ENVIRONMENTAL RISK MANAGEMENT AUTHORITY

ERMA New Zealand

NGĀ KAIWHAKATŪPATO WHAKARARU TAIAO

THE REASSESSMENT OF 1080

An Informal Guide to the August 2007 Decision of the Environmental Risk Management Authority

13 August 2007

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Chair's introduction

The reassessment of the pesticide 1080 for use in pest control is the largest and most challenging exercise ever undertaken by the Environmental Risk Management Authority (ERMA New Zealand).

The application for reassessment was five years in the preparation; more than 1400 submissions were lodged with us; and we heard in person from more than 150 submitters during our two weeks of hearings around the country.

Because of the intense public interest generated by the application, we decided to produce this information bulletin to complement the formal decision itself. While it has no formal status, we hope that it will help to explain the background to the application, the reassessment process and the reasoning behind the Authority's final decision.

Public opinion is deeply divided on this issue. This is because our nation is faced with an extraordinary environmental and economic dilemma. On the one hand, pests like possums, rabbits, rats and stoats pose a major threat to New Zealand's environment and economy. On the other, the aerial application of the poison 1080 is seen by many to impose unacceptable risks. A number of people who support the aerial use of 1080 do so only because of the need to manage the threats to the environment and the economy posed by possums and because of the absence of any better substitutes at the present time. These people view aerial application of 1080 as something of a 'necessary evil' pending the development of a suitable alternative.

The 1080 Reassessment Committee (the Committee) took full account of the deeply felt concerns of many New Zealanders about the risks and costs involved in the aerial application of 1080. At the same time, we were bound to recognise the critical importance of 1080 aerial drops to current possum control programmes. We also took into account the considerable improvements made in recent years by principal users to the way 1080 operations are managed. Many – though by no means all – of the complaints and criticisms we heard were historically based and have now been addressed by changes in such areas as improved consultation and notification procedures, reduced bait dosages and more precise and reliable navigational systems in aircraft.

Our decision recognises that, for the time being, there is no practical alternative to the continued use of 1080 in areas where the preservation of native bush and agricultural production would otherwise be at serious risk. But it also reflects our view that there is an urgent need for further improvements in the way 1080 is used. The tightening up of mandatory controls, the establishment of a watch list to monitor the impact of future aerial drops, our recommendations on research into the adverse effects of 1080, our appeal for further research into alternative methods of pest control and our decisions on the management of aerial drops will hopefully ease some of the remaining concerns.

We stress that our decision on this application is not intended to be for all time. It does not give the aerial application of 1080 a green light so much as a flashing amber light – 'proceed, but with caution'. Aerial drops, which represent 94 percent of 1080 use (by land area) will in future be kept under close scrutiny. Whether or when a further reassessment is undertaken will depend largely on how well the new management regime is implemented and on the response to our recommendations – including that additional research be undertaken into alternative methods of possum control.

We wish to place on record our gratitude to all those who took the time to present their views to us during the submission and hearing stages of the reassessment. We were greatly impressed with the quality of the presentations we heard from both applicants and submitters. There is no question but that the hearings have helped clarify a number of misunderstandings and have contributed to a better informed public debate on this matter.

We trust that the decision we have taken will find support among most New Zealanders as a way forward that, for the time being at least, best reflects and protects the overall interests of our country.

Neil Walter : Chair
Environmental Risk Management Authority

Wellington : 13 August 2007

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Background to the use of 1080 in New Zealand

The introduction of possums and other pests into New Zealand

Brush-tailed possums were introduced to New Zealand from Australia in 1837 in an attempt to start a fur trade, but have since multiplied to the point where they are probably now the country's number one pest. The 1080 reassessment application from the Department of Conservation and the Animal Health Board describes the destructive impact of possums on native plants and birds.

Actual possum numbers are not known, but estimates put them in the range of 40 to 70 million, with the pests devouring an estimated 7 million tonnes of vegetation a year.

In addition, possums carry bovine tuberculosis (Tb) and spread this contagious disease around cattle and deer herds. It has been estimated by the applicants to this reassessment that if bovine Tb is not controlled it could cost the country up to $5 billion over 10 years.

Not just possums, but stoats, ferrets and rats have flourished in the favourable conditions in this country. These pests have no natural predators and have caused a great deal of damage to native animals and birds and to the forest environment generally.

Stoats were introduced to New Zealand in an attempt to control rabbits, but they soon discovered a far easier meal could be found in the nests of native birds.

New Zealand is unique in having no native ground-dwelling mammalian carnivores, the only native mammals being two species of bat. Birds evolved here with little fear of attack and some, such as kiwi, weka and takahe, adapted to living permanently on the ground. This left them vulnerable when possums, stoats and other invaders entered the forests.

The introduced predators thrived because there were no larger predators to control their populations.

The poison 1080 is used mainly to target possums, but also kills other pests, such as stoats and rats, that attack native birds. 1080 is also considered by farmers to be an important weapon in the battle against rabbits.

1080 was first approved for use in New Zealand in the 1960s in order to control these introduced pests that were having a severe effect on New Zealand's environment and agricultural production.

Environmental damage caused by possums

Possums are a threat to New Zealand's environment on two fronts: they eat the eggs of native birds and attack their young; and they destroy significant numbers of native trees.

Possums have a preference for trees such as rata, kamahi, pohutukawa, kohekohe and totara. Defoliation through possum damage kills trees slowly but surely. In the most serious cases, possums have caused the complete collapse of the forest canopy in an area within 15–20 years of their arrival.

Above : A possum feeds on a kereru egg.

Opposite : Possums were brought in to start a fur trade, but now pose a major threat to the environment.

An example of defoliation by possums in the South Island.

Possums also compete with birds for food. In preference to leaves, they tend to eat flowers, leaf buds, fruit and insects – all of which are critical for healthy bird populations.

In addition, possums are known to raid bird nests and eat eggs and chicks. Kokako, kaka and other hole-nesting birds are particularly affected. Possums and rats also eat the giant New Zealand land snail.

Terrestrial invertebrates (animals without a backbone, such as insects) are also under threat from possums and other predators, both through direct predation and through the loss of their food sources (flowers, fruits and leaves).

