

Social acceptability of stoats and stoat control methods

Focus group findings

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CONTENTS

Abstract	5
<hr/>	
1. Introduction	6
<hr/>	
1.1 Background	6
1.2 Context	6
1.3 Aim and approach to the research	7
2. Methodology	8
<hr/>	
2.1 The focus group methodology	8
2.2 Focus group selection and composition	9
2.3 Focus group process	10
2.4 Analysis	10
3. Findings	11
<hr/>	
3.1 Knowledge and experience of stoats	11
3.2 Stoat impacts	13
3.3 Current stoat controls	15
3.3.1 Approach to control	15
3.3.2 Current methods	16
3.4 New stoat controls	17
3.4.1 Improving existing controls	17
3.4.2 Live biocontrol or vector organisms	18
3.4.3 GE-based controls	19
3.5 Decision making	20
4. Conclusion	21
<hr/>	
5. Acknowledgements	22
<hr/>	
6. References	22
<hr/>	
Appendix 1	
<hr/>	
Focus group discussion schedule	23
Appendix 2	
<hr/>	
Summary of the discussions in each of the focus groups	24

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ABSTRACT

In May and June 2001 seven facilitated focus group discussions were conducted throughout New Zealand to examine New Zealand public and interest group perceptions of feral stoats and other mustelids, and attitudes to their control. Three of the group discussions were with the general public, and four with particular interest groups. Overall, stoats were perceived negatively, especially for their predation on native fauna. Participants in the public groups were largely uninformed about stoats, in contrast to those in the interest groups. Trapping and poisoning, the current forms of control, were perceived as having problems, with trapping tending to be preferred over poisoning. Proposed new forms of control under investigation, in particular the use of introduced diseases and genetically engineered organisms designed to kill stoats or reduce their fertility, received a largely negative response from the groups due to concerns about a lack of research and knowledge about potential risks and non-target effects. There was a clear preference for improving the current forms of control. Participants across all the groups felt the public should be involved in any decision-making about GE-based controls, but this would first require wider education about the stoat problem and any proposed biocontrol technologies.

Keywords: stoats, stoat control, public attitudes, perceptions, biological control, genetic engineering, genetic modification, focus groups, pest control, New Zealand

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1. Introduction

1.1 BACKGROUND

In May 1999, the New Zealand Government deemed the stoat (*Mustela erminea*) to be a sufficient threat to New Zealand's biodiversity to create a special five-year fund for research into stoat control. The Department of Conservation (DOC) established a Stoat Technical Advisory Group (STAG) to oversee the research program. The overall programme is focused on improving understanding of stoat biology and behaviour, and on developing control methods. Under investigation are better traps, better poisons and lures, and new forms of control, such as biological controls¹, including possible methods for controlling the fertility of the stoat. Some potential new methods may require the genetic modification or 'engineering' of organisms for use in biological control.

A key objective of the STAG is the development of realistic and sustainable control methods. In this regard, public understanding of the impacts of stoats and support for new control methods, including the possible development of biological controls, was considered important if such control methods were to be developed and used. The advisory group concluded that research on public understandings and attitudes towards stoats and stoat controls was a priority. This was confirmed in April 2000 in a workshop with a wide range of groups and stakeholders with an interest in biodiversity and the stoat problem. Subsequently, the authors were commissioned to undertake this research.

1.2 CONTEXT

Among stoat control researchers and practitioners there is recognition that there is considerable public and interest group sensitivity about the development and use of biological controls for animal pests, especially the use of exotic diseases and genetically engineered organisms. This has been confirmed through research on possum control (Fitzgerald et al. 1994), on rabbit control (Wilkinson & Fitzgerald 1998) and, more recently, on the fertility control of possums (Wilkinson et al. 2000). However, there is very little information on the nature and extent of the public's knowledge of the stoat problem, apart from a 1991 public survey on attitudes to pest control by Sheppard & Urquhart in which, in answer to an unprompted question, 3.6% of the respondents named mustelids (including stoats) as a serious pest for 'New Zealand as a whole' (1991: 5-6). This relatively low percentage may reflect a relatively low (unprompted) public awareness of stoats as a biodiversity threat

¹ Biological control is the control of pests and weeds by other living organisms, such as predators, parasites, disease-carrying bacteria or viruses. In biological control one organism ('a vector', such as a parasite) may be used to carry another (such as a disease virus) to the target pest.

at that time, and/or the survey's apparent focus on domestic pests². Either way, it should not be taken as an adequate indicator of the level of current public concern over the impact of stoats on New Zealand's biodiversity.

As the previous research has noted, biodiversity protection and dealing with pest animals such as the stoat are not simply technical issues, they also public issues. Interest groups and many members of the public increasingly want a say in how New Zealand makes decisions about the protection of its native flora and fauna, and about the control of the pests that are threatening these. They particularly want a say in decisions about what methods are used for pest control, as evidenced in the extent of public debate and involvement over the proposal in 1998 to introduce Rabbit Haemorrhagic Disease (RHD, also known as Rabbit calicivirus disease, RCD) to control rabbits, and the increase in the number of protests over the aerial application of 1080 bait to control possums in our forests (as seen, for example, on Television New Zealand's 'Assignment' on 12 August 2001). It can be expected that public interest in stoat control would be particularly high if new biotechnologies, using genetic engineering (GE) of organisms, are involved. Such biotechnology-based methods for controlling stoats will only be able to be developed and used if they are socially (and technically) acceptable.

1.3 AIM AND APPROACH TO THE RESEARCH

This research set out to ascertain the public's awareness, knowledge and perception of stoats and their impacts, and the social acceptability of existing (e.g. trapping and poisoning) and possible new stoat control techniques. It is intended to assist DOC, other researchers, and pest managers in their decision-making about stoat control strategies, and to help inform the public and interest groups about prevailing attitudes and issues.

Such research requires assessment of two components:

- The range of views held, which is a qualitative research task, carried out using, for example, in-depth interviews or focus group discussions.
- How widely these views are held, which is a quantitative research task, typically undertaken (as in our previous studies of possum and rabbit controls) using a sample survey. Such a survey is best designed and implemented after the range of views has been identified and described.

Assessing the range of views and how widely these views are held involves, therefore, two studies. The subject of this report is the results from the first—the identification of the range of views about stoats, their impacts, current controls and potential new controls, using a series of focus groups. The second stage in the research has involved quantifying the views of the New Zealand public using a sample survey, the design of which was based on the focus group findings. The results of this survey will be reported separately.

² The preceding (prompted) survey question asked respondents to rate the seriousness for New Zealand as a whole, of rats, termites, fruit fly, wasps, flies, grass grubs, possum, and rabbits as pests. Other serious pests noted in the unprompted question were ants, cockroaches, dogs, deer, people, fleas, mosquitoes, wild goats, spiders, and borer.

2. Methodology

2.1 THE FOCUS GROUP METHODOLOGY

The first of the two studies was intended to explore:

- The knowledge and perceptions of stoats
- The range of views of the stoat problem
- Attitudes to control and current control methods
- Issues of concern around the development and use of a range of new technologies
- Views on biological control, including the possible use of GE (also known as genetic modification, or GM) in controlling stoat fertility

Based on our previous pest research experience, focus groups seemed the appropriate technique for the research task.

Focus groups are, as Morgan notes, ‘basically group interviews’, where

the reliance is on interaction within the group, based on topics that are supplied by the researcher, who typically takes the role of a moderator. The fundamental data that focus groups produce are transcripts of the group discussions. (Morgan 1988: 9.)

In focus groups, interactions between the participants are encouraged in order to stimulate discussion, thereby eliciting the participants’ views, beliefs and values. Follow-up questions are used to deepen the discussion. The hallmark of focus groups, according to Morgan, ‘is the explicit use of the group interaction to produce data and insights that would be less accessible without the interaction found in a group’ (Morgan 1988: 12). So, while a series of ‘thematic’ questions may be put to the group, discussion, like everyday conversation or argument, is frequently non-linear. The moderator’s primary role is to ensure the set topics or themes are canvassed without stifling the free exchange between the participants. As such, focus groups are ‘better suited to topics of attitudes and cognitions’ (Morgan 1988: 12).

Our previous experience with using focus groups for this kind of research showed that, in addition to the points noted above, they can have the following advantages:

- They enable the researcher to efficiently and effectively access a wide range of viewpoints from a range of types of interests.
- They provide the possibility of consistency of format through the use of a standard set of questions put to each group and the provision of a standard set of background information.
- They make possible easy comparison of views between different groups, and the identification of themes.
- They provide a good basis for designing quantitative surveys.
- They enable participation of stakeholder groups in the research process.

In her study for DOC of Aucklanders’ conservation expectations, James also noted the appropriateness and advantages of focus groups for such exploratory research (James 2001).

2.2 FOCUS GROUP SELECTION AND COMPOSITION

In consultation with the Stoat Technical Advisory Group, it was decided to hold a series of one-off focus groups covering a range of interest groups and the New Zealand public. The challenge was to ensure that the widest range of views was canvassed, within the resource constraints of the project. The choice of groups and the kinds of individuals in the groups was informed by the results of three series of focus groups and surveys on similar issues (Fitzgerald et al. 1996; Wilkinson & Fitzgerald 1998; Wilkinson et al. 2000). These previous studies confirmed that different sections of the population have different views on pest control; for example, men and women tend to have different responses, likewise urban and rural people.

Focus groups with members of the urban public were therefore held with men and women separately in Auckland, and a mixed group in a rural area (Northland). The location for the two Auckland groups was determined through an analysis of the demographic characteristics of neighbourhoods (based on Census area units), as recorded in the 1996 New Zealand Census of Population and Dwellings. The neighbourhood chosen was close to national mean levels of age, ethnic composition, income, and education. The participants for the two groups were then recruited by approaching the parents' association of a high school in the chosen neighbourhood. The location for the rural group was chosen on the basis of region, likelihood of experience with pest problems, and its degree of removal from an urban centre, with the participants recruited through networks of contacts in the area.

The special interest groups identified were scientists and pest control specialists, individuals and groups with conservation interests, and people with a practical and ethical interest in the treatment of animals. Participants for the first two of these groups were recruited through direct approach to individuals, while the latter was through the SPCA (with the potential composition of the group confirmed in advance).

To gain a Maori perspective, a focus group was organised with iwi and trust representatives on the East Coast of the North Island, with the participants recruited by direct approach to trust boards and groups (on the day, this group was depleted due to a tangi). In addition, early in the research, the opportunity was taken during fieldwork in Northland to do some informal interviews with individuals attending a DOC workshop for Maori on the utilisation of native birds (at Moerewa), and with individuals involved in a local kiwi recovery and predator control project.

The seven focus groups held, their composition, locations, dates, and the name by which they are referred to in this report, were:

- Urban men, consisting of eight local residents of mixed ages and backgrounds—held in a school meeting room, Birkenhead, Auckland, 6 June 2001 (Men)
- Urban women, consisting of eight local residents of mixed ages and backgrounds—held in a school meeting room, Birkenhead, Auckland, 27 June 2001 (Women)

- Rural residents, consisting of nine persons of mixed ages, gender, and background—held at a private residence, Motatau district, Northland, 7 June 2001 (Rural)
- Scientists and pest control specialists, consisting of eight persons of mixed gender, mainly aged 30–55, and from different disciplines and institutions—including Landcare Research, Lincoln University, NIWA, Environment Canterbury, commercial pest operators, and DOC field staff—held at Landcare Research, Lincoln, Canterbury, 29 May 2001 (Scientists)
- Animal welfare interests, consisting of nine persons of mixed age and gender drawn from the SPCA (staff & ordinary members), SAFE, and groups with an interest in specific animals—held at SPCA, Wellington, 12 June 2001 (Animal Welfare or AW)
- Conservation and environment interests, consisting of eight persons of mixed age and gender drawn from local trusts and practical conservation/stewardship groups—held at a private residence, Christchurch, 14 June 2001 (Conservation)
- East Coast Maori, consisting of four middle-aged to elderly males representing different groups—held in the meeting room of a local trust, Gisborne, 13 June 2001 (Maori).

