

Environmental Risk Management Authority Decision

Application for the Reassessment of a Hazardous
Substance under Section 63 of the Hazardous
Substances and New Organisms Act 1996

Name of Substance(s): Sodium Fluoroacetate (1080)
and Formulated Substances Containing 1080

Application Number: HRE05002

August 2007

Chair's introduction

The reassessment of 1080 for use in pest control is the largest and most challenging exercise ever undertaken by ERMA New Zealand.

The application was some 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.

Our decision is to approve the continued use of 1080 but to apply more stringent controls, including a mechanism for monitoring future aerial drops. We also recommend more research into alternative methods of possum control, further studies on the impact of 1080 and improvements in the overall management of aerial drops.

Public opinion is deeply divided on the continued use of 1080. 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 hand, the aerial application of the poison 1080 is seen by many to impose unacceptable risks. Many 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 the absence of any better options 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 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 aerial drops of 1080 to current possum control programmes. We also took into account the considerable improvements made by the principal users in recent years 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 our 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 for research into the adverse effects of 1080, our appeal for more 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. Aerial drops of 1080, which account for most of its use in New Zealand, 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 more research be undertaken into alternative methods of possum control.

The Committee wishes to place on record its gratitude to all those who took the time and trouble 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. We believe that the hearings have helped clarify a number of misunderstandings as well as contribute to a better informed public debate on 1080.

Neil Walter
Chair
Environmental Risk Management Authority

Wellington
13 August 2007

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1. Summary of decision

Date signed 13 August 2007

Application Code	HRE05002
Application Type	Application for the reassessment of a hazardous substance under section 63 of the Hazardous Substances and New Organisms Act 1996 (the Act)
Applicants	Animal Health Board (AHB) and Department of Conservation (DoC)
Date Application Received	18 October 2006
Hearings held	14–25 May 2007
Considered by	A Committee of the Environmental Risk Management Authority (the Authority)
Purpose of the Application	Reassessment of sodium fluoroacetate (1080) and formulated substances containing 1080 (a vertebrate toxin). The applicants wish to continue to use 1080 for the control of possums, wallabies and rabbits, and for targeted by-kill of rodents and mustelids (mainly stoats).

- 1.1.1 Application HRE05002 to import, manufacture and use sodium fluoroacetate (1080) and formulated substances containing 1080 in New Zealand is approved with controls in accordance with the relevant provisions of the Hazardous Substances and New Organisms (HSNO) Act, the relevant regulations made under the Act and the HSNO (Methodology) Order 1998.
- 1.1.2 The controls imposed are part of a new overall management regime which involves three main elements:
- the establishment of a watch list which will include the requirement for information on aerial 1080 operations to be provided to the Authority;
 - the strengthening of existing controls and addition of new controls to further mitigate the risks involved in aerial 1080 operations; and
 - improvements in pre-operation planning, consultation and notification and in the actual management of aerial 1080 operations.

2. Background to the use of 1080 in New Zealand

2.1 The introduction of possums and other pests into New Zealand

- 2.1.1 Brush-tailed possums were introduced from Australia in 1837 in an attempt to start a fur trade, but they have since multiplied to the point where they are probably now the country's number one pest. The 1080 reassessment application records their destructive impact on native plants and birds.
- 2.1.2 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 and spread this contagious disease around cattle and deer herds. It has been estimated by the applicants that if bovine Tb is not controlled it could cost the country up to \$5 billion over 10 years.
- 2.1.3 As well as possums, stoats, ferrets and rats have flourished in the favourable conditions in this country. They 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.
- 2.1.4 New Zealand is unique in having no native ground-dwelling mammalian carnivores, the only native mammals being two species of bat. Birds such as kiwi, weka, and takahe have evolved here with little fear of attack and have 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.
- 2.1.5 The poison 1080 was first approved for use in New Zealand in the 1960s in order to control a number of introduced pests that were having a severe effect on New Zealand's environment and agricultural production. 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.