Bovine Tb

Bovine Tb is caused by a bacterium called *Mycobacterium bovis*. The disease shows up as lesions in the lymph nodes of the upper respiratory system and, in severe cases, lesions can be found in the lungs and other organs. The disease is usually detected before it leads to death.

New Zealand has had a national eradication campaign underway against bovine Tb since the 1970s. Currently, the Government provides funding of approximately $87 million per annum to support this programme. Additional funding comes from regional councils and individual farmers.

The disease is one of the country's most serious animal health problems and is regarded as a threat to humans should they come in contact with infected milk or diseased carcasses. The risk of human infection with bovine Tb is minimised by the pasteurisation of milk.

Bovine Tb constitutes an economic risk because it creates negative perceptions and market resistance among overseas consumers about the quality of New Zealand milk and meat.

New Zealand is a signatory to the Office International des Epizooties (OIE) Terrestrial Animal Health Code. New Zealand has to comply with the requirements of the Code in order to be involved in the trade of live animals, meat and meat products, and milk and milk products. As a Tb-infected country, New Zealand is unable to trade live cattle and deer with Tb-free countries.

New Zealand's National Pest Management Strategy sets a target of 99.8 percent of cattle and deer herds being free of bovine Tb for a three-year period. The Animal Health Board (AHB), which is responsible for controlling the spread of bovine Tb, expects that if the current planned use of 1080 continues, Tb infection rates should be below the 0.2 percent target by 2015.

In implementing the strategy, the AHB liaises with the farming community through 15 regional animal health committees (RAHCs), which advocate for bovine Tb control in their areas and provide advice and feedback to the AHB. In most parts of the country, regional councils organise the actual vector control work.

Bovine Tb is controlled in a number of ways. The spread of the disease among cattle and deer herds is countered by the testing of animals, the classification of infected herds and the imposition of controls on herd movement.

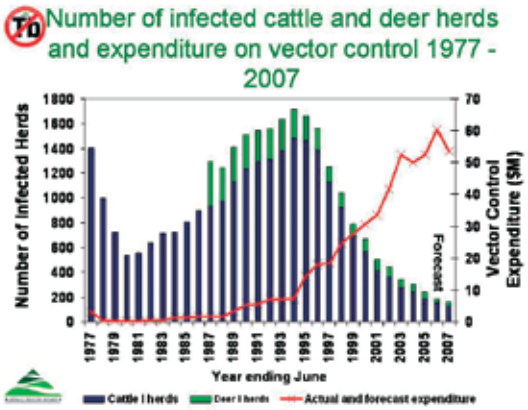
A second approach to bovine Tb control involves targeting what are called vectors, that is, groups of wild animals that carry Tb where the disease is sustained in the population by continual re-infection. Wild animals are responsible for around 90 percent of new herd infections. Bovine Tb can infect most mammals but possums, and in some areas ferrets, are the main culprits for spreading of the disease.

Possums are vulnerable to bovine Tb and the disease quickly becomes infectious in this species. The 1080 reassessment application notes that possums are now recognised as the main reservoir of bovine Tb infection in both cattle and deer, with infected possum populations present in 40 percent of the country. Stoats are also recognised as a key Tb vector.

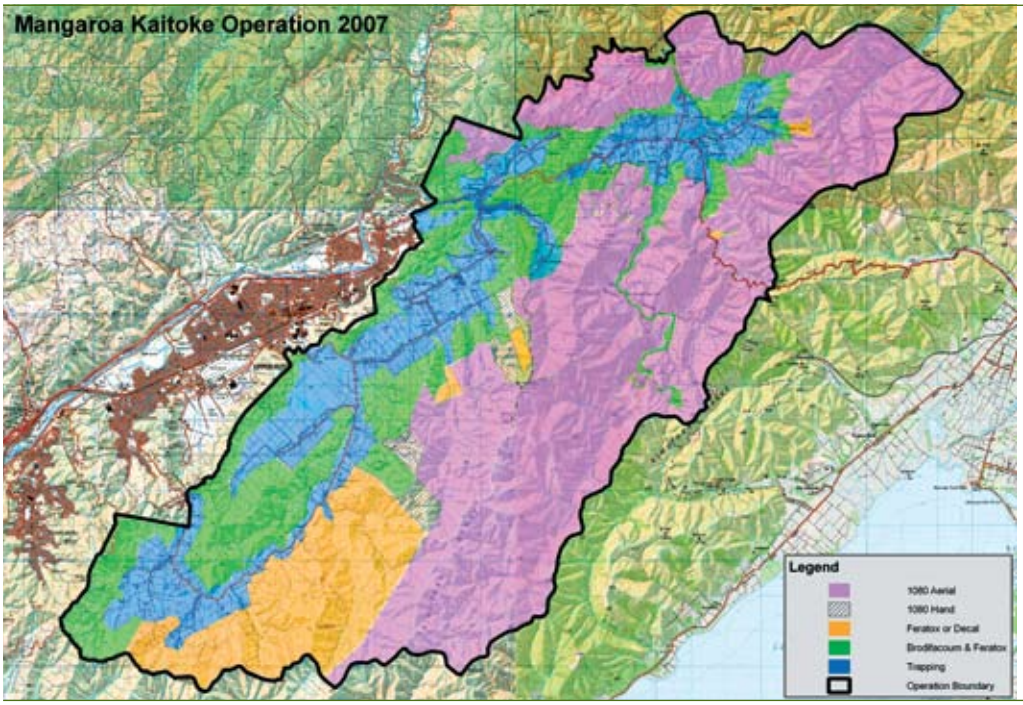
The options for control of possums

Possum control is carried out using a variety of techniques.

Trapping and shooting are long-established methods of controlling possums. They have traditionally formed the basis for the possum fur industry and, more recently, the possum meat industry. All AHB and many Department of Conservation (DoC) pest management operations are open to tenders using these control approaches.



This graph from the Animal Health Board was used by the Board to show how increased expenditure on possum control has reduced the number of herds infected by bovine Tb.



The Mangaroa Kaitoke pest control operation near Wellington is a good example of how aerial drops of 1080 are used in conjunction with trapping and ground-laying of other poisons to combat possums.

Another method of ground control of possums is laying bait that contains 1080 or various other poisons. Ground control is generally used on more accessible terrain where possum numbers are low, as a follow-up to aerial drops or at the borders of sensitive areas such as next to a farm or near water to complement aerial application.