2.3 FOCUS GROUP PROCESS

In each group, the moderator put a standard set of questions to the participants (Appendix 1). This was accompanied with supplementary questioning to elicit detailed or further comment. Standardised information briefings on particular themes were provided, with visual aids, at relevant points during the discussions. As noted previously, because participants were encouraged to engage each other on matters of attitudes and values, discussion of the set topics frequently moved in a non-linear fashion, with the moderator ensuring each of the topics was covered in the time available. The focus group discussions generally lasted from 90 to 120 minutes.

Two researchers typically conducted each focus group (one researcher acting as moderator, one as note taker and recording technician). A DOC stoat research programme scientist attended the first focus group to observe the process. With the prior agreement of the participants, the focus groups discussions were audio recorded, supplemented by note taking to facilitate later analysis.

The briefings given in the focus groups were prepared in advance from information provided by DOC scientists and covered basic facts about stoats, their impacts, and a description of current and potential controls. DOC and Landcare Research specialists reviewed the prepared briefing.

2.4 ANALYSIS

The analysis of the focus group discussions was undertaken using a procedure developed by the researchers in previous studies (based on suggestions from Krueger 1990). This involved listening to the audiotapes of each focus group in conjunction with the written notes, then preparing detailed annotated

discussion flow diagrams of each focus group (referencing verbatim quotes) while rechecking against the audio recording. A list of the key points raised under each topic, linked (for context) to the discussion flow diagrams, was then prepared for each group (Appendix 2).

3. Findings

This section presents a summary of the findings across all focus groups. Words that appear in italics are direct quotes taken from the annotated discussion flow diagrams prepared while listening to the recordings of the focus groups, and are faithful to the language of the speaker. The context of particular quotations was checked against the discussion flow diagrams, and where necessary, the audio recordings. A more detailed summary of the discussions in each of the groups is presented in Appendix 2.

3.1 KNOWLEDGE AND EXPERIENCE OF STOATS

The focus-group discussions each began with a general question on group members' knowledge and experience of stoats. Generally, participants were aware of what kind of animal the stoat is, possibly having seen one sprinting across the road when driving, or in conjunction with work or recreation within a bush environment. Some, however, had very little knowledge of stoats or other mustelids: *I have no idea what a stoak is* [sic] (Women), and many had never seen one.

Stoats were described as *tough little critters*, *busy* (Scientists), *hoha* [nuisance], *koretake* [good for nothing], *pest* (Rural), *beautiful*, *sleek*, *slender*, *agile*, *cunning*, *highly intelligent* (AW), *fascinating*, *killers*, *cute* (Men), *unpleasant* (Women), *ferocious*, *nasty mongrels* (Conservation). Negative reactions were the norm among the groups. Some individuals, though, stated they held no apathy toward the animal itself (*it's only trying to survive*), but were concerned about the effects of the stoat's actions. A few participants from different groups made statements such as *I respect them, even though I have trapped and killed many* (Scientists), or *pretty cool animal actually, amazing* (AW), showing interest in, and even respect for, some of the traits that make them such effective killers, in particular their intelligence and tenacity. Some, when asked what they knew of stoats, responded with a statement regarding the damage that stoats are capable of, saying they are a *biodiversity threat*, *destructive* (Scientists) and *kill for fun* (Conservation).

There were large variations in the amount of experience group members had with stoats within, and particularly between, groups. The Scientists, Conservationists, and Animal Welfare groups were the most informed and had the most experience. In the public groups, experience ranged from *learned everything I know about stoats in the last 5 minutes*, and *I'm your typical city boy* (Men), to previously or currently having had their hens attacked by stoats,

and being involved in trapping. A member of the Animal Welfare group described their experience: *I lost once a whole heap of little turkeys and a duck ... the first day I put them outside, I looked in the next morning and they were all dead, and they'd all had their heads removed.* This kind of experience was common among those who had spent time on farms with poultry. There were also several trappers of stoats and other pests. Specifically, the Conservationists had experience managing reserves that required constant pest control, bringing them into regular contact with mustelids. Members of the Scientists group had experience with stoats and their control, though sometimes this was indirect. There was only one positive anecdote recalled, by an individual who owned an old house that was cleared of rats courtesy of a stoat.

Many of the participants, across the groups, said they had very limited experience with stoats, often having seen them only very briefly, or not at all. In these cases it seemed that some knowledge and opinion was gleaned from associations with other mustelids, in particular the ferret: *I know nothing about them [stoats], ferrety looking? like a mink* (Rural). Some participants had experience with, or were aware of, the keeping of pet ferrets. A member of the Men's group was a previous owner of a pet ferret and the Animal Welfare group members had treated ferrets for injuries. Several older public participants remembered ferrets being used in rabbiting on the farm, particularly by rabbit boards.

It was suggested in two groups that the public's association of stoats with pet ferrets could skew their perception of the problem and the animal, ferrets being seen as *warm, fuzzy pets* (Scientists). Descriptions of pet ferrets were not necessarily favourable, however: *quite ... yuk, pointy faces and sneaky, slinking in a snakelike way* (Women). *I'm appalled that people would want to, and do, keep ferrets as pets* (Conservation). Members of the Rural group were aware of a ferret (fitch) farm in the area and were against the idea: *we don't want them, they can get away and do damage.*

Almost every group recognised and discussed the connection between stoats and weasels. Unanimously the word 'weasel' had negative connotations, illustrated by the phrase *to weasel your way out of something* (Women). Words such as *sly*, *mean* (AW) and *sneaky* (Women) were linked to 'weasel'. A teacher from the Women's group noted the number of *nasty weasels* that appear in children's stories. To a lesser extent, the word 'ferret' was also negative in connotation, as in the phrase 'to ferret through', meaning to *sneakily rifle through things*, or *gain information through false means, deceptive* (Women). As illustrated in all of the groups, the use of these mustelid names within the English language has already conditioned peoples' opinions, although it was noted that the word 'stoat' was never used in the same way as 'ferret' or 'weasel'.

When the groups discussed mustelids in general, few participants in any of the groups knew about any physical and behavioural differences between them, and for those who had minimal knowledge, the focus was on physical size. Members of the Scientists, Conservationists, and, in particular, the Animal Welfare groups (along with others who had trapping experience) were more aware of the individual mustelid characteristics, and of the mustelid family in general. However, as discussions progressed in each of the groups, questions were often asked regarding territoriality, predator/prey relations and breeding

habits; such as: *are they territorial? Do they stay in one area?* (Rural), and *Do they travel in pairs?* (Women).

The fact that stoats and other mustelids are introduced animals in New Zealand seems almost to be implicit knowledge. Even in the groups where little was known about stoats, most individuals understood (or guessed that) mustelids were introduced for rabbit control. The knowledge that stoats were a deliberately introduced predator seems to strongly influence people's opinions about possible control methods, as discussed below.

3.2 STOAT IMPACTS

Following a short briefing (which involved presenting photographs and information about stoats and other mustelids, their introduction into New Zealand, and some basic ecology), participants were asked what effect they thought the introduction of stoats was having on New Zealand.

In most of the focus groups (especially Men, Women, Rural, and Maori) there was very little direct experience of the impacts of stoats. This was to be expected, considering the admitted low level of knowledge about stoats. They made inferences, however, based on the knowledge gained from the focus group discussion so far, the media (including television documentaries) and word of mouth. The Animal Welfare group stated that *obviously* stoats prey on endangered wildlife, but that the impacts on such fauna are *not obvious and are not seen, so we have no evidence or personal experience*. Stoats were described as an *invisible predator* (Maori), unlike possums. A Men's group participant made this statement regarding experience and access to knowledge:

As urban dwellers our problems are mice and rats (if we have any). We don't have a day-to-day perspective on these animals, therefore it doesn't affect us, therefore we don't think about it, so it isn't a problem. Part of it's to do with P.R. and public education and my image of possums being the problem is because I see what they've done when I'm driving through the forest. I don't see what the stoats have done.

On the other hand, the Scientists and Conservationists could offer direct experience and knowledge of the impacts of stoats. The Scientists group suggested that the *opportunistic* stoats have had a *significant influence* on the invertebrate and lizard populations in our environment, as well as offering research data: *some of the birds I've worked on, stoats are preying on up to 60% of nests*; another study showed that *mustelids preyed on up to 80% of nests (mainly stoats)*. Another member of the group stated that from watching videos of nests being raided, rats were making the most visits. Conservationists could also offer some direct experience to the discussion of impacts. The manager of a reserve and sanctuary said he was *scared of them*, because *you leave the gate open and 5 years' work is gone*, noting that one ferret or stoat could do vast amounts of damage. However, he also added that distinguishing the impacts of different types of predators was very difficult. Another member of this group offered more direct experience of stoat impacts (or the lack of them), in stating that after an intensive nine-month possum trapping operation, which caught many mustelids trying to eat dead possums, large flocks of brown

creeper appeared the next year. Maori group members noted the depletion of birdlife in their area over time: *the only bird that seems to have survived is the pukeko* (Maori).

A common thread coming through in these discussions is the difficulty in separating the impacts of each of the many introduced pests in New Zealand. Even between the Scientists who had conducted studies (including videotaping nests), there was disagreement over which animals were doing the most damage. Also, in most groups it was suggested that it is necessary to view the *overall picture* (Men), one group member stating that focusing on one animal is *dangerous and silly* because, *if we focus on one, others will get away* (Men). It seems that the concepts of biodiversity and ecosystems are not lost on the participants, some non-specialist interest group members showing a good understanding. A Maori group member stated that these pests (including rabbits, possums, and stoats) were all *destroyers*, each exploiting a slightly different part of the environment. There was some debate in several groups over the role stoats play in controlling other pests, such as mice, rats, and rabbits: *some sort of balance has been established* (Scientists). Would removing stoats exacerbate those problems? All the groups tended to arrive at the recognition of a need to systematically control or eradicate a range of pests if we are to make a significant effort to save our indigenous species. Despite the connections between these animals in the environment, the Scientists thought that pests were perceived by the public as being a threat to either biodiversity, agriculture, or both, and stoats could be classified as being a threat to biodiversity: *now that we've got to control these things for biodiversity reasons, we've got to control a whole suite of pests* (Scientists).

Political impacts were also an issue with the Scientists. It was observed that, for these pests to be eliminated, they might need to be seen by policy and decision-makers as a threat to our national culture or the economy. Possum and rabbit control were seen to receive support because these animals threaten agricultural production. In many of the groups the issue of the national commitment to biodiversity protection and pest control arose, i.e. how important are our native species and our biodiversity to the average New Zealander?

An interesting discussion developed when an Animal Welfare focus group participant questioned the term 'pest', asking if there is a Department of Conservation definition. A group member offered this:

A pest is something that people consider there's too many of them, or doing something that people don't like, but it's a people thing, it's our perception ... There will be other animals taking over in large numbers which we don't consider a pest because we get an economic benefit out of them. I can guarantee that if you could get \$100 for every possum that you catch or sell, then it won't be seen as a pest, but as a resource (AW).

Following this discussion revolving around classification issues and the legitimacy of one species making that judgement of another, one participant pointed out that, even after an animal is labelled a 'pest' or judged to be of lesser value to humans, *should we be able to hurt it? Where the suffering comes in is where we should draw the line* (AW).

