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POSSUM -MANAGEMENT IN NEW ZEALAND

Critical Issues in 1998

PCE Progress Report No.1

Office of the
PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT
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The Commissioner contracted Dr Wren Green, Ecologic Conservation Consultants, to investigate whether key recommendations from the PCE's 1994 report on possum control had been actioned and to identify any strategic risks for possum control in the future. That report forms the basis of this progress report.

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1.0 INTRODUCTION

In 1994 the Parliamentary Commissioner for the Environment released a wide-ranging report examining the use of 1080 for possum control, other control methods, how the effects of possums are managed, the statutory framework for managing possums and the management of feral animals carrying tuberculosis (Tb). The investigation was in response to widespread complaints concerning aerial application of 1080 for possum control.

The investigation concluded that while 1080 cannot be used with absolute safety, the risks of its use are acceptable in relation to the benefits of use. This reflects the seriousness of the 7possum problem on two counts: the major damage they cause to unique native species and ecosystems and their role in spreading bovine tuberculosis. The possum threat is reflected in the \$30 million spent on possum control in 1993/94, (a figure that has since increased) as well as a further \$14 million this year for possum research.

Although the Commissioner's investigation supported the ongoing use of 1080, it warned against the continuing heavy reliance on 1080, or any other toxin, in the long term. It identified the risks of developing bait and poison shy animals and the damage to our 'clean and green' image with trading partners. Other control methods can be used in some places, but in the long term the best hope was for a breakthrough in biological control or similar technology. The Commissioner warned, however, that it might take 10-15 years of research effort and that realising this potential would require a guarantee of long-term research funding. The development of alternative biological controls is vital to New Zealand's long-term environmental and economic interests.

This report evaluates progress made in implementing key recommendations from the 1994 report. It then identifies various strategic risks that may have a significant impact on whether effective possum control continues to be achieved in the future.

2.0 RESPONSES TO RECOMMENDATIONS

One of the main responses has been more effective communication and coordination between the control agencies and the research advisers, funders and providers. This has

occurred over a period of major restructuring for most of the agencies involved in possum control and possum/bovine Tb research. As the Elliott Report (1997) notes: "Over this time the NSSC (Possum/Bovine Tb Control National Science Strategy Committee) research strategy and priority statements have provided a useful element of stability."

However, communication channels need to be exercised and evaluated frequently. The quality assurance initiatives (section 3.6) may require more formalised coordination and stronger roles for the NSSC and NPCA (National Possum Control Agencies). More information transfer may be desirable and the adequacy of operating budgets for the NSSC and NPCA may need reviewing.

It is also pleasing to note that the much needed standardisation of monitoring operations has occurred. All agencies now use the trap-catch technique, as developed by Manaaki Whenua - Landcare Research, as an index of possum abundance for monitoring operations. If it is used carefully, in accordance with the associated protocols, it allows for objective comparisons of kill rates between operations. The next big challenge will be getting a suite of better measures for performance monitoring, ie. how well a particular system (eg. native forest, or Tb-infected herd) has responded to possum control. Work by Landcare Research on a Foliar Browse Index for native forests is an example of a useful performance monitoring technique.

There was a list of research priorities in the 1994 report. Apart from the recommendation for more social science research (see section 3.3). these have largely been addressed and have led to a number of significant achievements. Credit should go to the research framework and coordination provided by NSSC.

One group of recommendations concerned improving operational performance and was related to quality assurance issues. There has been progress on this in different parts of the industry, but much remains to be done. Initiatives in quality assurance are covered elsewhere (section 3.6) and are rightly recognised as an important challenge for the possum control industry.

A number of recommendations were linked to legislative issues or regulations. While some have been acted on, it is too early in the case of the Biosecurity Act 1993, amended in 1997, to

assess the impact of the amendments on possum control. On the other hand, the recommendations concerning the Pesticides (Vertebrate Pest Control) Regulations 1983 should be considered in the light of their shift to the Hazardous Substances and New Organisms Act in 1998 (section 3.6).

3.0 WHAT STRATEGIC RISKS REMAIN?

Despite real progress since 1994, possums are still a very significant risk to New Zealand. Possum impacts are complex, both environmentally and economically.