In certain areas the most – in some cases the only – effective approach to possum control is through the aerial application of baits coated with 1080. Aerial dropping allows it to be delivered to steep or inaccessible areas and to places with thick vegetation. This technique is typically used to kill large numbers of possums quickly as the start of an ongoing pest management operation. 1080 is currently the only poison approved for aerial application against possums on the mainland.

While poisons are currently the preferred option for most possum control in New Zealand, each poison has its own advantages and disadvantages.

Brodifacoum kills possums more slowly than other poisons and its tendency to bioaccumulate (build up in organisms) is a major drawback because it would require restrictions to hunting within a drop area to be increased. Phosphorus is seen as less humane than other poisons. Pindone is less persistent in the environment than brodifacoum, but it is also less effective. Cyanide is highly dangerous to human beings compared with 1080 and other poisons.

1080 is top of the applicants' preferred list because it is suitable for aerial use and can quickly kill large numbers of possums over large areas or in areas that are hard to access.

Poisons are applied in a number of forms. 1080 is applied aerially in the form of cereal pellets or mixed with carrots (coloured green or blue, to reduce visual attractiveness to birds). In bait stations it takes the form of cereal bait, paste or gel.

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The reassessment of 1080

What is 1080?

The pesticide 1080 is a manufactured chemical compound called sodium fluoroacetate, chemical formula FCH2COONa. It is also known as sodium monofluoroacetate.

Fluoroacetate occurs naturally in some plants, particularly in Western Australia and South Africa, and seems to protect them against browsing animals. It kills by interfering with energy metabolism, leading to energy depletion, breathing problems and death by heart and central nervous system failure. It is lethal to many animals if they eat enough of it. Animals that consume a non-lethal dose generally recover within a short period of time.

1080 is manufactured in Alabama in the United States. New Zealand currently accounts for around 80 percent of global consumption. This is mainly because of its effectiveness against possums, the absence in New Zealand of the large populations of native land mammals found in other countries and the inaccessibility of some of New Zealand's bush areas.

When the technical grade (raw) 1080 product enters New Zealand it is converted to soluble concentrate and bait at factories in Wanganui, Waimate and Christchurch. The factories are owned and operated by a Crown-owned company, Animal Control Products. Carrot baits are usually prepared at the site of the operation by being coated with soluble concentrate.

1080 has been used in Australia for rabbit control since the 1950s and more recently for fox and wild dog control. The substance was first registered for use in New Zealand in 1964.

1080 is less persistent in the bodies of animals than other poisons, such as brodifacoum. It dissolves rapidly in water. In wet environments, 1080 residues disappear in one to four weeks. However, in dry or cold conditions it can take months to break down. Possums that eat a lethal dose of 1080 usually die within six to 18 hours.

Few harmful effects on human health have been identified from accidental exposure to 1080. Like all poisons, however, it must be handled carefully. A licence is needed to possess the poison, and formal permission is required to use it in most areas in New Zealand, especially on the conservation estate or where members of the public may have access to the treatment area.

1080 is highly toxic to dogs and deer. Dogs that feed on poisoned carcasses die, as do deer that eat 1080 carrots and cereal baits. While some see deer as a pest in some areas, hunters argue that the killing of deer in this way is cruel and unnecessary. Research suggests that 1080 can also kill birds but that this impact is minimal and has a short-term effect on the population. Likewise, no long-term effects appear to have been identified with regard to invertebrates.

As a precaution, New Zealand Food Safety Authority guidelines say that meat from wild animals taken from 1080 drop areas should not be eaten for four months after the drop, or two months after the operation has ended and 100mm of rain has fallen.

The application

In February 2002, the AHB applied to the Authority for a decision on whether there were grounds for a reassessment of 1080 and substances containing it.

A committee of the Authority decided in March 2002 that there were grounds for reassessment. These were:

- the large increase in the amount of 1080 being used and planned for use;
- the completion of significant research on 1080 since it was first registered in 1964; and
- considerable public concern about the use of 1080.

In October 2006, the AHB and the Department of Conservation (DoC) jointly submitted the formal application for reassessment of 1080. DoC is responsible for managing 30 percent of New Zealand's land area as conservation estate. Its brief is to protect these areas and, specifically, to protect New Zealand's indigenous biodiversity – that is, native plants and animals. DoC manages pest operations in its areas. The AHB carries out possum eradication operations nationwide – often through regional councils – aimed at stopping the spread of bovine Tb. Other programmes using 1080 are run from time to time by forestry interests and individual farmers.

In their application, DoC and the AHB sought approval for the continued use of 1080 for the control of possums and other pests, including rabbits, wallabies, rodents and stoats. The applicants wished to gain increased certainty over their future ability to use 1080 for aerial and ground operations and to respond to widespread public concern about the safety of 1080.

The applicants argued that 1080 is essential to controlling possums, which pose significant risks to farming (through the spread of bovine Tb) and to the environment (through predation of native plants and birds). They argued that there is currently no alternative to 1080 that is as affordable or effective, and emphasised the importance of being able to continue to use 1080 aerially.

Submissions

A central part of the process for reassessing a hazardous substance is to provide the opportunity for the public to make submissions.

The application for the reassessment of 1080 was publicly notified on 2 November 2006. In response to requests from several submitters for more time to prepare submissions, the deadline was extended until 31 January 2007.

A total of 1406 public submissions were received on the 1080 application, many of which were either against the use of the poison or requested increased restrictions. Some submissions, such as that from the Environmentally Safe Pest Control group, represented the views of many individuals. Organisations such as the Deerstalkers' Association, the RAHCs and the Royal Forest and Bird Protection Society put in multiple submissions through their various branches.

Staff at ERMA New Zealand prepared an Evaluation and Review (E&R) Report on the application. This analysed the information provided in the application and the science around 1080, and canvassed the issues associated with its use. The E&R Report is accessible on ERMA New Zealand's website (www.ermanz.govt.nz/news-events/focus/1080/index.html).

Opposite : One major reason possums are poisoned is to stop them spreading bovine tuberculosis to the nation's livestock herds.

The E&R Report served as a background document for the Authority's decision-making Committee charged with making the determination about the future use of 1080. Submitters were invited to respond to the recommendations in the E&R Report during public hearings held at seven different locations around New Zealand over the period 14–25 May 2007.