The impacts of the loss of native species due to stoats and other introduced animals was posed to the Maori group: *I think it is something taken away from*

us, in a spiritual sense but it's very difficult to put your hand on it. There's a sense of loss. The speaker continued to say that if his grandmother was still alive she would tangi (mourn) for the loss of the native species, for the memories, and for the separation of the people from the land and bush. However, it was believed that not all Maori shared these sentiments, the suggestion being that the present generation is less in touch with the environment than previous generations. Others felt that the traditional Maori values of respect for nature and resources are now being revived in the very young, who are being educated in their culture and language.

The Women's group commented that introducing animals, such as ferrets, stoats, and weasels in order to control other pests was *short-sighted*, but at the time knowledge and the appropriate government structures were absent or insufficient to be able to assess and predict the effects. It was also suggested that native species were not valued in the past in the same way they are now, not being seen as having *productive value* at the time. Most thought that the introduction of new organisms was handled better nowadays, with the awareness that *hindsight* provides. Others disagreed, seeing that the move towards the *global society* has created an *industry* around the illegal importation of species based on individual greed, and that increasing global trade, contact between nations, and speed of transportation makes it possible to have accidental introductions of species or even botched introductions.

3.3 CURRENT STOAT CONTROLS

3.3.1 Approach to control

After a short briefing on the impact of stoats and the current control methods, the focus groups addressed the question of what New Zealand should be doing about its stoats, and how they felt about current control methods. The ultimate goal of stoat control was discussed in almost all groups, and the widespread feeling was that the goal should be total eradication. For example, a participant in the Conservation group noted that, since stoats have no natural predators in New Zealand, *we [humans] have to be their predator*. The Scientists especially noted that a sustained and determined effort was seen to be required: *if we want kiwis in New Zealand, we must kill the stoats*.

However, not all participants wanted stoats eliminated from New Zealand. One of the Animal Welfare participants claimed that stoats had value in that they help control other pests, such as mice and rats. Also, stoats were seen as not the only pests that deserved attention. The various groups also identified possums, rats, cats, dogs and other mustelids as threats to New Zealand's native fauna. Participants in the Men's and Rural groups suggested that all pests should be eradicated *and ecosystems repaired* (Men).

All the groups, however, recognised that total eradication of stoats, although desirable, would be difficult if not unachievable. Several reasons were given. According to the Scientists group, eradication was not feasible with current stoat control technology. The example was given of rabbits, which had not been eradicated despite the effort that had gone into control. That group also questioned the level of public commitment to stoat control or eradication. And,

for the Maori group, the need for human involvement in control efforts meant that there would be errors made through possible bad management or poor implementation.

Overwhelmingly, the various groups felt that the main reason for stoat control was to protect New Zealand's natural environment from damage by stoats and preserve its indigenous species. As a participant in the Men's group said, *if we've got any interest in birdlife at all, then these fellas have got to go*. Concern was expressed particularly for the kiwi, which was described in the Rural group as part of our national identity, and in the Women's group as not only an icon but also a symbol of New Zealand birdlife, which is in decline. One issue, recognised by the Men's group, was that *fewer and fewer experience nature, therefore fewer and fewer people appreciate it*. People were also seen as creating value structures around certain animals, reflecting the society at the time, as articulated in the Conservation group:

As human beings we are making value judgements about what animals we want to retain and what we don't, values change over time, but at the moment we are calling certain animals pests which are undesirable, we want them gone.

The Women's group discussed protection of kiwi in detail, including what they would be prepared to pay to ensure their protection: all participants were prepared to pay an extra \$1 per week in taxes for 5 years to protect kiwi, but only a couple were prepared to pay \$10 per week. However, use of public funds for controlling stoats was seen as less important than dealing with other issues, such as health and education. The group tended to be split over the extent to which New Zealand should be spending money on environmental issues compared with social issues. Taxing tourists, since they come to New Zealand to experience its natural environment, was also suggested in the Women's group as a means of paying for stoat control.

Some groups discussed the idea of establishing island sanctuaries for kiwi and other native species, and abandoning efforts to control stoats on the mainland. It was suggested in the Men's group that such sanctuaries might be important as *an insurance policy* until new, more effective, stoat control technologies are developed. The Women's group was not prepared to resort to establishing such sanctuaries: *it's not natural, like farming them*. The kiwi, because of its status as the national symbol, and therefore the public desire to preserve it when under threat, was described by one of the Scientists as a *political tool* to help secure funding for stoat eradication. And the Animal Welfare group worried about the potential implications of deciding not to protect kiwi on the mainland:

If you said 'flag the kiwi, it's a lost cause, we can't save it', and so the stoats are just going to eat all the kiwi and move on to something else ... Next species down the track you're going to be saying, 'OK, what are we going to do, save this one or let it go? We'll let it go because they've already destroyed that many', then it just keeps going until we don't have any natives left.

3.3.2 Current methods

Following the discussions on the approach to stoat control, discussions turned to the various control methods in current use, beginning with trapping. Reactions to trapping were varied, with discussions often focused on trapping's

humaneness. The Women's group was particularly negative, describing it as *violent, barbaric, and old method*. Once they discussed the various forms of trapping, though, the group decided that kill traps were preferable to leg-hold traps, because they were more humane and specific, and made it easy to count the number of stoats killed. The Animal Welfare group favoured *instant-kill traps*. However, kill traps were described in the Conservationists' group as *certainly not instant*. Some groups, (AW, Conservation, Scientists) considered that traps alone would not be enough. Among the Scientists' group, traps were described as *effective*, but *labour-intensive* and having little impact on stoat numbers, particularly in remote areas. They noted that trapping could be used as *a holding strategy* until new technologies are developed.

No group was enthusiastic about poisons, the general feeling being that, if poisons were necessary, they would be tolerated rather than supported. Thus, the Rural group preferred trapping to poisons because of their distaste for poisons, rather than a particular preference for trapping: *we are the worst users of 1080 in the world*. If poisons were to be used, they preferred controlled and limited use rather than aerial drops. And the Animal Welfare group expressed disapproval of the slowness of death, and therefore suffering, associated with the current poisons. Non-target effects of poisons were also mentioned in several groups: *poisons can backfire* (Maori), *poisoning is riskier than we realise* (Conservation). The non-target effects were generally raised in relation to other animals, though one member of the Maori group spoke of a man who died from cyanide poisoning while poisoning possums.

The most commonly discussed attribute of current stoat control methods was their humaneness. The Animal Welfare group wanted to ensure that stoats did not suffer when they were killed: suffering was described as *not tolerable, because the moment you say it's tolerable, that takes away the incentive of trying to make it [stoat control] better*. Most groups referred to the inhumane way stoats treated the animals they attacked, and this was seen, in part, as a justification for less-than-humane treatment of stoats in turn: *stoats aren't humane* (Maori); *the stoat is a vicious killer, and any way of controlling it is a good way* (Men). Even statements that humaneness was important were often somehow conditional: *every animal is worth treating humanely, if you can* (Women). Only the Animal Welfare group remained steadfast in its requirement for humaneness, though in discussion one member argued that this requirement should be weighed against the current and future suffering caused by stoats to kiwi chicks.

3.4 NEW STOAT CONTROLS

3.4.1 Improving existing controls

The groups were not keen to embrace new methods of stoat control without improving current methods. Improvements to current methods were suggested in all groups except the Women's. The Animal Welfare group was particularly creative, and their suggestions for improvements to current methods included: *traps that also deliver poisons; electronic traps, perhaps with cameras or telemetry to advise when traps should be cleared; solar-powered electrocution*

traps; better camouflage of traps; and marking females so that nests can be detected. Trapping was generally favoured over poisoning, if current methods were improved. Several groups described the social and economic benefits of stoat control efforts using existing labour-intensive means: *trapping creates jobs* (Rural), *harvesting stoats for their tails* (Conservation). A bounty for stoats was suggested in two groups (Maori, Conservation). However, a participant in the Conservationists group felt that, as with other pests, if a bounty were offered, stoats would end up being ‘farmed’.

3.4.2 Live biocontrol or vector organisms

Some participants viewed with some unease the introduction of live organisms as a biocontrol or its vector, describing it as *mucking with nature* (Rural) and *playing God* (Scientists). This reaction applied whether the control involved GE or not. Bringing in yet another organism was considered to be *like introducing stoats to control rabbits* (AW). And,

they had good reasons to bring rabbits into New Zealand, then they had even better reasons to bring in stoats and ferrets to control those animals. Now we're going to bring in a genetically engineered organism to control those, so what are we going to have to be bringing in in 20 years to control the genetically engineered organism that's controlling stoats? (AW).

However, other participants were in favour of the efficiency gains of using a *self-sustaining control* (Scientists) that would spread from stoat to stoat. The members of the Women’s group agreed that, if a live organism was introduced, very stringent testing on every native bird species in New Zealand should be carried out first. Participants in three groups (Maori, AW, Scientists) said that, if fertility control was to be delivered in a bait that required stoats to take it from a bait station, rather than being allowed to spread from stoat to stoat, then why not poison the stoat at the bait station instead?

The canine distemper virus³ was not favoured as a biocontrol for stoats. Distemper was described as *a brutal disease* (Men) and *not specific enough to use* (AW); also, *it could go wrong* (Rural). The fact that it also affected dogs and seals was of concern to some groups. The few groups who gave it any support at all were generally grudging in their support: *the diluted [vaccine] strain might be okay* (Scientists); *in principle, it could be good in areas where there was little danger to seals, particularly if used in the vaccine strength* (Conservation); *distemper has been almost eradicated from dogs, so the diluted strain of the disease would be better to use* (AW). Participants in several groups raised questions about the practicalities of using distemper, and suggested that more research would be required before its use could be considered: *stoats are solitary and it wouldn't spread easily* (Men); *we would need to know what strength kills seals relative to the vaccine strength* (Conservation); *potential environmental overlap between stoats and seals* (Conservation). Several participants, in various groups specifically worried about the prospect of viruses mutating and impacting on other indigenous species, such as bats: *an introduced control agent is a biological entity—has*

³ Canine distemper is a contagious viral disease with a high mortality rate in dogs and other carnivores. In dogs it induces fever and respiratory problems. Mustelids are known to be susceptible to the virus.

host switching potential through random mutation—it would be like bringing in another ‘stoat’ (Scientists). The infection of dogs, seals, sea lions, and bats was specifically mentioned as a possible impact of using a virus such as distemper, while the impact of a virus that mutated or switched species was expressed more in terms of a general danger to ecosystems.

3.4.3 GE-based controls

In all three public groups—Men, Women and Rural—the immediate reaction to the prospect of GE being used to produce a stoat biocontrol was one of resistance and unease: *genetic engineering rings alarm bells with everybody* (Women). Several participants expressed general discomfort about GE without being able to explain why, e.g. *I’m not comfortable* (Rural). Several said they wanted to know more about GE before they could decide whether they thought it should be used. Others were concerned about the possibility of unforeseen effects of GE: *putting something unknown into the environment and you don’t know what sort of effect it’s going to cause and have on other things* (Women); *when you start interfering with nature, you’re having a few problems, eh* (Rural). When the Women’s group was asked directly whether they thought GE-based stoat controls should be used, half said no or not at present, and half said they were uncomfortable or wanted to know more about it before they could decide. In all three public groups the cost of researching and developing a GE control was raised as an issue.

