assessment transect yields a catch rate greater than 5%.

June 1994
Letter sent to adjoining landowners reminding them to ensure that their boundary fences are secure.
Provided dog muzzles to adjoining landowners dogs, as requested.

June 1994
Public meeting in Raglan organized by Hon Simon Upton.
Toxicologist, Charlie Eason, gave a presentation on the effects of the toxin 1080.
Guy Salmon from the Maruia Society gave a speech supporting the use of 1080 to control possum's.
Those at the meeting voted for an audit by the Commissioner for the Environment before the aerial application of 1080 cereal baits on Karioi.

June 1994
Gave visual presentation to Waikato District Council. This presentation covered possum control methods available, the positive and negative aspects of each method, the environmental impact of possums and the possum control proposal for Karioi.

June 1994
Attended a meeting with the Raglan iwi. Again I gave a presentation on the conservation values of Karioi and the method's available for possum control.
The majority of those attending the meeting voted against the use of 1080 cereal baits and the use of cyanide poison on the privately owned forest to the NW of Mt Karioi.
The use of only traps, means that only about 257 hectares near the upper reaches of this forest will be part of a departmental funded intensive possum control operation.

July 1994
Finance made available for possum control Karioi.
Operating $30665.00, Wages $8514, Total $39164.00.

Other
For names etc, of individuals or groups we have been dealing with see Appendix 8.

Yours faithfully

C. Giddy

Colin Giddy
FOR REGIONAL CONSERVATOR