In making its final decision, the Committee considered the application, all written submissions, oral presentations made at the hearings, the E&R Report and the report produced by ERMA New Zealand's Māori Advisory Committee. The Committee also drew on the advice of a number of experts who were appointed because of their specialist knowledge and experience in areas such as tikanga Māori, ethics and animal welfare, agricultural economics, ecotoxicology and ecology.

The public hearing

The holding of multiple, nationwide hearings was a first for ERMA New Zealand and the Authority's most extensive public hearing process to date. More than 150 individuals and organisations, as well as the applicants and ERMA New Zealand's Māori Advisory Committee, made oral presentations at the hearings.

The hearings demonstrated the high level of public interest in the application and the strong division of opinion surrounding the use of 1080. Those who spoke at the hearings represented a broad range of New Zealanders. The opinions expressed about 1080 ranged across the full spectrum of views.

A number of regional animal health committees submitted that 1080 was essential as a tool for possum control because of its effectiveness, particularly through aerial application, in controlling bovine Tb. Regional councils and Local Government New Zealand also argued for its continued use on those grounds.

The Royal Forest and Bird Protection Society and some of its local representatives told the Committee that 1080 was essential for protecting and increasing populations of native birds and for improving the condition of forests.

Others arguing in favour of continued 1080 use included farming groups and individual cattle and deer farmers, including some who had suffered from the impact of herds infected with bovine Tb and from the destruction of pastures because of overwhelming rabbit populations. Many submitters expressed support for 1080 as a means of improving forest health and spoke of increased bird numbers following 1080 drops.

A number of presenters, however, called either for 1080 to be banned or for its use to be heavily restricted. Aerial operations were the most common target of those opposing the continued use of 1080, with many submitters complaining of a lack of care and accountability in this method of use. Poor communication between some users of 1080 and local communities was a recurring theme of these submissions.

Opponents of the aerial use of 1080 included a number of deerstalkers and pig hunters, who spoke about the damage being done to deer and wild pig populations. Other submitters argued that 1080 was a threat to human health and challenged the adequacy of research into its health and environmental impacts.

Dog owners were well represented at the hearings, with some submitters describing the death of their own dogs following an aerial drop of 1080. Some submitters argued on animal welfare

grounds that 1080 was an unnecessarily cruel way to kill possums and inflicted a similarly cruel death on dogs. Other submitters said 1080 was killing unacceptable numbers of native birds and spoke about observing "silent forests" after a 1080 drop.

Presentations from Māori, both groups and individuals, spanned the spectrum from strong opposition to the use of 1080 to support for its continued use as an effective pest management tool. Many recognised that, for the long-term protection of taonga (treasured Māori possessions), pest species like possums had to be controlled or eradicated. However, a consistent theme from Māori submitters was the need for earlier and more meaningful engagement with agencies and other users, at both a strategic and an operational level. They felt that the involvement of Māori in the early stages of developing pest and conservation management strategies would ensure that cultural requirements were appropriately taken into account. The Committee heard about examples of this in action, including the Tūwharetoa Māori Trust Board, the Lake Taupo and Lake Rotoaira Forest Trusts, Te Rūnanga o Ngāi Tahu and Te Ao Mārama Incorporated.

The views expressed at the hearings were representative of the wide-ranging public debate that has occurred in New Zealand since 1080 was first used. At the extremes, these views represent differing world views and a sharp philosophical divide. The issue generates strong emotion on both sides of the debate. The Committee was, however, impressed by the quality of presentations and the respectful behaviour shown by all who attended the hearings. There was a pleasing willingness to allow all concerned to have their say, whatever their views. Many people had travelled long distances, often at personal inconvenience and cost, to express their views in person. The thought and work that had gone into submissions and presentations alike was a striking and encouraging feature of the consideration. The Committee is deeply grateful to all those who took the time and made the effort to provide it with either information or opinions.

Māori interests

Sections 6(d) and 8 of the Hazardous Substances and New Organisms Act 1996 (HSNO Act) require that decision making under the Act takes into account the relationship of Māori to the environment and the principles of the Treaty of Waitangi (Tiriti o Waitangi).

ERMA New Zealand is supported by a Māori Advisory Committee, Ngā Kaihautū Tikanga Taiao, which is responsible for providing advice and assistance on applications. Ngā Kaihautū provided a report on the application for reassessment of 1080 and formally presented this at the public hearing.

The applicants conducted national consultation with Māori prior to lodging their formal application with ERMA New Zealand to canvass Māori opinion and obtain information on any issues or concerns posed by the continued use of formulated substances containing 1080.

In addition, ERMA New Zealand hosted a hui on 1080 for its Māori National Network in November 2006 to consider the issues raised.

Iwi/Māori groups and individuals involved in the applicants' consultation, the ERMA New Zealand hui and the submissions process together expressed a broad range of views, from passionate opposition to proactive support. However, one clear and consistent theme evident throughout the feedback provided by iwi/Māori was a desire to improve their effective engagement with pest and conservation management organisations and agencies in decision making relating to 1080 operations.

The 1080 decision

The 1080 reassessment decision in summary

The Committee, having considered all the evidence before it, has decided to allow the continued use of the pesticide 1080. Although there is a degree of commonality in the existing controls for both ground and aerial application, the Committee has decided to put in place additional controls on aerial application because of the higher levels of risk involved in this method of pest management.

For the most part, ground operations using 1080 seem to be well managed, and many of the new controls differ little from those already in place. The Committee has, however, put the applicants and other users on notice that a tighter management regime is required for aerial drops of 1080. There are four main elements in this:

1. establishing a watch list, and requiring reports on aerial 1080 operations to be provided to the Authority to enable active monitoring of all future 1080 aerial operations;
2. strengthening existing controls to further mitigate the risks involved in 1080 aerial drops;
3. promoting best practice in relation to pre-operation planning, consultation and notification as well as the management of 1080 aerial operations; and
4. recommending that further research be undertaken both into alternatives to 1080 for pest control and where there remains a lack of knowledge – and a degree of public concern – about the effects of 1080.