2.2 Environmental damage caused by possums

- 2.2.1 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 tall 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.
- 2.2.2 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 vulnerable. 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 competition for their food sources (flowers, fruits and leaves).

2.3 Bovine tuberculosis

- 2.3.1 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, in the lungs and other organs. The disease is usually detected before it leads to death.
- 2.3.2 New Zealand has had a national eradication campaign underway against bovine Tb since the 1970s. Currently the Government provides funding in the order of \$87 million per year 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 animals, milk or diseased carcasses. The risk of human infection with bovine Tb is minimised by the pasteurisation of milk.
- 2.3.3 Bovine Tb constitutes an economic risk because it can create negative perceptions among overseas consumers about the quality of New Zealand milk and meat. It also has the potential to trigger market access restrictions. New Zealand is a signatory to the Office Internationale 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.
- 2.3.4 New Zealand's National Pest Management Strategy sets a target of 99.8% of cattle and deer herds being free of bovine Tb for a continuous 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% 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 Board. In most parts of the country, Regional Councils organise the actual vector control work.
- 2.3.5 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, ie groups of wild animals that carry Tb where the disease is sustained in the population by continual re-infection.

- 2.3.6 Wild animals are responsible for around 90% of new herd infections. Bovine Tb can infect most mammals but possums, and in some areas ferrets, are the main culprits. Possums are vulnerable to bovine Tb and the disease quickly becomes infectious in them. The 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% of the country. Stoats are also recognised as a key Tb vector.

2.4 The options for control of possums

- 2.4.1 Possum control is carried out using a number 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 DoC operations are open to tenders using these approaches.
- 2.4.2 Another method of ground control of possums is laying bait containing 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 of New Zealand the most – in some cases the only – effective approach to possum control is through the aerial application of baits coated with 1080. Aerial dropping of 1080 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 strategy. 1080 is currently the only poison approved for aerial application against possums on the mainland.
- 2.4.3 While poisons are currently the preferred option for most possum control in New Zealand, each poison has its own advantages and drawbacks. Brodifacoum kills possums more slowly than other poisons and its tendency to bioaccumulate (build up in organisms) is a major drawback as it would require longer hunting restrictions. 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.
- 2.4.4 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.
- 2.4.5 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. On the other hand, 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 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.

2.5 What is 1080?

- 2.5.1 1080 is a manufactured chemical compound called sodium fluoroacetate, chemical formula FCH_2COONa . It is also known as sodium monofluoroacetate. Fluoroacetate occurs naturally in some plants, particularly in Western Australia and South Africa, and seems to protect those plants 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 which consume a non-lethal dose generally recover within a short period of time.
- 2.5.2 1080 is manufactured in Alabama in the United States. New Zealand currently accounts for around 80% of the global consumption of 1080. 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.
- 2.5.3 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 main manufacturer is a Crown-owned company, Animal Control Products Limited. Carrot baits are usually prepared at the site of the operation by coating with soluble concentrate.
- 2.5.4 1080 has been used in Australia for rabbit control since the 1950s and has been used in that country 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 in 6 to 18 hours.
- 2.5.5 Few harmful effects on human health have been identified from accidental exposure to 1080. Like all poisons, however, 1080 must be handled carefully. A licence is needed to possess the poison and formal permission is needed to use it in most areas, especially on conservation estates or where members of the public may have access to the treatment area. 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.

3. The reassessment of 1080

3.1 The application

- 3.1.1 Sodium fluoroacetate (1080) was first assessed and registered for use in New Zealand in 1964 and subsequent registrations of products containing 1080 referenced the original data. Sodium fluoroacetate (1080) and formulated substances containing 1080 were transferred to the HSNO regime in June 2005 and November 2004 respectively, with essentially the same conditions that applied under previous legislation. Sodium fluoroacetate (1080) and the formulated substances containing 1080 are therefore currently approved substances under the Act.
- 3.1.2 In February 2002, the Animal Health Board (AHB) applied to the Authority for a decision on whether there were grounds for a reassessment of 1080 and substances containing it. The AHB is the national body set up by the Government to combat bovine tuberculosis.
- 3.1.3 A Committee of the Authority decided in March 2002 that there were grounds for reassessment. These were:
- a significant 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
 - significant public concern about the use of 1080.
- 3.1.4 In October 2006, the AHB and DoC jointly submitted the formal application for reassessment of 1080. DoC is responsible for managing 30% of New Zealand's land area as conservation estate. Its brief is to protect these areas and, more specifically, to protect New Zealand's indigenous biodiversity – ie native plants and animals. DoC manages pest operations in its areas. 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.
- 3.1.5 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 greater certainty over their future ability to use 1080 for aerial and ground operations and to respond to widespread public concerns about the safety of 1080.
- 3.1.6 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 aurally.