Similarly the pathways for action, from identifying a possum impact, such as predation on birds, to the point that control occurs, are also complex. Figure 1 illustrates the main linkages

and relationships between information needs and their input to control operations, in a general and simplified way. It identifies the interactions between research and risk assessment and the implementation-evaluation stage. Together these elements constitute the system that delivers possum management in New Zealand. Failure in one part of the system can disrupt other parts and may slow or reverse past gains. The examination of progress in implementing the recommendations from the PCE's 1994 report led to an evaluation of strategic risks in relation to possum control that still remain.

Have the changes within the possum management system and in society as a whole had an impact? What are tomorrow's risks that could affect today's achievements? This section looks at a number of strategic risks and the questions they raise.

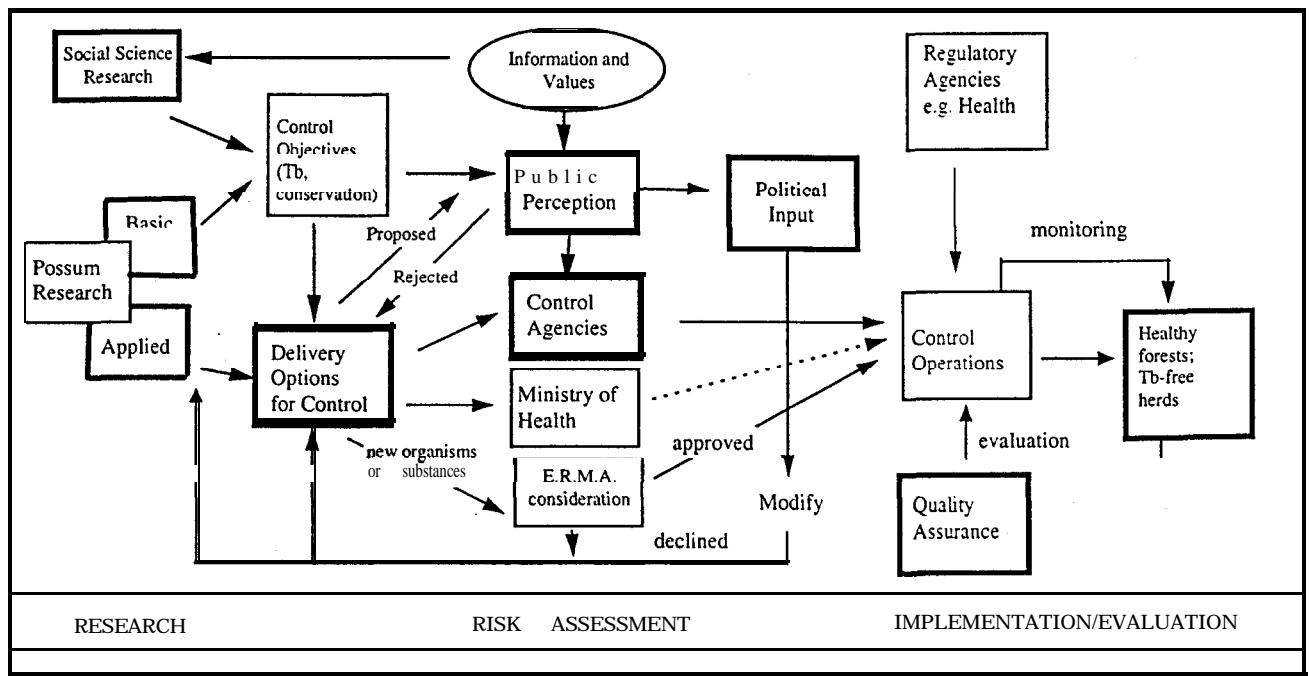


Figure 1 Information and Implementation of Possum Management in New Zealand
Key: = strategic risk areas

3.1 Playing the numbers game

The rabbit and the possum are both major pests in New Zealand. Significant taxpayer resources have been invested in researching and controlling both species. In the case of the rabbit this has been done with little attempt to estimate the total rabbit population in New Zealand because it is not numbers per se but site specific effects that

are important. Why then is there frequent reference to a national possum population usually quoted at 60 to 70 million?

Historically, the stark image of 70 million possums devouring native forests was promoted to help gain public support and political commitment to spend more money on possum

control. But there are disadvantages in maintaining this approach over a long period of time to justify current or increased expenditure levels. Firstly, the estimate of 60-70 million is simply an estimate with wide margins of error. To obtain a more accurate national total would require more methodological research and additional expenditure.