The controls – which are compulsory on all users of 1080 – incorporated in the Committee's decision include:

- the requirement for all people who possess 1080 to obtain a controlled substances licence to show that they are a 'fit and proper' person, and for all users of 1080 to be trained in its safe use and management;
- the requirement to notify immediate neighbours of any 1080 operations and the use of explicit signage warning the public, including dog owners, about areas where 1080 has been used, with signs to remain in place for six months after an operation, or until baits are removed or baits and carcasses are shown to be non-toxic;
- tighter restrictions on aerial applications, including the requirement to notify the public of such applications;
- notification to the Authority of any changes to the type or formulation of baits so that the Authority can be sure there is no significant change in the risks of using the changed substance;
- requirement for better consultation with local iwi and/or hapu groups where they may be affected by 1080 aerial drops; and
- to give effect to the watch list, a report is to be provided to the Authority on all aerial 1080 operations, which covers consultation, incidents and any information on post-operation monitoring. The Authority will review these reports carefully and report annually on the information collected.

Opposite : A kaka feeds on southern rata.

The Committee has also made a series of recommendations in relation to 1080 use. These cover further research into the effects of 1080 and the use of alternatives, and improvements in current management practices, including improved public consultation and better engagement with Māori.

A full list of the main controls for using 1080 and the Committee's recommendations is given later in this document.

Weighing the benefits, costs and risks of 1080

The benefits of using 1080 are considered first, followed by the risks and costs. Benefits, costs and risks are considered in terms of the factors laid out in section 6 of the HSNO Act. Discussion then follows showing how the Committee weighed up the benefits, costs and risks, taking into account the proposed new 1080 management regime.

1080: the benefits

The Committee noted the following significant benefits that accrue from the use of 1080 to control possums and other pests. Other possible benefits were identified, but were considered to be less significant. These less significant benefits are discussed later in this document.

Benefits for the environment:

- protection of vulnerable plant species from browsing by pests;
- the native ecosystem is likewise protected;
- retaining the capacity to create predator-free offshore islands;
- reduced predation of some native birds;
- reduced competition for food supply for native birds;
- reduced predation of, and food supply competition with, native bats, lizards and frogs;
- protection of native invertebrates from food competition and predation; and
- protection of native land snails from predation.

Benefits for Māori:

- positive impact on tikanga and mātauranga Māori;
- protection of taonga species and resources from browsing by pests; and
- protection of iwi/Māori economic interests.

Benefits for society and communities:

- reduced concern about native ecosystem degradation;
- farming communities benefit from the reduced incidence of bovine Tb; and
- enhanced enjoyment of recreational activities that rely on healthy forests and native biodiversity.

Benefits for the market economy:

- reduced loss of livestock to bovine Tb;
- reduced risk of bovine Tb to overseas market access and continued consumer demand for meat and dairy produce;
- reduced costs to individual farmers and government from disease and pest control;
- removal or relaxation of restrictions on livestock movements; and
- reduced competition for grazing from pest species (primarily rabbits).

1080: the costs and risks

The costs and risks associated with using 1080 are collectively referred to as adverse effects, in contrast to the beneficial effects discussed above.

The Committee identified the following significant adverse effects that may result from the use of 1080. Other possible adverse effects were considered to be less significant, taking into account the new management regime. These less significant adverse effects are discussed later in this document.

Adverse effects on the environment:

- effects resulting from any accidental spill of packaged 1080 products during manufacture and transportation;
- effect on native birds exposed directly to 1080 baits or pellets; and
- effect on native bats, frogs and lizards exposed directly to 1080 baits or pellets.

Adverse effects on human health and safety:

- possible adverse health effects from exposure to 1080 of people working with the poison.

Adverse effects on Māori:

- negative impacts on tikanga and mātauranga Māori;
- possible undermining of the roles and responsibilities of kaitiaki (guardians);
- negative impact on the physical and spiritual health and wellbeing of Māori caused by any compromise or contamination of traditional food sources or healing practices; and
- negative impact on the economic development potential of iwi/ Māori.

Adverse effects on society and communities:

- loss of opportunity to hunt because of reduced deer and pig populations;
- anxiety resulting from disagreement between pest control agencies and the hunting community about the best way to manage pests; and
- concern for the welfare of target and non-target animals exposed to 1080.

1080: benefits weighed against costs and risks

The environment

The Committee found that the continued use of 1080 has significant benefits for New Zealand's environment. These benefits would not be fully realised if the use of 1080 were restricted to ground-based operations only.

In terms of native plants, few submitters disputed the benefits of 1080 in controlling pests to protect native plants and biodiversity. Many submitters gave accounts of their personal experience of seeing the bush recover after 1080 use. The Committee found that, while plants can take up 1080 from the soil, there were no adverse effects on the plants.

Some submitters expressed concern about the deaths of native birds, bats, insects, frogs and lizards attributed to aerial drops of 1080.

Other submitters, however, attested to the increase in bird populations after 1080 drops had reduced pest numbers. Radio tagging of birds showed that few were killed during the 1080 operations surveyed. Even when birds were killed, the weight of evidence pointed to the overall recovery of populations.

While some submitters felt that 1080 use had increased predation of native species, others argued that its use had led to increased breeding success among native birds.

The Committee found no evidence of native bats being harmed by 1080 and considered the effects of 1080 on insect populations to be minor and localised. It noted there was little evidence of adverse effects on frogs and lizards.

The Committee concluded that well-managed aerial operations posed a low risk to the native environment and to indigenous biodiversity if 1080 was used in compliance with the controls and best practice guidelines. It also saw ground baiting as presenting little risk to the native environment and indigenous biodiversity.

The new controls to be placed on 1080 will require those using it to notify the Authority of any changes in the type of bait to be used or adjustments to the formulation of bait. This

Possums feeding on kiekie fruit.

acknowledges the concerns of some submitters that birds and other non-pest species could be more attracted to some types of baits than others.

The Committee concluded overall that the protection and regeneration of native flora and fauna were greatly assisted by the use of 1080 through aerial application.

The Committee found no scientific evidence that 1080 had adversely affected aquatic species or persisted in water. It saw the risk of 1080 being dropped into water as being minimised by recent reductions in the amount of bait being used and the use of global positioning system navigation equipment in aircraft. However, because the likelihood remains that on occasions 1080 will be dropped in water, the Committee recommended that further laboratory tests be carried out on the degradation rate of 1080 in water in order to provide additional assurance on this point.