3.2 Legislative basis for the application

- 3.2.1 The application for the reassessment of sodium fluoroacetate (1080) and formulated substances containing 1080 was lodged pursuant to section 63 of the Act and, as required under that section, deemed to be an application made under section 29 of the Act. As required under section 63, sections 29 and 54–61 of the Act apply, as do the additional matters referred to in Part II of the Act. Unless otherwise stated, references to section numbers in this decision refer to sections of the Act.
- 3.2.2 Consideration of the application followed the relevant provisions of ERMA New Zealand’s decision-making Methodology established under section 9 of the Act. Unless otherwise stated, references to clauses in this decision refer to clauses of the Methodology.

3.3 Appointment of Committee

- 3.3.1 The following members of the Authority were appointed¹ to consider the application (in accordance with a delegation under section 19(2)(b)): Mr Neil Walter (Chair), Professor George Clark, Dr Manuka Henare and Ms Helen Atkins.

3.4 Timeline

- 3.4.1 The timeline for the application was as follows:

Table 3.1: Timeline for the application for the reassessment of 1080

Action	Date
Application formally received	18 October 2006
Application publicly notified	2 November 2006
Public submissions closed	31 January 2007
Evaluation and Review Report circulated	27 April 2007
Hearings held	14–25 May 2007

3.5 Time limits and waivers

- 3.5.1 Under section 59, the Committee waived the statutory time limits three times:
- The submission period was initially due to close on 14 December 2006. In response to several requests to provide submitters with additional time to prepare submissions, the Committee extended the submission period until 31 January 2007. This was publicly notified through a press release and publication in the four main daily newspapers and the Waikato Times on 11 November 2006.

¹ By resolution of the Authority.

- The requirement to fix a hearing date within 30 days after the closing date for submissions was waived, pending finalisation of the Agency's² review of the application. Hearings were subsequently held between 14–25 May 2007 (see section 3.12 below).
- Given the high public interest in the reassessment of 1080 and the need for the Committee to carefully consider the wide range of views and weigh all the information carefully, the requirement for the Authority to publicly notify its decision no later than 30 working days after the conclusion of the hearing was waived.

3.6 Ministerial call-in

- 3.6.1 The Minister for the Environment was advised of the application on 1 November 2006 (section 53(4)(a)) and given the opportunity to 'call-in' the application under section 68. This action was not initiated.

3.7 Agencies notified

- 3.7.1 In accordance with section 53(4)(b), government departments and Crown entities (as listed in Appendix S to the Evaluation and Review (E&R) Report) were advised of the application and given the opportunity to comment or make a submission.
- 3.7.2 Three government departments were identified as having a specific interest in the application and were provided with a copy of the application (excluding the confidential information (composition details on the 1080 formulations) but with the opportunity to access this if necessary). These government departments were the New Zealand Food Safety Authority (Agricultural Compounds and Veterinary Medicines Group), the Ministry of Health and the Department of Labour.
- 3.7.3 Other government departments and Crown agencies were provided with a copy of the application summary.

3.8 Public notification

- 3.8.1 The application summary was also sent to interested parties who had indicated that they wished to be notified of this type of application (listed in Appendix S to the E&R Report).
- 3.8.2 In accordance with section 53, the application was publicly notified on the ERMA New Zealand website and advertised in the Dominion Post, New Zealand Herald, Christchurch Press, Otago Daily Times and Waikato Times on 1 November 2006. The extension to the submission period was notified in the same five newspapers on 11 November 2006.