The Scientists felt that there were *ethical and practical problems* around using a modified bacteria or parasite worm to deliver a fertility control, including long-term specificity. Plant-based biocontrols were considered preferable. Participants in this group considered genetic modification to be *very new*, and that the hurry to develop and use the technology was being *driven by commercial interests*. The Conservationists likewise thought that GE was too risky, with specificity being the key issue, though they preferred resources being put into GE research and development of traps than into poisons. Research on GE was required to gain sufficient knowledge in order to make a decision on its use:

The idea is often better than what’s achieved; a lot of things are claimed for genetic modification which may or may not live up to the claim (Conservation).

The Maori group members noted that some Maori would say that GE was against their culture, but observed that Maori lore often involved ancestors who must have had genes from other species. One gave an example of a woman who was said to be part shark, who had gills under her armpits and swam with sharks: *I think Maori were involved with genetic engineering right from the beginning*. However they considered that using live vector organisms for delivering a fertility control was not acceptable.

New biocontrols for stoats, whether or not they would require the use of GE, were generally seen as risky. The prospect that GE might be applied to stoat control caused Men’s group members to question whether the purpose or aim of stoat control (i.e. to protect native birds and other species) was sufficiently important to take risks with such technology. And in the Women’s group, members said they accepted uncertainty in many areas of life but *biological things* had *vast implications* and they were unanimously uncomfortable about GE.

3.5 DECISION MAKING

Several groups discussed the process of making a decision on the introduction of a new stoat control. The Women's group was adamant that the public needed to be involved in the decision, or at least consulted:

I think that, as citizens of New Zealand, we all have a right to be informed about what methods are being used by scientists or anybody to control animals or things they're putting into our environment. It affects everybody indirectly, if not directly, and I think we should all know about it. The public process is definitely one that needs to be applied. I don't think they can just make up their own plans and go ahead and do them without telling anybody.

The Conservationists' group warned also about the dangers of a group of advocates for a particular new control trying to release it before adequate testing had been done:

We don't trust ourselves. There's always going to be a section in society that will exploit this sort of technology-power, in a social-technological sense, to everyone's disadvantage, and it's a high risk.

The Animal Welfare group felt that there was a need for expert opinion in such matters.

The Maori group felt that the power or mandate to manipulate genes must be given by the people, not just taken by a powerful minority, and that this mandate must be obtained through consultation and education. The scientists and technical specialists' role in this is to say:

This is the outcome we want, these are the options that are available to us, this is what this option means. These are some of the strengths of this option and these are the weaknesses, so people can give full informed consent.

Once the mana is given to the scientists, then collective responsibility for the outcome applies:

I give you the mana to actually carry out the work, but the responsibility still sits with the givers of the power and the people need to understand that too. It's about collective responsibility because at the end of the day it's our environment you're dealing with and it's our kid's environment.

4. Conclusion

Most focus group participants, particularly in the public groups, did not know much about stoats. Those who did have some knowledge regarded stoats with a small amount of admiration and a large amount of abhorrence. As people who knew little about stoats learned more about them during their focus group, their responses became like those who did know something. Stoats don't engender feelings that they are cute and furry, as do possums and rabbits; instead they are seen as ruthless killers with all the negative features typically attributed to the mustelid family.

Because of their lack of knowledge and experience of stoats, most focus group participants didn't know the damage stoats caused. We had to tell them. When we told them about the predation on North Island brown kiwi, people were concerned, but some said it was difficult to separate the effects of the different pests in New Zealand. The threat to kiwi, as an iconic species, helped muster support for stoat control.

The public's understanding of trapping, in contrast to the specialists', is unclear. They don't know much about traps, the application of traps to controlling stoat numbers, and the effect of traps on the stoat itself. The expressed preference for trapping in the public groups may therefore be based on a lack of detailed knowledge of the method. Improved traps, such as those currently being researched, are likely to be seen favourably because they could address the concerns about humaneness that the focus group participants expressed following our briefing on current trapping methods and the likelihood of a quick death for the stoat. The public groups, and to some extent members of the animal welfare and conservation groups, did not appear to favour poisons such as 1080, regardless of the species they are used on, including stoats. But some also acknowledge poisons as a necessary tool without other options available.

Specificity of the control method is a cloudier issue for stoats than for possums or rabbits, because most focus group participants did not seem to mind if a stoat control also affected other mustelids. However, these people would be uneasy if a control spread beyond the mustelid family. Humaneness was discussed more than specificity. In all groups it was expressed that, because stoats themselves were not humane in their treatment of their prey, it was acceptable to be less than humane in killing them. While individuals expressed concern over the humaneness of the control method, only the Animal Welfare group was steadfast in requiring it.

None of the groups were keen to embrace new control methods unless efforts were also made to improve existing methods. People generally did not give elaborate reasons for their position; they just seemed more comfortable with existing methods. Discomfort with new biocontrol methods, especially GE-based controls, was particularly intense. The risks posed by genetically engineered controls were seen as much greater than those of existing controls. Distaste for stoats (and/or their impacts) does not appear to be sufficient to make people keen to embrace the use of GE to control them.

Introducing new organisms was seen in all groups as perpetuating the problematic cycle of using exotic organisms to control organisms that had previously been introduced.

There were calls for a public decision process in some groups. Such a process would not be easy to implement because few members of the public currently know enough about stoats to make reasoned decisions on their management, while the interest groups, whose members do possess such knowledge, tend to have very strong views. A public information campaign would be needed to inform the public sufficiently to be able to participate in decision-making about the control of stoats. Such a public information campaign should be feasible because of the public clear affection for the kiwi and people's desire not to have kiwis relegated to zoo specimens.

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Appendix 1

FOCUS GROUP DISCUSSION SCHEDULE

Introductions and explanations:

Introduce the team

Confirm the purpose of study and purpose of focus group

Confidentiality, approval to tape, ground rules

1. Knowledge/experience, relationship with other mustelids and pests—round robin

What do you know about stoats? ... seen one? etc.

What's your experience of stoats? ferrets? weasels? ... Ever seen any?

What is the difference between each of these animals?

Briefing 1: Description of stoats and other mustelids—photos; basic ecology; introduction to New Zealand

2. Unbriefed discussion on impacts

What effect do you think the introduction of stoats is having in New Zealand?

What about compared with possums and rabbits?

Briefing 2: Impacts; size of problem; current control efforts (photos of technology)

3. Discussion of stoat control efforts and technologies

What should New Zealand be doing about its stoats?

What do you think about the current forms of control? ... trapping? poisoning?

What are the main issues for stoat control/management?

Briefing 3: Possible new stoat control technologies: canine distemper; fertility control; improved poisons and traps

4. Discussion of new stoat controls; trade-offs; control risks versus impacts

What do you think of these new forms of control?

- Biocontrols: distemper, fertility control
- Use of GM
- New poisons and traps

What do you think the issues and risks might be for each of these?

How do you feel about the use of GM to develop a stoat control?

Appendix 2

SUMMARY OF THE DISCUSSIONS IN EACH OF THE FOCUS GROUPS

(The researchers' cross-references to the discussion flow diagrams, and details of direct extended quotations have been removed.)

1. Urban Males—Auckland

Perceptions, knowledge, and experience

- There were varying degrees of knowledge and experience of stoats among those in the group—ranging from almost none at all (seen pet ferret; hope to learn) to a relatively wide knowledge and experience such as trapping, farming. One had kept a ferret.
- Most had seen a stoat. Some knew about them and their effects e.g. experiences on farms with chickens
- All thought of stoats as aggressive predators; some said they are vicious and expressed a strong dislike related to the damage they are capable of causing.
- Yet stoats and other mustelids were also seen as fascinating animals based on their intelligence, curiosity and ferocity as hunters.
- There was a little confusion over mustelid size differences.
- Ferrets were known as possible pets.
- Reactions to the picture of the stoat included: *Oh, they're absolutely cute!* Some commented that the photograph presented the animal as endearing, teeth not showing, etc. and since it was a still shot, could be misleading by not portraying its true nature as very rapid movers, furtive, etc.
- The group seemed familiar with the stoat's (and other mustelids) introduction to New Zealand for rabbiting. Knowledge of this was almost implicit, and very little comment was made about this.
- Questions about stoat control were being anticipated during this discussion.

Impacts

- Knowledge of the stoat's introduction, threat to biodiversity and repercussion on wildlife was evident in the group. A good understanding of concepts such as ecosystems and biodiversity was apparent.
- Generally, New Zealand's birdlife and biodiversity was felt to be battered, and stoats are a part of the problem. The main problem for New Zealand's environment was seen as loss of habitat, especially forest. A healthy habitat is our wildlife's defence.
- Possums were seen as New Zealand's main pest, by denuding the forest and impacting on other wildlife. Stoats were the second major pest because of their direct attack on wildlife. Widespread use of 1080, dogs and cats were also mentioned as environmental problems.
- There was a feeling that we need to focus on dealing with all introduced pests. A focus on a single species was considered *dangerous and silly*—we need to see the overall picture. If one pest is removed, another will take its place.

- Group members observed that urban dwellers lack understanding of the problems, and there is a need for more information and awareness.

Current controls

- The group immediately gravitated to fertility controls, which were seen as humane and potentially effective at eliminating stoats, rather than just controlling them if used in combination with other methods such as trapping.
- The preferred approach was the eradication of all pests and the repair of the damaged ecosystems, i.e. more than protecting just birdlife.
- Regarding natural predator/prey evolutions, the question was asked about the natural status quo before humans arrived here. Maybe we are seeing just another stage or continuation in the overall environmental dynamic.
- The suggestion was made that we are in a losing battle over the natural environment and pests, and that money is perhaps better spent elsewhere—such as creating sanctuaries for endangered species.
- The discussion moved on to the value of ecosystems—both spiritual and practical. On the practical side, humans themselves need ecosystems to survive, and these systems are already severely damaged. Since all species are interconnected, how much can our ecosystems handle before there is a collapse (reference was made to indicator species such as amphibians in Australia)? The two-legged predator (human being) was felt to be the worst.
- Both traps and poisons were felt to be inhumane. New control technologies are needed in this area.
- The group felt we should keep the overall goal in perspective, i.e. *to save the kiwi*. So sanctuaries will be important until new, more effective technologies emerge.

New controls

- The topic of new controls, in particular GE, was raised early by the participants in the context of the discussion about current controls.
- When the subject of GE-based controls was introduced there was an instant and obvious negative reaction (grunt, moan!)—immediate resistance to the idea.
- The prospect that GE might be applied to stoat control caused the group to question whether the purpose or aim of stoat control was sufficiently important to take risks with such technology.
- GE-based control was seen as a possibly very expensive alternative—especially the research and development cost. The cost of controls was an issue. Not enough is known about GE to tell whether it will remain within the intended boundaries and be species-specific. The long-term outcome is unknown.
- There was concern in the group that the introduction of a GE organism is just a step on from the introduction of the stoat itself. They were uncomfortable with viruses because of their ability to mutate.
- The group members were sceptical about the use of distemper as a biocontrol, it being seen as *a brutal disease*. There were also practical concerns, e.g. stoats are solitary and it wouldn't spread easily; may kill other animals, etc.; plus concerns about the use of viruses.
- The recent accident at Kaikoura involving the spillage of pest control poison into the sea was mentioned—and seemed to have heightened the public's

concern over poisons. However poisons were still preferable to new controls. Intensified trapping and poisoning was seen as a better answer than biocontrol, especially if the specificity of traps and poisons is improved. The group noted that one knows the stoat is dead when its been trapped or poisoned.