Regarding soil, the Committee noted the concern of some submitters about the possible effect of 1080 on micro-organisms in the soil, especially in dry, cool conditions. It acknowledged that there was little research available on the persistence of 1080 in such soil conditions and recommended that further research be done in this area.

Human health and safety

The Committee saw only minor benefits to human health and safety through reductions in the risk of human infection from bovine Tb.

In terms of risks to human health through either direct exposure during the manufacturing of 1080 formulations or the application of bait (particularly during loading of aircraft), the Committee felt that these risks could be managed through adherence by users to the controls. The Committee highlighted the need for all those using 1080 to carefully follow the control requirements for personal protective equipment and to adhere to the requirements of the relevant Department of Labour guidelines.

The Committee paid close attention to the risks associated with transporting 1080 around the country. It heard few expressions of concern about the transportation of 1080 or 1080 bait, although some submitters expressed concern about the effect of a major spill. The Committee concluded that, while there might be some localised effect, no significant wider effect was likely to result from a spill because of the biodegradability and water solubility of 1080.

Regarding risks to human health through either direct exposure, water contamination or via food (wild animal meat, in particular), the Committee acknowledged the high level of concern expressed by a number of submitters. In relation to direct exposure to bait, poisoning surveillance statistics from the National Poisons Centre indicate that cases of humans suffering harm from 1080 operations in New Zealand are very rare. Accidental poisoning risk can, in the Committee's view, be managed adequately by users adhering to the controls on the use of 1080, which include providing effective signage to mark drop and ground baiting sites and the publicising of aerial operations.

In respect of drinking water, the involvement of local Medical Officers of Health where there is possible contamination of public drinking-water supplies or other risks to health does, in the Committee's view, provide an adequate safeguard as well as an avenue for any local concerns to be addressed. Regarding exposure via food (wild meat or plants, in particular), the Committee's view is that the public consultation measures to be introduced, including those for iwi/Māori, the use of controls such as signage and restrictions on the sale of feral deer meat, will address the concerns raised.

Relationship of Māori to the environment

The Committee considers effective pest management to be critical to the protection and enhancement of New Zealand's native species and ecosystems. The Committee also recognises that the uniqueness and value of New Zealand's natural environment depend heavily on the cultural context within which it rests, including the vast experiential knowledge system developed around it.

The Committee considers that the continued use of 1080 aerially is critical to the continuing achievement of conservation and resource management outcomes important to iwi/Māori. The Committee is sympathetic to the expressed desire of some iwi/Māori organisations to be able to continue using the most effective tools available for the protection of taonga.

The Committee heard expressions of opposition from a number of Māori to the use of 1080. However, there was also a level of reluctant acceptance among many Māori that, at this stage, 1080 is the best tool available for protecting taonga species of native birds and plants.

Some submitters expressed concern that the use of 1080 undermined traditional knowledge and the kaitiakitanga (guardianship) role of protecting and enhancing the natural environment. In general, Māori submitters were concerned that they were not sufficiently involved in the decision-making processes either at the strategic or operational level.

Other Māori submitters considered the continued use of 1080 as being vital to the long-term security of taonga species and provided information about the positive results of successful operations. They noted that the more involvement they had in the development and implementation of operations, the more beneficial the outcome was overall.

The Committee considered these issues within the context of the Treaty of Waitangi (Tiriti o Waitangi), noting that the three principles of partnerships, participation and protection were relevant. At the partnership level, the Committee is encouraging agencies to review the options for stronger Māori involvement in the development and decision making for pest and conservation management strategies. The Committee also believes that the early and meaningful participation of Māori in the planning, implementation and monitoring of 1080 operations is important and has put in place controls aimed at ensuring that this occurs. In terms of protection, the Committee notes the expressions of grievance outlined by submitters about the possum (and other) pest problem, but considers that the efforts of agencies like DoC and the AHB are addressing the need to actively protect Māori interests.

Society and communities

Submitters were sharply divided on the social and community effects of 1080. Some considered that 1080 improved the health of native ecosystems, while others argued the exact opposite. Likewise, some considered that the use of 1080 improved the country's clean, green image by protecting native ecosystems, while others held that its widespread use damaged this image.

With regard to other community/societal factors, the Committee considered that the gains to farmers from removing possums as a bovine Tb vector were a significant benefit of 1080.

The Committee considered concerns in relation to hunting, domestic pets (especially dogs), animal welfare, the integrity of water supplies, the general use of poisons in New Zealand and the impact of 1080 on New Zealand's clean, green image.

Hunters from around the country made their views on the impact of 1080 use known to the Committee. Deerstalkers in particular were strongly opposed to the continued use of 1080 because of the damage it did to deer populations and the hunting industry, the restrictions it placed on hunters' access to favoured spots and the inhumane way that deer can die when poisoned by 1080.

The Committee acknowledged the strong interest that hunters had in the 1080 issue and the extensive use they make of New Zealand's bush. However, it also heard such counter views as:

- deer eat new undergrowth in forests, slow the process of reforestation and are considered by one of the applicants to be a problem in some areas;
- the total feral deer range is 6.7 million hectares, of which only 1.5 million hectares are subject to control using 1080; and
- the restrictions on feral deer meat apply only for a limited time of several months during a period of around six years, which is the typical current gap between 1080 drops.

Overall, the Committee concluded that the adverse effects of 1080 on hunting, while of concern, were not sufficient to justify a ban on aerial drops of the poison. The Committee did, however, acknowledge that the by-kill of deer could significantly affect the hunting potential of any given area, and that hunters had put forward a persuasive case for more extensive use of deer repellent. Stronger engagement between users of 1080 and the hunting community is needed to clarify the issues and policies at play. The Committee also recommends that users consult with relevant hunting groups prior to undertaking aerial 1080 operations in hunting areas.

The Committee also notes that the Minister of Conservation has recently convened a panel of stakeholders, including the New Zealand Deerstalkers' Association, to look at how to manage deer, chamois, thar and pigs in a way that improves the conservation of native habitats but also recognises the importance of the four species to recreational hunters.