² The Agency is the executive arm of ERMA New Zealand which provides support to the Authority.

3.9 Māori interests and concerns

- 3.9.1 Sections 6(d) and 8 of the HSNO Act require that decision making under the Act takes into account the relationship of Māori and their culture and traditions with their ancestral lands, water, and other taonga³ as well as the principles of the Treaty of Waitangi (Tiriti o Waitangi).
- 3.9.2 Accordingly the applicants conducted national consultation with Māori prior to lodging their formal application with ERMA New Zealand to canvass Māori opinion and obtain information about issues or concerns posed by the continued use of formulated substances containing 1080.
- 3.9.3 In addition, ERMA New Zealand hosted a hui on 1080 for its Māori National Network in November 2006 to consider the issues raised.

3.10 Evaluation and Review (E&R) Report

- 3.10.1 The E&R Report was compiled by a project team made up of staff from the Agency with input from external experts contracted to provide advice on various aspects of the application. The purpose of the E&R Report is to assist and support the Committee's decision-making. Amongst other things, it consolidates and evaluates relevant information in a format and sequence consistent with the decision-making requirements of the Act and the Methodology.
- 3.10.2 The Agency's project team comprised the following members of staff:

Name	Title
Andrea Eng	General Manager, Hazardous Substances
Janet Gough	Senior Policy Analyst
Sue Scobie	Senior Advisor, Hazardous Substances
Jim Waters	Senior Advisor, Hazardous Substances
Nicola Reeves	Advisor, Hazardous Substances
Robin Toy	Manager, Reassessments
Michael Morris	Manager, Legal & Risk
Linda Robinson	General Manager, Māori

- 3.10.3 The E&R Report was externally peer reviewed by Dr Abdul Moeed and reviewed and signed off internally by Dr Donald Hannah, General Manager, Strategy & Analysis.

³ A taonga is anything considered valuable or precious to Māori and can be tangible or intangible. A more full description of taonga (as it pertains to this decision) is provided at paragraph 6.4.2 below.

- 3.10.4 As well as requesting further information from the applicants, additional information was requested from and supplied by:
- Dr Mark Fisher, Ethics and Animal Welfare, Kotare Bioethics;
 - Professor Ross Cullen, Agricultural and Resource Economics, Professor of Resource Economics at Lincoln University;
 - Stuart Ford, Agricultural Economics, The AgriBusiness Group;
 - Dr Peter Fisk, Ecotoxicologist, Peter Fisk and Associates.
- 3.10.5 The additional information in the form of reports received from these consultants is appended to the E&R Report as indicated above.
- 3.10.6 The Authority also appointed Dr Richard Sadleir, ecologist and expert on vertebrate pest management and Mr James Doherty, a highly respected kaumatua of Ngāi Tuhoē and an acknowledged expert on tikanga Māori to provide the Committee with expert advice in their respective areas of expertise. Both Dr Sadleir and Mr Doherty attended all the hearings and provided advice to the Committee as required, but did not participate in the subsequent consideration of the application by the Committee.

3.11 Information available for the consideration

- 3.11.1 The Committee had available for its consideration the application (including confidential appendices), the E&R Report (including published errata), the Ngā Kaihautū Tikanga Taiao (Ngā Kaihautū)⁴ report, and the written submissions and additional information provided by submitters prior to the hearings. During the hearings the Committee considered the evidence presented, and the additional information provided, by the applicants, ERMA New Zealand staff, Ngā Kaihautū and submitters.
- 3.11.2 In accordance with clause 35(b) the Committee invited the applicants to comment on the cost-effective application of the controls to achieve a specified level of risk management. The Agency met with the applicants on 6 June 2007 to discuss the cost-effective application of the proposed controls and sought further written responses on the proposed controls on 13 July 2007.
- 3.11.3 The Committee is satisfied that it had sufficient information, both relevant and appropriate to the risks, costs and benefits of the substances to enable it to consider the application (clause 8).