- The wider issue of environment threat and destruction of natural habitat as a major issue was revisited during this discussion.
- Having no kiwis in the wild was felt to be not an option. Minimally protected island sanctuaries are needed as an insurance policy—and ‘mainland islands’ are not realistic—it’s much easier to handle limited geographic area. Some saw that biocontrols on the mainland could compromise the island sanctuaries—what’s to stop such controls getting to the islands if released?
- Some saw kiwis as a symbol of New Zealand’s biodiversity and natural environment.
- The group expressed concern that our values are changing, and younger generations may not think that the natural environment not so important. This is because they haven’t experienced it directly as much as older generations—due the decrease in natural species and their visibility.
- The ultimate criteria for deciding on controls were felt to be risk, and cost. New controls must be carefully tested and assessed since even a very small risk may be all it takes to cause a disaster for the environment.

Comments

The members of this group appeared quite articulate and well informed, with a good understanding of complex ideas such as biodiversity, sometimes challenging the focus on individual animals and approaches. Preference for a holistic view was evident. Many responses seemed emotive, although not altogether uncalculated—illustrated in their concerns about all controls. However, when challenged, they indicated willingness to compromise and recognised the need to work towards a solution to the stoat problem. Individuals had different perspectives on the issues, and consensus was seldom reached on issues. An important position was filled by a city office worker in the group, who questioned value systems and pointed out the lack of understanding and information possibly prevalent among the urban public who make up the vast majority of the New Zealand population.

2. Urban Females—Auckland

This focus group was conducted in the same neighbourhood as the men’s group.

Perceptions, knowledge, and experience

- There was little awareness of the stoat problem in the group, and not much knowledge of loss of faunal diversity caused by stoats. Members saw the stoat as similar to a ferret. Few had seen a stoat, and no one had seen one up close. Many of existing opinions and judgements were based on knowledge of ferrets.
- Stoats were seen as preying on birds and rodents (mice). They were a nuisance on the farm—especially causing havoc with young animals, hens, birds etc.

- Few were aware of the deliberate introduction of stoats as a biological control for rabbits.
- The members noted that some mustelids had particular associations in peoples' minds. 'Weasel' has bad connotations—sneaky, etc. Also ferrets are like this but to a lesser extent. They were also described as *Yuk*, and physically unattractive.
- Participants noted that ferrets are kept as pets, though this is uncommon—a *strange pet*. They expressed concern over the possible effects on wildlife if ferrets were allowed to escape.
- Group members were not very sure of the physical differences between ferrets, weasels, and stoats.

Impacts

- The participants had little knowledge of the impacts of stoats on New Zealand's birdlife. Much was inferred from the previous discussion, the first briefing, and information given by facilitators throughout discussion.
- They noted that stoats presented a big problem for kiwi, birds' eggs, and small and flightless birds.
- On the positive side, stoats were seen as useful for reducing rat and rabbit numbers.
- Some commented that the original introduction of the stoat was based on ignorance. In the past there was a slightly different value system and a lack of centralised control over such matters. *It probably seemed a good idea at the time.*
- There was a lack of conviction and agreement in the group that introductions of new organisms are handled better nowadays—reference to RCD and its illegal introduction. Controlling introductions was thought to be more difficult now due to greater physical mobility, individual greed, and globalisation.

Current controls

- Discussion on the control of stoats focused initially on the aim of control. Participants felt that the aim should be to eradicate stoats completely, but this is probably not feasible. Our number one priority should be to protect kiwi. Other birds and ecosystems, though, are still important—anything 'native' should be protected.
- The kiwi was seen as not only a national icon, but also a symbol of New Zealand birdlife that is on the decline.
- There was a negative reaction to the use of traps—*violent, barbaric*. But the group members preferred kill traps to poisons. Kill traps were seen as more humane, specific, and make it easier to count the stoats that are killed.
- It was noted that every animal is worth treating humanely if possible, but it is difficult to decide to what extent this should be made possible.
- The group members indicated they would prefer to be distanced from the killing process, but if stoats threatened their livelihood (i.e. chicken farming), they would have few qualms about trapping them.
- On the question of how much group members would be willing to pay to protect kiwi, only a couple of people were prepared to pay an extra \$10/week

in taxes (for 5 years) to ensure kiwi are protected. All were prepared to pay an extra \$1/week.

- Stoats were seen as relatively less important compared with our other problems, such as social issues, health, education, etc. Group members were split over the extent to which New Zealand should be spending on environmental issues compared with social issues.
- The group was not prepared to resort to protecting kiwi and other species by establishing island sanctuaries and forgetting the situation on the mainland of kiwi and other native species. It was seen as unnatural—like farming them.
- Some felt that eradication of stoats is required, and they were prepared to pay, providing the problem is dealt with quickly (efficiently), but they were not prepared to see such effort drag on for a long time.
- It was suggested that an alternative to the taxpayer carrying the cost of stoat and other pest control was to tax tourists—since they come to New Zealand for the environment, they should pay. New Zealand should maintain its natural environment in order to keep up the income of tourist dollars.

New controls

- The group had an immediate, sceptical reaction to the idea of GE-based controls. Questions were asked over their specificity, and there were concerns over the *unknown* effects and consequences.
- All group members felt that if a live organism was introduced (including distemper in a weak form), very stringent testing should be carried out beforehand, i.e. test on every native bird species in New Zealand. However, the group's reaction indicated that it would be unacceptable to try such an introduction at present.
- It was suggested there should be an increase in funding for a search to identify a particular behavioural or biological characteristic of the stoat in New Zealand that could be targeted in control (*Achilles heel*, etc.).
- One individual commented that the development of a GE-based control sounded expensive, and should be left alone—especially if it's not generally acceptable anyway.
- When asked directly whether GE-based controls should be used, half the group said no or not at present, and half said they were uncomfortable or would need to know a lot more about it before forming a judgement. Some felt it would be okay to do laboratory-only research so that we can develop and learn about it thoroughly, with the possibility of a release of a very specific control in the future. Generally the idea of the use of GE in the lab to develop a stoat control received a much more muted response than the idea of field release of GE organisms.
- Group members said they accepted uncertainty in many areas of life, but biological tampering has wide-ranging implications and was unacceptably risky.
- There was a lot of concern about the idea of GM foods. However participants were not sufficiently concerned to take time out to investigate what their current foods have in them, or to learn more. One person in the group referred to the Greenpeace book regarding which foods include GM ingredients. *It would drive you mad when you were doing your shopping* (referring to Milo—generally considered healthy and good for the children).

- Group members felt that they would like to have a say in the decision on new stoat controls, particularly if they involved the use of GE. Public information would be required, and such information would need to cover the pros and cons. However, it was felt that the public do not necessarily have to be involved in a decision over the development and use of a non-GE control, or a decision to undertake GE research in the lab.
- Generally the group members felt they did not have a good understanding of the methods (e.g. fertility control) or the issues involved in the use of GE.
- There was also general acceptance/trust that controls are in place regarding the development of GE-based stoat controls, and that there is a process of public, stakeholder and expert involvement before a final decision is made.

Comments

It was difficult to assess the feeling of the whole group. Individuals tended to speak in turns, but when particularly disagreeable or agreeable people spoke up, there was considerable murmuring in the group, although this did not necessarily result in open discussion or debate. People tended to voice objection/support for a particular viewpoint if it was a bit controversial and evoked strong feelings. Examples of this were trapping, use of poisons, the extent of investment in saving native fauna, and GE control.

In the public domain, social and personal issues may override environmental issues such as stoats and their impacts. This was illustrated in this group by the lack of individual investigation of what is in foods, and that individual women seldom rejected GM food products, even though they seemed to have strong concerns over GM foods. It's possible, therefore, that a negative public reaction to the development and use of GE-based stoat controls could be provoked simply by trying to raise awareness of the possible use of GE and attempting to build support for public spending on for such work. The responses of this focus group lead to the question of who actually cares about stoats and the forms of control, and how much do they care?

3. Rural Public—Northland

Perceptions, knowledge, and experience

- There was varying knowledge and experience of stoats in the group. Many had never seen a stoat, or only very briefly. A couple had a good knowledge, including physical appearance and awareness of the biodiversity threat. Most could not tell the difference between the various mustelids.
- There was a general awareness in the group of the damage stoats cause to hens and chickens. Participants disliked the way stoats kill (e.g. all hens in coop) but actually eat little.
- Stoats were seen as undesirables—an animal in the wrong place is *a pest*.
- The local Maori word that best describes stoats is koretake (useless, or invalid), which is stronger than hōhā (a nuisance).
- Once participant had experience of a stoat ridding a house of a rat infestation, and therefore being useful.
- Ferrets were more familiar to the group, and they had more knowledge of them than the previous group. Ferrets had been farmed in the area, and there were some concerns over them getting away into the countryside. Ferrets

were seen as pets by some, *spreading bugs?* attacking hens and their eggs, and having more fur. They are also longer than stoats.

- One group member was involved in kiwi protection on a private property, and had trapped many ferrets.
- Some members commented that stoats are difficult to see in grass, though occasionally seen on roads. Some question as to whether stoats are nocturnal
- The group asked questions about the stoat's territoriality, diet, predators, and lifespan.

Impacts

- Little was known in the group of the exact effects stoats are having on bush life or other animals.
- Most indicated they never knew that stoats were a problem in Northland. One individual had seen many running across the road on the West Coast of the South Island.
- The problem of loss of kiwi was attributed to many predators (dogs, cats, pigs) as well as stoats, so there was a considerable reaction of surprise/shock at the statement that 60% of young kiwi deaths are attributable to stoats. One person commented, *It gets me fired up.*
- The group felt that information on the impact of the stoat on kiwi populations needs to be disseminated to the public to raise awareness of the problem. Information could also be distributed to schools and the learning media. The best ways of informing people in rural Northland about the stoat problem, and possible forms of control were at the pub/TAB, TV, local radio, and through the schools.
- The participants were keen to learn more about stoats and their impacts, putting a considerable number of questions to the facilitators.

Current controls

- The participants indicated that they preferred stoat eradication to containment or control. The same applied to possums.
- Some suggested that biodiversity issues needed to be taught in schools, including increasing the awareness of pests. The child's knowledge and views will be then passed onto parents. This may help stimulate thinking about control methods (e.g. new traps) and raise awareness in the community of the need to protect kiwi, etc. by tying-up dogs.
- The group felt that increasing awareness was important to create a willingness to fund stoat control. The public itself could participate more in stoat control (trap inventors, easier access to traps and poisons), particularly in rural areas.
- It was felt that the kiwi is part of our national identity, a native, and it's important that New Zealanders know it is out there in the wild. The kiwi is particularly important because it is visible and audible; it's the only large flightless bird in New Zealand; and it represents New Zealand.
- The idea that kiwi should be farmed because commercial animals never become extinct was a little offensive. But breeding them to re-stock the population, (not for profit) was OK.
- The group members were weary of poisons. Their use needs to be closely controlled, and limited use was acceptable, e.g. in bait stations. Aerial drops of

1080 poison are unacceptable; *we are the worst users of 1080 in the world*. Concerns about the effects on waterways etc. Trapping was felt to be preferable.

- There was a feeling in the group that New Zealand should get rid of all pests, not just stoats, but that there was too much spending on pest control science and that we need to just get on with the job.

New controls

- The group participants were cautious about the suggestion of using distemper as a biocontrol for stoats, with concerns that it could go wrong. The public would need to be informed so they could have dogs etc. vaccinated. Using distemper was also seen as a *wrong*, and that *two wrongs don't make a right*. There were concerns about its effects on dogs and seals.
- Some suggested that unemployed people could be engaged in trapping, instead of looking at developing and using biological controls and GE.
- Fertility control was seen as presenting a potential danger to other animals if it crossed the species barrier through mutation or lack of specificity. GE-based control was seen as unacceptable. GE was also seen as expensive to develop.
- The group felt there was some hysteria around GE; more information about it was needed, along with proof that it would work and was safe. Previous *mucking around with nature* had resulted in bad effects.
- Generally the group was uncomfortable with GE-based control, and asked for guarantees before any sort of field test/release. However studying GE-based control in the laboratory was acceptable.
- The group thought it was important to maintain the focus on getting rid of stoats, continuing with trapping and trapping research. Participants were uncomfortable about increasing the use of poisons or using new poisons: controlled use is OK. We should continue with research on GE-based control, especially fertility control.
- Participants also felt that the social benefits stoat control efforts should not be overlooked. Trapping creates jobs, particularly jobs for those who have none.