A number of submitters told the Committee about their grief at the loss of family pets or working dogs through 1080 poisoning. Dogs are particularly susceptible to 1080 and need to be kept out of drop areas. Owners also need to be vigilant that dogs do not get access to dead or dying possums. The Committee acknowledged the very real distress caused by watching a pet or working dog die from 1080 poisoning. It considered that the risk of this could be minimised through the use of improved signage and publicity. The Committee was told that antidotes are now available to treat dogs poisoned with 1080. It will also ask users of 1080 to carefully assess the possibility of possum carcasses remaining toxic when deciding on the periods for public exclusion from 1080 areas.

The Committee acknowledged the animal welfare concerns of some submitters. However, it also noted that there is work being done to better avoid risks to non-target species and to ensure the application of lethal doses to target species.

The Committee heard a number of complaints relating to the effect of toxic substances on water supplies and the general environment. It considered that concerns about the former could be alleviated by improved community understanding of 1080 operations and the limits placed on them.

Market economy

In economic terms, the Committee accepted that the use of 1080 contributed significantly to helping the AHB meet its targets under the National Pest Management Strategy for eradicating

bovine Tb. Losing access to 1080 would increase risks to market access and consumer demand in the dairy and meat sectors, including venison. It would also lead to increased pest control costs for individual farmers, both in terms of costs associated with controlling bovine Tb and those associated with removing pests, such as rabbits, that compete with farm stock for grazing. Losing access to 1080 would also increase pest control and government agency costs for vector and disease costs associated with bovine Tb.

The Committee noted that the benefits to be gained from using 1080 varied depending on whether it was able to be used aerially or solely via ground control. It accepted that increased benefits ensued from aerial drops, mainly because of the ability to cover large areas quickly and achieve a high 'knock down'.

The Committee accepted the applicants' views that, if they were restricted to ground control methods, the longer-term benefits of using 1080 would not be realised and the costs of pest control would continue to rise in the foreseeable future.

A number of working dogs have died from 1080 poisoning. The Committee noted that, while farmers acknowledged the risk to working dogs, they were also aware of the appropriate measures to take to protect dogs. Again, improvements in consultation and notification procedures for aerial operations should help, as should the monitoring programme for aerial 1080 operations.

Some submitters expressed the view that overseas markets would be worried about contamination of New Zealand meat products by 1080. The Committee concluded that such contamination was unlikely because of the exclusion of livestock and restrictions on the sale of feral deer meat from 1080 areas.

Regarding the impact of 1080 on the possum fur and emerging possum meat industries, the Committee noted that most aerial 1080 operations were in isolated areas where possum trapping for the fur trade was uneconomic. It doubts that the number of possums available to the fur trade would decline so far as to make the industry non-viable. The Committee encourages 1080 users to work with the fur industry to ensure trappers and shooters are given maximum opportunity to participate in pest control programmes.

Conclusion

Overall, the Committee concluded that the benefits of using 1080 outweighed the adverse effects. It considered that the benefits would not be fully realised if the use of 1080 were restricted to ground operations only.

The Committee considered that the adverse effects of using 1080 could be managed adequately, provided it was applied on the ground in accordance with the controls. However, its aerial use did raise the risk of additional adverse effects. Hence, the Committee tightened the controls further for aerial operations.

The changes fall into two main categories – controls and recommendations. The controls are mandatory requirements, while the recommendations are improvements that the Committee wants to see made and will be actively monitoring by means of the watch list. Some of the controls are new, while others are enhancements of existing controls.

Opposite : Defoliation by possums in Waikato.

The new management regime for 1080

The importance of engagement

The Committee attributes some of the concern surrounding aerial drops of 1080 to poor communication and consultation on the part of a few users. The Committee's recommendations and controls are aimed at improving this situation.

Improved public information programmes will help to reduce public concern in this regard. Such communication, along with better signage and media advertising, especially around aerial 1080 operations, should ensure that the public knows what is going on and is well informed about the risks involved and the preventive measures to be taken to avoid such risks.

Improved communication with hunters in particular is needed to break down the barriers that, in the Committee's view, have emerged between users of 1080 and deerstalkers and pig hunters. Regular and constructive dialogue between users and hunters should lead to the latter being able to influence possum control methods in specific areas.

The Committee encourages the users of 1080 to establish a best practice model of communication and consultation. Such an approach might include the following features:

- start talking to people early in the process;
- consult widely so that no one with a concern is left out;
- include community representatives in the decision-making process;
- explain risks to the public in such a way as to address all concerns;
- present material to the public simply and clearly;
- answer the public's specific concerns; and
- focus on building relationships with the community, including special interest groups.

If required, any future reassessment of 1080 will be greatly assisted by the implementation of the reporting requirement to be put in place by ERMA New Zealand. This will, in effect, constitute a watch list. The Authority will issue a report each year on all aerial 1080 operations, including comments and complaints from the public.

Moreover, the research recommended by the Committee will help to ensure that in the event of a future reassessment the Authority will have access to comprehensive and reliable information about the effects of 1080.

Mandatory controls

The main controls now imposed on 1080 are as follows:

- The use of the pure active ingredient of 1080, sodium fluoroacetate, is restricted to research and the development and manufacture of 1080 products. This means that 1080 can be used only in approved formulations.
- Signs marking areas where 1080 is used must contain a statement warning the public, including dog owners, about the danger from possum carcasses. This must be readable from a distance of 10 metres.
- Signs must remain in place for six months after a 1080 operation or until the earlier of either the retrieval of the bait or demonstration that the bait and carcasses are no longer toxic.