Secondly, by promoting the possum problem as one of 'reducing numbers' the two major objectives of possum control are obscured. The actual national objectives are:

(1) reduction of bovine tuberculosis in New Zealand's cattle and deer herds to a level where New Zealand qualifies as a Tb-free country;

(2) protection of native biological diversity and the restoration of degraded native ecosystems. The protection of other environmental values and vulnerable crops are additional objectives of possum control.

There are strong national and international reasons, both economic and environmental, for why these objectives should be pursued with vigour and long-term political commitment. In fact, gains have been made in reducing Tb levels and possum impacts in priority conservation areas. For example, the remorseless rise in the number of infected herds from 1980 to 1994 has been reversed. In the past four years the number of infected cattle herds has decreased by 35%, infected deer herds by 49%.

However, the '70 million' argument continues to be used and implies that substantial expenditure on control has been ineffective. Consequently there is a risk that political and public support for continued investment in possum research and control may decline; possibly indicated by the large petition to Parliament in August 1998 calling for a bounty on possums. The major objectives, including their costs and benefits, may not be fully appreciated by politicians and the wider public.

Questions

☞ *How do we ensure that New Zealanders appreciate the necessity of control in conservation as well as economic terms?*

☞ *How can the "possum threat" be presented in ways that:*

a) *maintain public support for a range of control methods;*

b) *generate political support and funding from public and private sources; and*

c) *focus on the strategic issues that pose the greatest threats to native biodiversity, agricultural productivity, and market access?*

3.2 Lack of integration for control strategies

Political support for possum control requires well focused strategies that are cost effective and outcome focussed. It has been suggested that incorporating the various objectives of possum control into a single national strategy would be more effective in retaining political support and funding. The control agencies rejected the idea of a national possum management strategy early in 1998. The agricultural goal (Tb elimination) and conservation concerns (species and ecosystem protection) were sufficiently distinct that a single strategy was not perceived as useful.

Although these two objectives do differ, they need to be strongly aligned, otherwise there is a risk that possum control issues are not seen in their full context. Agencies need to maintain the strong communicative and cooperative approach in order to align the research, operational and quality assurance components of the whole system.

There is a present presumption that the system needs no specific leadership. The system functions because the common interest in killing possums provides sufficient incentive to ensure cooperation and alignment between the agencies. As long as this incentive remains, the need to impose coordination through the mechanism of a single national strategy is reduced. However, one important set of agencies, the regulatory agencies, are not so strongly bound to this common interest. The Ministry of Health and the Environmental Risk Management Authority (ERMA) have, naturally enough, less interest in possums and a greater focus on protecting public health and safety.

What is also required, therefore, is good understanding between control agencies' and the regulatory agencies of the overall objectives of possum control. While their independence is necessary, regulatory agencies need to understand all the risks associated with alternative methods of possum control. This includes the risks of not controlling possums and the opportunity costs that could result if tighter regulations increase the costs of control.

¹ Control agencies include regional councils and Department of Conservation

Questions

- ≡ **Are the control agencies effectively communicating overall strategic goals?**
- ≡ **Conservation and Tb control objectives differ, but are the relationships sufficiently formalised to identify common interests, eg complementary and divergent research needs, information transfer, control methods and development of quality assurance system?**
- ≡ **What understandings are appropriate between the control and regulatory agencies so that all considerations - public safety, environmental protection, animal health and occupational health - are appropriately balanced?**

3.3' Research gaps

3.3.1 Possums as predators

The research focus on possum impacts has been largely, and appropriately, on understanding the relationship between the possum and the plants at risk (impacts on native forests as well as crops). Relatively recently the possum was shown to be a scavenger of birds (Brown et al, 1993). Intensive field studies by Landcare and Department of Conservation scientists have since demonstrated that possums, usually in conjunction with ship rats, are serious predators of North Island kokako (Innes et al, 1998) and kereru (NZ pigeon) (Innes 1998). Possums and mustelids were estimated to cause 10% of egg loss of kiwi in mainland forests (McLennan et al, 1996). Possums also depress numbers of fruit eating birds by eating their preferred fruits. However, Innes et al (1998) conclude that "Predation is a more immediate cause of current kokako declines than competition."

Intensive management of ship rats and possums at "mainland island" locations has been particularly successful at improving survival of kokako and kereru. This success has allowed the cost of addressing the predation problem and the difficulty it poses for species management on any larger scale to be assessed. If vulnerable kokako populations are to recover, possums and ship rats have to be managed to very low levels (less than 1% trap catch for possums, and less than 1% tracking rate for ship rats) at the onset of the kokako nesting season, for several consecutive years (Innes et al, 1998).