Comments

The majority of the participants in this group were Maori, and long-time residents of the local community. Despite their rural residence, not many of the participants were involved in farming or activities that would bring them into contact with stoats. Generally they were not well informed of the problem, and the surrounding issues. Much of the discussion centred on raising awareness and the need for information regarding the impacts of stoats on kiwi and other birds, and the potential control options. They were adamant that awareness would not only bring about a greater level of funding, but also direct public participation in stoat control, particularly in rural areas. Group members seemed cautious of all methods except trapping, though noted that trapping was not particularly effective in reducing stoat numbers. Once again, a specific concern surfaced about potentially making the same mistake as we did when we introduced stoats, and particular care would have to be taken over introducing live biocontrol organisms.

4. Maori—East Coast North Island

The focus group opened with an expression of thanks from the participants for the researchers having made the effort to consult with Maori on this issue.

Perceptions, knowledge, and experience

- Participants explained that Maori are conscious about how they manage their natural resources—they use everything that they take, respect the seasonality of species, and have limits on sizes and numbers of the things they take.
- The close relationship between the people and the natural world was explained: *It's not just me as a Maori itself, but it's all those things that make me a Maori. That's our culture, our wildlife, our maraes and our concepts ... It's like a fine Swiss watch, you know, if one of the cogs are not turning, well you're not getting the right time anymore.* Ecological/scientific principles are applied as common sense in the Maori culture.
- It was felt that many urban Maori cannot relate to the environment as a whole, having been absorbed into pakeha culture, money, jobs, etc. But there is a resurgence of Maori values among the kids (and the spiritual connection with the environment).
- Most agreed that weka numbers have dwindled drastically since the days of their youth when there used to be many weka on of the East Coast. The general decline of native fauna was due to over-hunting, competition from other species, and loss of the native bush—the replacement pine forests can't support the wildlife: *I remember my great-grandfather once said, in terms of ... (our forest), one day a silent forest will stand here.* This decline has been over an observable time period (anecdotes from last 50 years). The participants were concerned about the fate of many birds (tui, kereru, morepork, kiwi, smaller birds), except pukeko. The crayfish have also gone.
- The loss of species and its impact on Maori was felt to be not much of a concern to the present generation. Only the very young are being taught an appreciation of the environment: *I think it is something that is being taken away from us, in a spiritual sense, but it's very difficult to put your hand on it. There's a sense of loss. The old women would tangi, cry for the memories, and separation from the bush and birdlife. The birds are our friends too* (a story was shared about how a group was saved from attack by birds giving warning).
- Stoats were referred to as *the enemy*—they kill birdlife, and can be described as *koretake* (good for nothing). They are disliked—as implied by the word 'weasel'. Stoats in the wild have no value as a resource, though they might provide skins if reared in captivity.
- It was noted that the 'Poms' introduced stoats to try to recreate mother England. A couple in the group said they had English ancestors—*My grandfather introduced sheep and gorse to the area, and gorse now a pest, so I can't talk.*

Impacts

- Stoats were seen as similar to possums and rabbits, in that they cause destruction to the environment, wildlife, trees, vegetation, and the land.
- Stoats, though, were felt to be the worst because they are 'invisible'. Possums are easier to deal with. One participant recalled his possum trapping days, when 2 people working for 6 weeks in dense bush got 20,000 skins.

- The participants thought that the goal should be ‘eradication’, though the size of the problem might mean *the cure could be worse than the disease*. It was seen as important to look for long-term solutions to the stoat problem and not just go for ‘control’ because once we put up with having some of the animals, their numbers will build up, e.g. rabbits. Monitoring and auditing of ‘control’ efforts was thought to be difficult, and because it depends on the availability of funds, we may not be able to afford it in the bad economic years.
- The participants felt that allowing organisms into the country is a concern, including GMOs: *their ability to adapt is beyond our comprehension*. However fertility control was felt to be a good approach.
- It was felt that another solution would be to enable locals to make a living from trapping, perhaps aided by a bounty system. Trapping was considered to potentially provide a good income for those willing to work (examples of some locals earning good money from possums by selling the plucked fur).
- The group discussed public perceptions and noted that some people are against the use of animal fur, while urban people are likely to see the stoat as a cute little animal—they just don’t see the damage.

Current controls

- The group felt that humaneness was not an issue when it came to killing stoats—stoats are not humane to kiwi. In simple terms, if you come across a stoat, kill it, just as it would kill a kiwi. *There’s no such thing as humanely killing something. If you’re humane you don’t kill it, it’s as simple as that, and so you do what you have to do to actually kill it and if you’ve got an efficient method, fine, but if all I’ve got is a blimmin’ baseball bat, then that’s what I use.*
- With regard to poisons, group members expressed concern over the possibility of poisons affecting non-target species. One member talked of a man who died of cyanide poisoning while poisoning possums. People in the area are strongly opposed to helicopter drops of 1080, and there had been an experience of a drop that went wrong when the wind changed and farm paddocks were poisoned. However, local bird counts found there was no impact from 1080 use.
- It was felt that the ‘human element’ means there will be errors in such control efforts, and bad management and poor implementation are a worry.

New controls

- Members of the group felt that the use of some biocontrol organisms (bacteria) for stoat control might be okay but there are risks of such bacteria becoming ‘superbugs’ (like the hospital MRSA bug).
- On fertility control, the group felt that this was acceptable, but if it involves the use of a live vector organism it is not acceptable: *I’m totally against that. If it’s a living organism how are you going to stop it?*
- Delivering a stoat fertility control using a bait (not live) was felt to be a waste of time—why not just kill it with the bait?
- The members of the group noted that GM/GE, as a concept, was not foreign to Maori. One narrated a story about a woman who was said to be part shark, had gills under her armpits and swam with sharks. Others might say that GM is totally against our culture. One member reported that: *Maori were involved*

with genetic engineering right from the beginning. If we go back into our history, when Tane Nuiarangi created the first man out of the soil at the Karuwaka, what was that? Maori have manipulated the natural world through magic: Every now and then man would give it a nudge, whether it would be now or 100 years, or 500 years ago. I would guarantee that our tipuna were giving it a nudge from time to time as well, according to their knowledge. In other words, Maori have been using a primitive form of GM/GE for years.

- To illustrate this, the example was given of Turehu, a (fairy) woman, who cursed a man, causing him to have blond hair and blue eyes and these characteristics can be seen in some Maori today. GE is not therefore culturally abhorrent to Maori, and to believe so is a romantic misunderstanding of Maori origins.
- A discussion on the theoretical example of human genes being used in an organism to control stoats revealed that this would not be necessarily culturally unacceptable. If the ancestors can be sharks, rocks, trees, one can't complain about GE: *When you take a human gene and put it into something else, aren't you just reproducing the same concepts? And it's about concepts. So how does one stand and say culturally whether it's right or wrong? ... The only difference is that it was done supernaturally. It's OK because we don't have any control over that.*
- However, it was felt that the power or mandate to manipulate genes must be given by the people, not taken. This mandate must be obtained through consultation and education. *Take it slow, or something will happen to you.* The scientists, etc. must say *this is the outcome we want, these are the options that are available to us, this is what this option means. These are some of the strengths of this option and these are the weaknesses, so people can give full informed consent.* The feeling was that a situation where a vocal few were dictating to the masses was not acceptable. Once the mana is given to the scientists etc., then there is a collective responsibility for the outcome: *I give you the mana to actually carry out the work, but the responsibility still sits with the givers of the power and the people need to understand that too. It's about collective responsibility because at the end of the day it's our environment you're dealing with and it's our kids' environment.*
- Some commented on the difficulties of combating stoats in inland areas due to the dense bush and rugged country, lack of roads or tracks, where it's easy to get lost, and the marijuana growers protect their patches.
- It was suggested, as an alternative, that DOC could use a bounty system and pay a premium on top of unemployment benefit to encourage locals to do stoat control. This could help the East Coast, which is not in good shape economically.

Comments

This group was relatively small which meant that comparatively few questions were asked about the stoat problem and potential new controls. Overall, the discussion centred on the Maori cultural interpretation of the state of the environment, resources and the stoat situation. The decline in native species is part of a larger problem of social change and environmental decline, which has impacted on many Maori cultural values especially the management of natural resources. The decline of native species is both a spiritual and physical loss.

The group was concerned about the use of poisons because of poor practise in their use, lack of specificity, and effects on the environment and people. Introducing exotic biocontrol organisms was also worrisome. Fertility control was acceptable to the group. GM/GE and altering the natural world for human gain was not considered to be foreign to Maori culture and values. Nevertheless, GMOs were seen as able to mutate and cause unforeseen outcomes. Proposals for using GE in stoat control would require a process of education and consultation, and would have to be mandated by the people. Humaneness of the forms of control was not a priority concern for group members.

5. Animal Welfare Interests—Wellington

Perceptions, knowledge, and experience

- The members of this group had had a lot of experience in dealing with animals and their welfare through various organisations. It included veterinarians, animal welfare workers, and animal rights campaigners.
- Most of the group had had little contact with stoats. Some had dealt with a trapped or injured stoat. Their knowledge and experience of ferrets was greater, and they had some understanding of the mustelid family.
- Stoats were described as *beautiful, slender, agile, fun, independent, pretty cool, cunning, intelligent, ruthless killers* and having a problem solving ability. They are also not very visible, and the main evidence of their presence in the environment is a lack of birdlife. They are not urban creatures, so animal welfare organisations see very few.
- Stoats were considered no more ruthless than cats in terms of effects on native and other fauna, but cats are perceived differently because they are pets. Public awareness of the impacts of the non-urban cat population is low. They are the biggest pest in Australia!
- The group members noted that some mustelids had particular associations in peoples' minds, e.g. 'weasel' had historically had the negative connotation of *sly* and *mean*. TV documentaries etc. refer to them as *wildlife killers*, but don't mention the greater damage caused by people (the *two-legged pest*).
- It was noted that stoats were introduced by the *acclimatisation society* to control rabbits, and we are still legally introducing exotic animals such as *killer guppies* which eat the fins off trout, etc.
- Stoats were also seen as very versatile animals, able to live anywhere, and having natural predators in New Zealand. Basically stoats are just trying to get by, as they know how.
- Discussion also covered the differences between ferrets and stoats, with stoats being seen as more agile, able to climb well, and having a different biology—for reproduction, etc.

Impacts

- The principal effect of stoats in New Zealand was seen as their predation on native wildlife (though they seem to have no effect on rabbits).
- Some commented that the effect was not obvious, and asked what the evidence for it was. They had no personal experience of stoat predation, but deduced from the amount of funds given to DOC to research stoat control, that they must be having a big impact.

- There was some agreement that the stoat is a pest, though some members queried the definition of a pest.
- This led to discussion-debate on discrimination on the basis of species. Some felt that labelling an animal a 'pest' merely reflected people's values, and that in New Zealand, if an animal has economic benefit, then it is not considered a pest (e.g. sheep). Even 'pests' should still be treated as animals that can suffer. They queried whether it is right or legitimate for humans (as one species) to make value judgements in the natural world—about what were good and bad species?
- Some responded that equal consideration for all species doesn't mean equal treatment, e.g. you still kill a mosquito if it's biting you. It's a fact of human life that we classify things into desirable, useless, pretty, etc. Is it therefore possible to think about all animals as being intrinsically equal?
- This drew the response that, while classification is part of human life, we should draw the line at causing suffering to other species.
- This philosophical discussion drew in other comments such as that humans are arrogant and *play God* with other species. God is supposed to look after all species—it's humans that create the problems, such as with stoats.