- No application rate is placed on the ground-based use of 1080, but the maximum application rate for aerially dropped 1080 is 30 grams of 1080 per hectare.
- Peanut-based 1080 pastes can be used only in contained ground bait stations. This is because it is attractive to native bats and its attractiveness to other native species has not been tested. For similar reasons, fish paste and polymer gel blocks are also restricted to contained ground bait stations.
- Carrot baits for aerial dropping or ground use (except when used for rabbit control) must be of a specified minimum size. This is because smaller pieces tend to increase the chances of non-target species eating the bait. Some carrot chaff (very small bits) is allowed, but the amount is restricted.
- Any changes to the composition or proposed use of 1080 formulations must be notified to the Authority in writing. This is because changes in formulations, bait size, colour, etc could change the risk profile of the bait and endanger non-target species.
- Ministry of Health permission is required before using 1080 in a water catchment area or in areas where there may be a risk to the public.
- Department of Conservation permission is required before using 1080 on the conservation estate.
- Anyone selling, supplying or using 1080 must have a controlled substances licence.
- In the case of an incident, such as a spill or usage error, the relevant regional council and the Authority must be informed, along with others.
- The packaging of 1080 formulations must allow for individual packages to be uniquely labelled in order for it to be able to be traced in the event of an incident.
- In the case of ground-based 1080 operations, owners and occupiers of land or dwellings immediately next to the target site must be given sufficient prior notification of the operation, including details such as location of the operation, approximate date and the name and nature of the substance to be used. This notification is to be repeated closer to the time of the operation.
- In the case of both ground control and aerial drops of 1080, neighbours must be informed, but in the case of aerial drops the public must also be informed by way of newspaper advertisements.
- Aerial operations require the decontamination of aircraft and loading sites once the drop has been completed.
- Aircraft involved in aerial 1080 operations must use a navigational guidance system (e.g. differential GPS) to ensure the accuracy of drops.
- Post-operation reports are to be submitted to the Authority on all aerial applications of 1080. These are to cover public notification and consultation, complaints received about the operation, any incidents that occurred and the outcome of any post-operation monitoring. These reports will be summarised in an annual report from the Authority. This requirement will take effect from 1 January 2008.
- Those using 1080 aerially must consult in good faith with local iwi/hapu. This recognises the principles of the Treaty of Waitangi (Tiriti o Waitangi) and seeks to ensure the role of Māori as kaitiaki is protected. This will be implemented through permissions granted for 1080 use under the Hazardous Substances and New Organisms Act.

Recommendations

The Committee further recommends that:

- additional research be undertaken into alternatives to the use of 1080;
- further research be carried out on the use of 1080, such as methods of application and application rates;
- further research be carried out on the effects of 1080, including:
  - its persistence in soil and water; and
  - effects on taonga species, traditional Māori medicinal plants and valued foods.
- public consultation processes be further improved;
- management practices around aerial drops of 1080 be standardised around best practice to ensure consistency; and
- agencies review their policies and processes relating to the involvement of Māori in the planning and implementation of pest management programmes.

A bellbird with a tui.

Appendix : ERMA New Zealand's decision-making process

This appendix explains the legal basis for the findings of the 1080 reassessment decision-making Committee and the process and principles used to reach its decision.

ERMA New Zealand and the HSNO Act

The Committee comprised four of the eight members of the Environmental Risk Management Authority: Neil Walter (Chair), Professor George Clark, Dr Manuka Henare and Ms Helen Atkins.

The Committee was constituted under the Hazardous Substances and New Organisms Act 1996 (HSNO Act). This legislation sets up and controls the operations of the Authority. The Authority is supported by the staff of ERMA New Zealand.

ERMA New Zealand effectively comprises four parts: the Authority, which makes statutory decisions under the HSNO Act; ERMA New Zealand staff; the Māori Advisory Committee, Ngā Kaihautū Tikanga Taiao; and an Ethics Advisory Panel.

ERMA New Zealand receives and processes applications to bring hazardous substances and new organisms into the country. It is also empowered to reassess substances already in New Zealand.

Reassessments of substances can be undertaken either in response to external applications or at the initiative of ERMA New Zealand's Chief Executive. The 1080 reassessment is in the former category.

The principles behind HSNO Act decisions

The HSNO Act established certain principles on which the Authority and ERMA New Zealand generally are required to base their processes and decisions.

Section 4 says the purpose of the Act is:

… to protect the environment, and the health and safety of people and communities, by preventing or managing the adverse effects of hazardous substances and new organisms.

Section 5 identifies two core principles:

- the safeguarding of the life-supporting capacity of air, water, soil and ecosystems; and
- the maintenance and enhancement of the capacity of people and communities to provide for their own economic, social and cultural wellbeing and for the reasonably foreseeable needs of future generations.

Section 6 identifies six matters that must be taken into account in administering the Act:

- the sustainability of all native and valued introduced flora and fauna;
- the intrinsic value of ecosystems;

- public health;
- the relationship of Māori and their culture and traditions with their ancestral lands, water sites, waahi tapu, valued flora and fauna, and other taonga;
- the economic and related benefits and costs of using a particular hazardous substance or new organism; and
- New Zealand's international obligations.

The Act further requires that those making decisions under it shall take into account "… the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects" (section 7). This is commonly referred to as the 'precautionary approach'.

In making decisions under the Act, the Authority is required to act in accordance with a prescribed methodology. The Methodology was established in 1998 by Order in Council after extensive consultation with stakeholders and provides a consistent approach to the Authority's decision making under the Act.

The reassessment process, submissions and hearings

The Authority must first find that a reassessment is warranted. Having determined that a reassessment is appropriate, the Authority then appoints a committee. It is this committee that formally considers the application and makes the final decision.

Public notification involves advertising the application, which is usually done in major newspapers, through the ERMA New Zealand website and by issuing a media release. The advertising must invite public submissions and let people know how they can get access to the application.

Submitters are given the option of being heard in person as well as making a written submission. If any submitter requests to appear in person, a public hearing must be held.

As part of the process, ERMA New Zealand staff produce a report on the application and written submissions (as noted above in section 2), which may contain recommendations for the committee. Oral submitters are entitled to comment on this Evaluation and Review Report at the hearing.

At the hearing, the applicant(s) get an opportunity to outline their application for the benefit of the committee and submitters. Submitters then speak in turn. Members of the committee are entitled to ask questions of applicants and submitters.

The committee is entitled to ask for further information from applicants and submitters in order to clarify any points made or issues raised. This happened often during the 1080 hearings, with all the extra information being posted on the ERMA New Zealand website (www.ermanz.govt.nz/news-event/focus/1080/index.html).

The committee is required to make its decision on the application within 30 working days after the conclusion of a hearing, but the Authority has the ability to extend this deadline if it is warranted. This was done in the case of the 1080 reassessment because of the complexity of the application, the weight of evidence presented and the issues raised by submitters.

ENVIRONMENTAL RISK MANAGEMENT AUTHORITY

ERMA New Zealand

NGĀ KAIWHAKATŪPATO WHAKARARU TAIAO

THE REASSESSMENT OF 1080