This finding, if it applies to other regions and other bird species, changes the assessment of the risks to native biodiversity posed by possums and has wider implications for research and control.

Relatively little research is done on the possum as predator. The possible implications for protected species management are significant.

The first task is to identify the appropriate level of research into possums as predators. The strategic risk to biodiversity is to continue management decisions, biased towards possum-plant considerations, which underestimate the impacts and implications of possum predation.

The second task is to evaluate the adequacy of ecological research in New Zealand that examines the broader impacts of possums on natural systems. What role do possums play in food web relationships and how does this distort ecosystem functions and relationships? For example, kereru "...perform an important ecological role as seed dispersers of several large-fruited trees" (Clout & Hay, 1989).

Questions

- ≡ **How many native bird species is the possum feeding on, and what is the quantitative impact on population dynamics?**
- ≡ **What constitutes a "safe density" of possums for particularly vulnerable and important species, such as kereru/kukupa?**
- ≡ **What are the wider implications for forest composition of a decline in kereru predation?**
- ≡ **What are the implications for the present measures of "success" of control operations which are geared to considerations of plant recovery, not bird survival?**
- ≡ **Does this increase the pressure to find cheaper control methods, and especially ones such as biological control, that are geared to conservation objectives?**

3.3.2 Social values

Very little research money is spent on social science research into understanding public attitudes and perceptions and effectively providing scientific information to the public. Concepts of 'risk' are not well explained to, understood, or accepted by key sectors and community groups. The assessment of the Possum/Bovine Tb Control National Science Strategy Committee (NSSC) (Elliott, 1997) was critical of the lack of progress that had been made in this area since 1994, despite a large study in 1994/95 (funded by MAF Policy and Landcare Research) to determine public attitudes to pest control technologies. Elliott commented on "a deep-seated wariness or even frank distrust of social science in the 'possum/bovine Tb control research establishment'. Yet it was widespread concern by the public and iwi over

1080 that led to the 1994 investigation. Not enough has been done since to find out how people decide what is 'acceptable', in terms of perceived risks to human health or to the environment. One cause for this shortcoming appears to be a significant difficulty in getting the research purchasers to buy such work. One Crown Research Institute recently had to make a social scientist redundant because of an ongoing lack of funding in this general area.

This lack of support by research purchasers is a real concern as more sophisticated control technologies become available. With them comes a more complex set of risks to evaluate before their potential can be tested and, perhaps, realised. On the one hand is the complex set of risks that communities will need to understand and evaluate. These risks are posed by the organism (the possum) and, to varying degrees, by the wide range of control mechanisms. On the other hand, how communities perceive and judge these risks is also influenced by their (dis)trust of the other stakeholders. A better understanding of these complex factors influencing community attitudes, values, and trust is fundamental. There is a major risk that the next generation of control technologies will arrive and the public debate over their benefits and risks will be both ill-informed and misinformed.

More effort could be spent in societal education on risk in relation to the benefits and costs of different control methods. At present, media coverage on the risks of control seems to be focused on operational mishaps and accidental dog deaths. This leads to narrow questions such as: Should operations continue with 'regrettable loss' of dogs? Should public parks be closed for several months, or do we stop using poisons and face major increases in cost from possum damage? The risk issues are larger than this and will become more, rather than less, complex.

Questions

- *How do we ensure the debate regarding possum impacts, management needs and methodologies, is informed and is not confused with public mistrust of the control agencies?*
- *What are the social and cultural values and concerns that determine whether a new technology is socially and politically acceptable or unacceptable?*
- *How can the different beliefs and value systems within New Zealand society (see section 3.5) be given due consideration?*
- *Is the problem one of inappropriate social science research proposals or a purchaser*

perception that the proposals are inappropriate or such research is not needed?

3.4 Risk of an inappropriate policy response

A major long-term research investment to identify potential biological control options has successfully passed the first hurdle. Landcare Research and its partners in the Australian Marsupial Cooperative Research Centre have carried out this work. Immunocontraception using egg antigens as a humane method for reducing possum fertility has advanced to the "proof of concept" stage. In this case, "proof of concept" means that reduction in possum fertility of the scale needed to have worthwhile effects in limiting wild populations have been demonstrated by experiments on captive animals. The next step is to develop ways to apply the bio-control, ie. to research and test the delivery options. This is a significant undertaking in its own right and is likely to take several years and cost millions of dollars.