Current controls

- The group expressed the opinion that in doing pest control, minimal suffering is very important. The nature of the suffering was important also, for example, the intensity of the suffering over a period of time.
- On the various methods, the feeling was that we should be using instant-kill traps and poisoned egg stations.
- However, poisoning could also mean a slow death, and there was the issue of poisons being passed on to other animals and getting into waterways. One person suggested that alpha chloralhydrate, which is used on seagulls, could be investigated for use on stoats. Another noted that even in the SPCA building, rats are killed inhumanely everyday by the laying of poison.
- One person commented that, with kill traps, there was a chance of a mis-catch (of non-target species). They also queried how the stoat dies.
- A discussion ensued on the issue of humaneness of stoat control methods. Some reiterated that causing suffering is not really acceptable, though may be unavoidable. Another noted that it should also be balanced against the suffering caused by stoats to kiwi chicks. The countering argument was that if we allow suffering, then it removes the incentive to limit the amount of suffering and improve the control methods. Others commented that we must be able to make better/more humane traps, and that traps are never perfect—a mother animal may die in a trap, but its babies then die slowly of starvation.
- This led to discussion about the goal of control. The question was asked whether we should eliminate stoats entirely, especially if they have a role in controlling other pests such as mice and rats? This was seen as the same as one of the arguments against the introduction of RCD to control rabbits, i.e. the consequences of ferrets switching prey, leading to the need for increased trapping of ferrets. Others felt the goal should be the elimination of stoats from New Zealand.
- However, trapping was considered too ineffective to achieve this.

- Suggestions for improvements to current methods included finding some way to mark females so that nests can be detected, use of stoat cages at kiwi holes, and stoat smelling dogs. It was also noted that stoats are cautious and avoid traps, so better camouflage of traps needs to be devised.

New controls

- It was noted that if fertility control required stoats to eat a bait to deliver the control, why not use the bait to fatally poison them? However, fertility control was seen as having the advantage of being more humane. One member asked that if it required a virus, how would it spread given that adult stoats appear very territorial and solitary? If it were spread through mating, what behavioural effect would it have in the population?
- One person picked up on the description of the development of fertility control for possums, querying the possible danger to Australia's possums of using a living organism to deliver the control.
- The possible use of distemper was seen as similar to introducing stoats in the first place. Canine distemper was not felt to be specific enough to use, and there was the issue of how specific the vaccination strain would be. It was suggested that the disease could spread through mating, and by using stoat-specific aerosol baits. Some wondered whether subsequent generations of stoats could become immune to the disease, or whether, like RCD, the young offspring might not be susceptible. In terms of the effects on other animals it was noted that distemper has been almost eradicated from dogs, and so the diluted strain of the disease would be good to use.
- On the development and use of live GE organisms for achieving fertility control the group was outspoken in opposition, finding the prospect *scary*. The view was that once we said yes to GE, it would never stop—it would become a slippery slope. However, fertility control without GE appeared to be acceptable. The discussion then moved to a re-evaluation of existing stoat control methods, possible improvements to these, and the purpose of control.
- Suggestions for improvements to stoat control using existing methods included: the possibility of tagging females and tailing them to their nests in order to eliminate the young; and for trapping, the creation of more effective and humane traps; improving trap baits; developing scent lures; traps that also deliver poisons; electronic traps, perhaps with cameras or telemetry to advise when traps should be cleared; and solar-powered electrocution traps. It was also suggested that a stoat-specific poison could be developed which could then be aerially sown.
- One person felt that stoat population numbers needed to be better understood, especially relative to the numbers of their prey.
- In terms of the goal of control, some wondered whether we were simply delaying the inevitable loss of some species, such as kiwi, so why waste the money involved? However, it was felt that having no remaining kiwi on the mainland would not be well received by the public, and that we need to try to protect the kiwi that remain if there is reasonable chance of saving them. Another participant noted that extinctions were occurring every day with sea animals, insects etc.

- On the question of what criteria should be used for making stoat control decisions, the ‘trickle down effect’, public opinion, and the financial social and ethical costs were considered important.
- There was some debate about biodiversity loss. Some noted that the kiwi is a highly valued species according to human values. One person felt that we are moving in *ever decreasing circles* and that the reduction in numbers of species is sign of ecological instability—and seems to be related to the size of the human population. The group felt that it matters if the kiwi dies out—it’s a matter of principle: *we must care, otherwise why care about anything with regards to nature*. One person noted that biodiversity is central to human survival, but we can’t return the environment to state of balance—we determine the balance through our values that put human needs and wants first. Another thought we perhaps needed to understand what the state of the environment was before humans started changing it. It was further commented that we (humans) caused the problem of environmental degradation, and we should fix it.
- Some called for a 100% guarantee of safety if we are to use GE in stoat control intended to save the kiwi. Some felt that the use of GE was not acceptable, while others felt that it *depends on the alternatives*, and we *can’t afford to lose Kiwi*. One observed that if an effective stoat biocontrol is developed, we must still look at other kiwi predators, such as cats and dogs.

Comments

Perceptions and values issues seemed to come to the fore in this group. The participants maintained that humans are also animals in the animal kingdom, and as such, other animals deserve our respect and humane treatment. Values are challenged when trying to define a pest—with economically valuable animals never labelled as pests even though they (or the people that keep them) cause massive environmental damage. It comes down to which animals humans value the most highly, and where the kiwi and other native fauna fit into this hierarchy of values, (for example, do New Zealanders value their cats more than kiwis?). The greatest environmental damage was attributed to the *two-legged pest*, and the stoat is an innocent part of the problem, and is only trying to survive.

The group tended to be very wary of introducing live organisms as biocontrol agents, this being seen as equivalent to bringing in stoats. Poisons were not favoured because of the suffering they cause to the target (and non-target) animals. The group seemed to prefer kill trapping, preferably using traps which have been improved to make them more specific, and humane. Research efforts should therefore be directed to improving trapping and trap technology.

6. Scientists/Technicians—Canterbury

Perceptions, knowledge, and experience

- Members of the group saw stoats as *tough, busy, aggressive, difficult to control, cunning, tenacious, ferocious, and furtive*. Some group members said they also respected stoats.
- Some had seen or heard stoats in the wild, describing them as very agile and able to swim and climb. One participant had seen a stoat that had worn its teeth down to nothing trying to gnaw free from a wire cage.

- In terms of the differences between the various mustelids it was noted there were size and temperament differences. Ferrets and weasels can be kept as pets, but not stoats. Weasels are less common, though maybe as widespread.
- The group also commented that they thought the public would view mustelids as warm/fuzzy pets (especially ferrets), noting that ferret owners had appeared recently on the 'Holmes' TV show where ferrets ran around Holmes' neck. Size may have an influence on opinions, with the smallest (weasels) being seen less favourably than the largest (ferrets). The word 'weasel' has bad connotations in English—meaning cunning, etc.
- The group felt that the public has a problem with killing things, and are very distanced from the reality of pest management, which is *a bit messy*, and the damage caused by pests.
- There was some discussion on the potential effect on ferret and weasel numbers if stoats were eliminated.
- One participant, in considering the relative abundance of the mustelids, referred to trapping programmes, which might catch, for every 1 or 2 stoats, 30 ferrets, a few cats, and 1 weasel.
- Ferrets were considered to pose a bovine TB threat, and the mustelids (especially stoats) are a threat to biodiversity. Opinions varied as to how aware the public is of the issue.

Impacts

- The group members were aware that stoats predate birds, invertebrates, lizards, and birds' eggs. They also referred to their tendency to go on *killing sprees* and, like foxes in hen houses, kill everything in birds' nests. One of the participants referred to studies in Kaikoura showing the level of predation on birds' nests by mustelids.
- Rats were also considered a problem for birds. Possums are a problem for native fauna primarily because they destroy habitat.
- On the purpose of pest control one participant noted: *Now that we're controlling these things for biodiversity reasons, we've got to control a whole suite of pests. They become one of a suite and that depends on the values you're trying to protect as to what you are going to control.* There was some feeling that we must prioritise pests to target, though there can be a difficulty in separating them because of the ecological interactions; because some kind of balance has been arrived at, what would happen to rats and mice if we got rid of stoats and weasels? One participant noted that stoats are very sparsely distributed compared to possums and rats (in normal years 1–2 pairs of stoats/ 50 ha, but the population density is cyclical). Another reported that theoretical studies on predator/prey cycles have never shown that predators can trade prey. The situation of farmers and ferrets was given as an example: on the one hand ferrets carry bovine TB, and on the other they help control rabbits.
- As a pest, rabbits were felt to be significantly different—traditionally seen as an agricultural pest, rather than a biodiversity threat. Cats were seen as a biodiversity threat, possums as threats to both agriculture and biodiversity, and stoats and weasels as threats to biodiversity. The group felt that rabbits and possums are a political issue, but stoats are, as yet, not a political issue. For this to happen, the urban (Auckland) politicians would have to start seeing

stoats as a problem for our economy, national culture, etc. This led to discussion about the relative importance of agricultural protection and biodiversity protection as political issues.

Current controls

- Under this area of discussion, the question of the goal of control efforts was raised again. The feeling was that our goal should be to eradicate stoats, and eradicate all pests, and eradication efforts must be sustained and determined: *If we want kiwi in New Zealand, we must kill the stoats.*
- It was felt that there should be a particular focus on the ‘mainland islands’, with science used to advice on priorities, etc., to ensure best use of limited resources.
- The question of commitment to control/eradication efforts was raised: this was thought to be both a cultural and political problem—and it’s not clear who in our society actually cares. Some felt that there was evidence of an increasing public support for biodiversity protection, and awareness was increasing—reference to TV programmes, etc. On the other hand, as one person noted, there are well-embedded attitudes, using as an example the case of a person bordering on an urban bush area who is undermining the conservation and restoration efforts by keeping 60 cats. The kiwi, though, because it’s the national symbol, can be used as a political tool to secure funding for stoat eradication.
- There was some view that eradication of stoats and predators is not feasible at the moment, and that there had been a similar decision to act to save the kiwi in the 1970s, but nothing happened. We just need to protect kiwi right now. In this regard, trapping can be used as a ‘holding’ strategy until new technologies are developed. Control was seen as perhaps a realistic step on the road to achieving longer-term eradication. Trapping was felt to be effective, but was labour-intensive and generally confined to accessible areas.
- The group felt that the overall focus should be on preserving our indigenous species and this would accord with changing attitudes in society (as indicated by the growing number of ‘Letters to the editor’ on fishing/hunting, etc.). While there is an increasing urbanisation of our society, this does not mean that urban people have different values from those involved in environmental management. One person noted that, in their experience, vegans and vegetarians don’t have a problem with killing stoats once the problem is explained to them. More generally, group participants felt that there was a need for greater public information/explanation about the impact of pests. When the pest status of possums is explained it makes the use of possum fur more acceptable.
- The group felt that poisoning is not as acceptable as trapping. Shooting and trapping are seen as more *manly*. However, the more explanation or description of the techniques used to control stoats and other pests, the less acceptable they appear to be to the public. What should be shown more explicitly is the gruesome story of stoats killing endangered species.
- As a counterpoint, the ethical point was raised that stoats have no choice about being a pest—they are just surviving as they know how, and getting by efficiently.