⁴ Ngā Kaihautū Tikanga Taiao is formally established as a Māori advisory committee under Part 4A of the Act to provide advice and assistance to the Authority as sought by the Authority on matters relating to policy, process and applications under the Act (section 24B).

3.12 Public consultation

Submissions

3.12.1 A total of 1406 public submissions were received on the 1080 application, with 259 submitters indicating that they wished to be heard in support of their submission at a public hearing. 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. Summaries of the submissions received are set out in Appendix T to the E&R Report.

The public hearings

3.12.2 In accordance with section 60 and clause 2(b), hearings were held on the following dates and at the following locations:

Date	Location
14–15 May 2007	The Otago Museum, 419 Great King Street, Dunedin
16–17 May 2007	The Commodore Airport Hotel, 449 Memorial Avenue, Christchurch
18 May 2007	The Rutherford Hotel, Trafalgar Square, Nelson
21 May 2007	The Spencer on Byron Hotel, 9–17 Byron Avenue, North Shore, Auckland
22–24 May 2007	Le Grand Hotel, 237 Victoria Avenue, Hamilton
24 May 2007	Pohara Marae, Oreipunga Road, Arapuni, Hamilton
25 May 2007	St James's Theatre, 77–87 Courtney Place, Wellington

3.12.3 Holding 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 Ngā Kaihautū Tikanga Taiao, made oral presentations at the hearings.

3.12.4 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.

3.12.5 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.

3.12.6 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.

- 3.12.7 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 due to overwhelming populations of rabbits. Many submitters expressed support for 1080 as a means of improving forest health and spoke of increased bird numbers following 1080 drops.
- 3.12.8 On the other hand, many presenters 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, many submitters complaining of a lack of care and accountability in the aerial use of 1080. Poor communication between some users of 1080 and local communities was a recurring theme of those submissions.
- 3.12.9 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 environmental impact.
- 3.12.10 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. Others said 1080 was killing unacceptable numbers of native birds and spoke about observing “silent forests” after a 1080 drop.
- 3.12.11 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, 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.
- 3.12.12 The views expressed at the hearings were representative of the wide-ranging public debate that has occurred in New Zealand ever 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 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. The Committee was also impressed by the quality of presentations. Many people had travelled long distances, often at some 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.

4. Sequence of the consideration

- 4.1.1 In accordance with the Methodology, and as outlined in the Decision Path used by the Committee (set out in Appendix E), the approach to the consideration adopted by the Committee was to:
- review the available information (clause 8);
 - establish the hazard classifications for each substance and derive the default controls that are prescribed under section 77 for each classification;
 - identify potentially significant risks, costs, and benefits (covered by clauses 9 and 11);
 - assess the potentially significant risks and costs (risks were assessed in accordance with clause 12, and costs in accordance with clause 13) using recognised techniques (clause 24). The adequacy of the default controls, prescribed under section 77 was considered alongside the assessment of risks and costs to determine whether those controls should be varied and identify where additional controls need to be applied, under section 77A, to mitigate any unacceptable risks;
 - consider all the risks and costs and determine whether the individual risks and costs (when combined) are negligible or non-negligible;
 - review any non-negligible residual risks and determine whether the decision should follow clause 26 or clause 27;
 - establish the approach to risk with respect to the individual non-negligible risks in accordance with clause 33;
 - consider (a) whether any of the non-negligible risks could be reduced by varying the controls in accordance with sections 77 or 77A, and (b) the cost-effectiveness of the application of controls in accordance with clause 35 and sections 77 and 77A;
 - assess the benefits associated with this application in accordance with clauses 9, 11, 13 and 14 and section 6(e);
 - taking into account the risk characteristics established under clause 33, weigh up the risks, costs and benefits in accordance with clause 26 or clause 27 and clause 34 and section 29 taking into account aspects of uncertainty (clauses 29, 30 and 32) and determine whether the application should be approved or declined; and
 - confirm and set the controls.