If viewed in the context of the historical and ongoing annual costs of possum control such costs could be considered small. However, Government will probably wish to evaluate its options, including the risks and benefits to Government of public versus private investment in the development of delivery options. The obvious advantage of the private sector option is that financial risk and expenditure are not a drain on public money. Yet financial considerations go beyond the immediate costs of development. Once a delivery system is approved for use, the control agencies will be the obvious purchasers for many years to come. Pricing the delivery system may then become an issue, as well as the overall costs and gains to Government in the context of its possum control objectives.

Government research businesses, especially Landcare Research, have, through long-term strategic investments and partnerships, developed considerable expertise and made significant progress in the development of biological control methods. One argument for their continued involvement is the benefit of continuity, co-ordination and momentum at a key stage in this process. However access to sufficient research investment may limit their capacity to contribute.

Questions

- *What policy framework should be used to evaluate the appropriate roles and*

- ≪ investment risks for Government in making biological control a reality?
- ≪ What weight should be given to fiscal risks, sectoral benefits, and the achievement of ecological management goals?
- ≪ Should a strategy be developed that links public information initiatives with ongoing technical and social science research? (There are linkages to sections 3.3 and 3.6.)

3.5 Overlooking tangata whenua concerns

The aerial use of 1080 in Maungataniwha Forest in Northland in 1995 provoked an angry response from tangata whenua. There were issues of insufficient consultation, a fear of 1080 and the effects on employment opportunities. In other places some Maori have been concerned about the impact of poisons on spiritual values associated with Tane's domain. Operational mishaps have also added to Maori concerns.

Since then, there have been local initiatives that have positively addressed these issues. The Department of Conservation conducted extensive consultation in the East Coast conservancy during 1995 and obtained a high level of support for their control plans. A formal co-management arrangement was signed between the Department of Conservation and Te Runanga o Ngatihine at the Motatau Forest, Northland. This followed a Landcare Research initiative, with Ngati Hine, to determine the impact of pests on kereru (pigeon) numbers. Extensive pest control, including rats and possums, is now helping the local kereru population to recover. A linked training course provided nine local people with field skills in pest management.

These are positive developments. Initiatives are needed on a larger scale, however, to counteract the suspicions and distrust some Maori (as well as Pakeha groups) have to poisons and 1080 in particular. What is needed is well targeted and effectively delivered information that addresses their issues, using consultation mechanisms that are appropriate to the circumstances. Explaining the benefits and risks of possum control is important.

There is a risk that if these consultation/information matters are not convincing some tangata whenua will remain antagonistic to control operations. While objections may be localised, adverse publicity can affect other communities and add to a wider public climate of mistrust. This could intensify if

Maori are not engaged in the process of debating the merits of new biological control techniques.

Questions

- ≪ What are the options available to address tangata whenua concerns arid needs, especially in anticipation of new control techniques?
- ≪ Is a specific strategic initiative required, or should agencies continue with their own approaches?
- ≪ Would there be benefits in addressing these questions as part of a public information initiative?

3.6 Developing a quality assurance culture

Past mishaps with the use of poisons were often caused by poor quality control (from bait preparation to operational practices), lack of best practice guidelines, lack of performance standards, inadequate auditing of operations, and variable quality of operators. In short, the possum control industry spent insufficient time and resources developing and integrating quality assurance practices into its activities. The lingering public distrust of poisons is in part one outcome of this lack of quality assurance practices.

Although the number of accidental poisonings has been markedly reduced over the past 20 years, there is little justification for complacency. On the contrary, a sense of urgency to implement quality assurance systems would be more appropriate given the following developments.

Firstly, the Ministry of Health has recently recommended lower maximum levels of 1080 in potable water from catchments treated with 1080 following an interim finding that relatively high doses of 1080 may cause mild developmental defects in pregnant rats (Eason et al, 1998).

Secondly, the Hazardous Substances and New Organisms Act 1996 sets out new requirements and standards for the use of new substances and organisms that affect possum control methods and operations. The Pesticides (Vertebrate Pest Control) Regulations 1983 made under the Pesticides Act 1979 continue to apply under the Hazardous Substances and New Organisms Act requirements. The application of quality standards is also appropriate for the licensing and training of operators under these regulations.

Thirdly, the trend for control agencies to contract out more of their possum control

operations has implications for monitoring the performance of operators. Operational monitoring can only be standardised and effective if there are nationally recognised and implemented quality assurance systems.