New controls

- The group felt that the starting point for new stoat control efforts, as a holding measure, was to maximise the efficiency of the existing methods, particularly trapping. Traps can be very effective, with trials indicating that the nesting success of birds can increase from 30% to 80–90% by trapping (using an intensity of 100 traps per 50 ha). A possible strategy was to start trapping at an intensive level, and then reduce the intensity until the optimal level is reached. Some predation may be acceptable. This should be accompanied by research and analysis.
- The possible use of canine distemper as a biocontrol was felt to be problematic, though the diluted (vaccine) strain might be OK. The problems relate to our ability to measure, understand, and manage the risks involved.
- On the risks of distemper, some noted the ability of viruses to mutate and jump species. The public would also have problems with the potential effect of distemper on their dogs. Before any decision on its use could be made, it was felt that we would need to know how effective it might be, the adverse effects, and the probability of the disease changing. This raised the question of whether our native birds are worth the risks, and by using such methods in favour of some species weren't we *playing God*. Some felt that there was a very low possibility of significant negative repercussions in using such a virus, however others countered that as a biological entity, a disease has a tendency to proliferate and adapt, with the possibility of it switching host—reference was made to CJD and the Hong Kong flu which jumped from other species into humans.
- On biological control, it was felt that a self-sustaining control was preferable for its potential effectiveness and lower cost, but it should not be a disease.
- Some participants thought that the use of a modified bacteria or parasitic worm to deliver a fertility control was problematic ethically and practically, such as ensuring long-term species specificity. Plant-based biocontrols were felt to be better.
- This discussion led to a questioning of the goal of stoat control developments. This was considered to be a matter of values with the following questions and issues raised: Are the risks of such biotechnologies worth it? On the other hand, would it be acceptable to have no kiwi left? But we already have the experience that our attempts to solve past mistakes lead to mistakes which we encounter in the future. Perhaps it would be better if the door on science were not closed, since it can generate benefits as well as problems.
- The 'holding pattern' strategy using existing methods was restated as perhaps the best option, though the role of 1080 in this was questioned.
- Group members tended to feel that GM/GE is very new, and there needs to be a lot of public education about it. At present the hurry to develop and use GM was seen as being driven by commercial interests. One person felt that the concerns about biocontrols such as viruses etc is not rational at present—that the concern is essentially a fear of the unknown.
- It was noted that New Zealand is one of 25 world hotspots for endangered species and there needs to be urgent action. However, the risks that we take in dealing with the problems should be decided by the public. Risk questions raised included the acceptable level of risk of non-specificity of biocontrol

agents, and what should be the time frame for specificity? On these matters, some felt that we should be prepared to accept more risk when it came to trying to save the kiwi, which is extremely important to New Zealanders (rather than, for example, a snail). The requirement for comprehensive testing of control organisms should be part of the risk management strategy.

- Some felt that we should be looking at the commercial uses of stoats, e.g. exporting stoat tails to Japan for use in traditional paintbrushes, etc.

Comments

This was a very well informed and articulate group, and the participating scientists and pest control specialists offered considerable comment on the issues raised.

Values and value systems were a central theme in the discussions, especially in relation to the goal of stoat and other pest control, the relative importance of biodiversity and particular species, the commitment to dealing with the problem, the prioritising of responses and the allocation of resources. The cultural and political context of the problem was recognised, especially the relative political weightings given to different pests. Values were also seen as determining the level of risk that was acceptable when setting out to develop and use new forms of stoat control. Live biological control agents, including viral and other diseases (such as distemper), and agents for delivering a fertility control, were considered to have too many uncertainties associated with them, and could endanger the very things we are trying to save, or cause danger to humans. In general, group members were very sceptical of biological agents being used in stoat control (as stoats themselves were used for rabbit control), preferring sustained, improved, and focused use of the current methods.

7. Conservationists—Christchurch

Perceptions, knowledge, and experience

- The group was knowledgeable and experienced, and many of the participants had been involved in conservation for years with a wide range of practical experience in ecological restoration, wetlands, etc. Some had practical experience of stoat and ferret control.
- A common goal expressed among the participants was to restore native flora and ecosystems in and around the city.
- Participants felt that native species belong here, and were here before man. Man has caused the problem of loss of biodiversity, and should therefore fix it. This includes the indigenous fauna, which is part of our culture, part of being a Kiwi. We have a unique yet vulnerable environment.
- It was also felt that our environment has economic value (e.g. Travis Wetland), and that science can benefit from studying indigenous ecology, interactions and their management. There can also be medical benefits in the form of remedies and drugs derived from our flora, etc.
- The group members saw a need to preserve threatened species by use of offshore islands. On the mainland, only the 'high profile' species are protected (not other species, e.g. invertebrates). It was proposed that we could connect up mainland 'islands' and reintroduce rare animals from protected areas; however private property creates difficulty.

- Some observed that conservation tends to have a *cute and cuddly* focus, but this is a leftover from the 60s and 70s. Nowadays there is an increasing focus on ecology and that kids now understand the word 'biodiversity'. Some saw a social movement developing around protecting biodiversity in New Zealand, and this would progress to a point of conflict with other interests (i.e. cat owners) and values. They also felt that there has been a maturing away from the colonial mentality, where land is seen in terms of its economic value, towards stewarding the land. Tax breaks are now needed for those protecting native ecosystems.
- All the participants had seen a stoat, at least momentarily. Some could not differentiate between the mustelids.
- Stoats were perceived as ferocious and nasty, and participants disliked/hated what they do. Mustelids were seen as killing for fun, e.g. in Travis Wetland, one ferret killed dozens of birds. It was also felt that as an animal, the stoat does not invoke antipathy; after all, we introduced them. Some participants indicated they were appalled by people keeping ferrets, and considered them unsuitable as pets.
- Some group members felt that scientific evidence on stoat and other mustelid numbers and their effects is required in order to get support from councils, etc. for control efforts and to gain more funding.
- A lot of comments on stoat impacts were made in this section of the discussion.

Impacts

- Participants in the group generally had a good awareness of the impacts of stoats and other mustelids on native fauna.
- One person noted they had seen stoats hunting in the Kawekas—*had a bird in its mouth, moving stealthily*.
- Those involved with Travis Wetland commented that if the gate is left open, *5 years' worth of conservation work is gone* due to ferrets. But it is difficult to distinguish between impacts of different predators on the birdlife there.
- One person talked about their experience of trapping when they saw stoats and ferrets trying to eat dead trapped possums. The trapping operation had a major impact with big flocks of brown creeper returning after just 9 months.

Current controls

- Traps were seen as labour-intensive, and having little impact, particularly in remote areas. However, the stoats have to be dealt with somehow.
- The participants were aware of cruelty issues, however they felt this shouldn't be a particular issue when it comes to killing pests such as stoats. Some, though, would prefer that someone else do the killing. Instant-kill traps are not instant in practice, but result in a relatively quick death.
- Participants were more concerned over the specificity of poisons used for stoat and other pest control. Stoat tunnel traps are very specific.
- One group member felt that a 'by-catch' of birds was acceptable with poisons, depending on population recovery rates. Another felt that that 1080 may save the bush, but kill the birds; but if we lose the bush, we lose the birds anyway. In general, New Zealanders, councils, etc. were felt to be tolerant of non-target deaths.

- Another person noted that since the stoat had no natural predators in New Zealand, we (humans) had to be the stoat's predator.
- New high-tech traps were seen as potentially having an impact on stoat numbers.
- There was some discussion on the public's apparent loss of faith in science and scientists, becoming opposed to new poisons, GM, etc. While some of this could be considered hysteria, public opinion is very important, even if it's wrong.
- Pest control was seen as requiring more resources and time is running out to save our native fauna. New Zealand should be committed forever to pest control.

New controls

- There were concerns expressed over new controls (especially biocontrols for possums) affecting originating populations in Australia or elsewhere. Importing/exporting limitations would be needed if we develop and use such controls in New Zealand.
- On the topic of biocontrols, it was noted that while trapping is time consuming/inefficient, biocontrols are risky. Are these risks worth taking? If we do decide to use them, we must be thorough in assessing them (reference to RCD/RHD), including the risks to other countries.
- It was felt that pest control needs to be seen from all points of view, and not leave some interests isolated, as occurred with farmers in the RCD situation.
- Specificity of new or modified organisms used for stoat control was a concern, with calls for high levels of guarantee of specificity. Without such specificity, these organisms, especially if released live into the environment, are too risky—even if kiwis might disappear. Such control technology is too new, and we could make a big mistake. If the control organisms could be closely controlled or withdrawn if necessary, their use might be okay. There could also be risks for the fauna of other countries.
- It was noted that new technologies are often better in concept than their final realisation. Doubts were also raised about DOC's ability to successfully develop and introduce GE-based controls.
- The discussion of the risks of GE-based control technologies led with a re-evaluation of the current methods, to suggestions that it would be better to intensify the use of current methods that we know work. Control efforts based on manual methods, such as trapping, can also provide jobs and involve communities.
- The group then raised the issue of where to focus the research effort, and the best use of the money. Some people suggested there needed to be more research on GM/GE and the manual methods, but not poisons. Others felt that the money might be better spent by putting kiwi into captivity in order to preserve them. However, it was observed that the public is probably not prepared to spend more on stoat control and kiwi protection, simply because the state of our *national icon* (the kiwi) is not taken seriously, and people don't really care. We can't consider New Zealand *clean and green* anymore.

- To afford the required stoat control it was proposed we could charge tourists a 'green tax'. This led to a short discussion on biosecurity, and the need for better prevention of the arrival of new organisms.
- Some people felt that there needed to be an increase in awareness of pests and their effects beyond just stoats, complemented by a long-term commitment to research and effort aimed at eliminating pests. We should be killing the 'killers', but just throwing money at the problem may not be the answer since bureaucracy will swallow it up.
- On the question of using the (vaccine-strength) distemper virus as a stoat biocontrol, participants felt that we would need to know what strength kills seals relative to the vaccine strength; if there was any potential environmental overlap between stoats and seals; and if stoats are relatively solitary, would the disease spread sufficiently in the population to be effective as a control. In practice, aerial drops of bait would be required, e.g. in Fiordland.
- The group felt that research is required on distemper, covering strength, interactions with other species. In principle, it was felt it could be good in areas where there was little danger to seals, particularly if used in the vaccine-strength. If it can kill more pests that is a good thing, but widespread use would be a worry. There was some concern expressed about viruses mutating.
- Some raised the possibility of stoat bounties and harvesting stoats for their tails (ermine), but others felt that, as in the past with other pests (rabbits during the time of the pest destruction boards), they would be *farmed*.
- This evoked a discussion of the human impact on the environment, with humans being seen as *the problem*. There was a general view that we need to be cautious in our approach to the stoat/pest problem and not make the same mistakes we did when we introduced stoats. Our values were seen as part of the problem, e.g. sport is far more important, and better funded, in New Zealand than conservation. DOC's funding philosophy was questioned, and there was some concern that our conservation estate was being used as a cash cow. However, the group noted there is an untapped pool of volunteers in New Zealand society for conservation work.

Comments

The members of this focus group tended to have a holistic view of the stoat problem and stoat control, covering social, economic and ethical aspects. Generally the group members had an optimistic view about being able to retain our native species. Many of them were directly involved in managing reserves or helping practically with conservation efforts and showed a high level of personal commitment to conservation. Most group members felt that people were becoming more aware of conservation, with words like 'biodiversity' increasingly understood by the general public. Like other groups, they were very wary of introducing diseases or genetically engineered organisms, preferring to improve existing methods. There was an apparent lack of confidence in DOC's abilities to get on top of some of the key problems, and to handle the use of some of the proposed biocontrols.