Fourthly, the use of bio-control technology in the future may require higher standards of performance from operators than is the case with traditional methods of possum control.

It is pleasing to note that the NPCA has recently set up a project to design and trial a quality assurance system that will cover all aspects of possum control. The elements of this system will include: the better use and sharing of information, developing risk analysis tools for regional councils and Department of Conservation conservancies, defining quality systems standards, peer-review audits of control operations in both Tb vector control and conservation activities and building a database for analysis and comparison of operational results.

To deliver a quality assurance system that is based on sound science it will be necessary to build in the ongoing integration of research findings. There will also need to be good rapport between operators and scientists to ensure research results are effectively communicated and used in the field.

Beyond this NPCA project is the larger challenge of developing a quality assurance culture across the possum control industry. Such shifts in the way we think and work rarely happen quickly. Implementation is invariably underfunded. The strategic risk is that the standards required by the new legislation and new technologies might arrive before the industry is fully trained and able to meet the required standards.

Questions

- “ How quickly must the quality assurance project move to meet the needs of new legislation and technologies?
- “ Are the relatively informal arrangements for communication and information sharing within the possum control industry adequate for the development, coordination, implementation and ongoing review of quality assurance procedures?
- “ Are the costs and benefits of quality assurance appreciated within the industry?
- “ Will participation in the quality assurance programme be mandatory for regional councils and Department of Conservation conservancies?

- “ Has funding been identified for further development and implementation of the programme?
- “ Will the quality assurance system accommodate the possible introduction of biological control methods?

3.7 Training needs

Strongly linked to the development of a quality assurance system is the need for appropriate training programmes. The training programmes run by the now defunct Animal Pest Destruction Council stopped several years ago. Regional council staff and contractors have limited access to training courses, while Department of Conservation staff receive some training in animal pest control.

The planning and management of possum control operations is sophisticated. New technologies and tighter regulation will make them even more so. The demand for training courses run by the NPCA has been high and indicates the need for more effort in this area. There appears to be an inadequate number of training providers and courses, and no obvious organisation with overall responsibility to improve the situation. As a consequence, areas for gains in operational efficiencies, such as lower sowing rates for aerial baits, are not being recognised and implemented by all operators.

There are risks associated with this training shortfall. Inefficiencies will continue, existing operators will find it difficult to keep up with technical developments, new operators will lack a comprehensive grounding in best practice and planning control operations, thus the improvements that should flow from the quality assurance system may not be effectively and comprehensively implemented.

Questions

- “ What priority is the possum control industry giving to training?
- “ Does the issue of training require coordination between agencies and the private possum control operators? If so, which organisation is the most appropriate to coordinate?
- “ Is the developing quality assurance system going to be linked to training opportunities?
- “ Are adequate resources being put into training the next generation of operators?
- “ What opportunities are there here for private sector initiatives, assuming they receive appropriate accreditation?

4. CONCLUDING OBSERVATIONS

The Commissioner's 1994 report "Possum Management in New Zealand" was a major investigation, sparked initially by public concerns over the use of Compound 1080 for possum control. In the past four years we have seen:

- much better coordination between the research establishment and control agencies;
- standardisation in monitoring control operations between agencies;
- implementation of the majority of the report's recommendations.

This progress is pleasing to note, although in looking ahead there are new challenges and associated risks that require consideration and action. Underlying these is the reality that, despite considerable progress and expenditure, the possum remains a very significant risk to New Zealand, both in economic and environmental terms. This is not the time to lessen the effort against what is arguably our major pest species.

This evaluation has identified several strategic areas that need to be addressed. In summary, they are:

- sustained political and public focus, as well as commitment, to substantially reduce Tb levels in cattle and deer herds and to protect native biological diversity;
- Promotion of the two national objectives rather than continued arguments about the merits of reducing the national possum population *per se*;
- strong commitment from all control agencies to collaborate and share information, research, experiences and expertise;
- better scientific understanding of the role of possums in New Zealand ecosystems, with a greater focus on its impact as a predator of native birds;
- appropriate policies to ensure the development and testing of delivery systems for possum-specific biological control methods can proceed as soon as possible;
- better understanding of community values and beliefs that shape attitudes towards the risks and benefits of control options;
- a greater effort to inform Maori and communities about the nature of risk, how it applies to possum impacts and the use of different control methods.
- development and implementation of a quality assurance system that permeates the possum control industry and delivers effective, efficient and safe operation.

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