5. Ethical considerations and international obligations

5.1 Ethical considerations

- 5.1.1 In preparing this decision, the Committee has taken into account the ERMA New Zealand ethics framework. This framework was developed as a tool to assist in the ERMA New Zealand decision-making process in terms of:
- asking the ‘right’ questions in order to identify ethical issues that need to be considered; and
 - using the answers to those questions to explore how ethical considerations should be addressed.
- 5.1.2 The foundation of the framework is a set of ethical principles, supported by procedural guidelines and standards. The two general principles embodied in the Act and the Methodology are:
- respect for the environment; and
 - respect for people (including past, present and future generations).
- 5.1.3 Under these general principles lies a set of specific principles which includes concern for animal welfare, concern for co-operation, concern for cultural identity, concern for sustainability and concern for peoples’ wellbeing.
- 5.1.4 The primary mechanisms for supporting the principles outlined in the framework and for evaluating whether or not they are upheld are the procedural standards associated with a fair decision-making process, namely:
- honesty and integrity;
 - transparency and openness;
 - a sound methodology; and
 - community and expert consultation.
- 5.1.5 In its consideration, the Committee has been mindful of the criteria in the procedural standards listed above, and has reviewed all of the information made available to it in the context of the principles and procedural standards. The Committee has been respectful of the views expressed by the applicants and submitters.
- 5.1.6 The Committee has used the framework to help analyse ethical dilemmas such as where submitters express opposing beliefs about effects of 1080.
- 5.1.7 The Committee notes that many of the ethical issues raised in submissions focused on animal welfare (target and non-target species). An additional ethical consideration raised by both those in favour of 1080 and those concerned about the use of 1080 was associated with people’s autonomy to pursue environmental and economic goals.

5.2 International obligations

- 5.2.1 The applicants contended that 1080 was required to enable New Zealand to meet requirements of obligations associated with animal health, biodiversity and conservation. The Committee agrees that 1080 and formulated substances are tools that may assist New Zealand to meet these types of obligations by protecting animal health and the natural environment, although it notes that there is no requirement under these agreements for specific tools to be used.
- 5.2.2 The Committee has also considered a range of international trade obligations and other obligations relating to chemicals management (listed in section 7.7.1 of the Agency's E&R report). It has concluded that the importation, manufacture and use of 1080 and formulated substances containing 1080 do not impact on any international obligations in these areas.

6. Treaty of Waitangi (Tiriti ō Waitangi)

6.1 Introduction

- 6.1.1 All persons exercising powers and functions under the Act are required (under section 8) to take into account the principles of the Treaty of Waitangi (Tiriti ō Waitangi). This obligation therefore applies not just to the Authority, but also to other agencies exercising powers under the Act, such as DoC and the Ministry of Health when granting permissions for the use of 1080 under section 95A of the Act.
- 6.1.2 The “principles” of the Treaty have evolved to reflect the underlying mutual obligations and responsibilities which the Treaty placed on the parties. There is no exhaustive list of principles, rather Courts and the Waitangi Tribunal have made it clear that they continue to evolve as the Treaty is applied to particular issues and new situations. With this in mind, when reviewing the issues raised by this application, the Committee has focused its attention on the generally accepted principles of partnership, participation and protection.

6.2 Principle of Partnership

- 6.2.1 The principle of partnership emphasises the shared obligation on both the Crown and Māori to act reasonably, honourably and in good faith towards each other. It is often regarded as the overarching tenet from which other key principles have been derived. The Courts have found that it is inherent in the Crown’s obligation to act in good faith and that it is obliged to make informed decisions on matters affecting the interests of Māori.
- 6.2.2 Many iwi/Māori submitters referred to their rights as partners under the Treaty to be included much earlier in the process of the agenda setting and decision making for pest and conservation management strategies. This was mainly expressed by way of concerns that, overall, efforts to involve iwi/Māori in these processes relating to the use of 1080, had not been “good faith” efforts in line with Treaty expectations. Of the iwi/Māori submitters, many felt they were either involved too late in the process (ie at an operational level only once the decision to go ahead with the operation had been made) or not at all.
- 6.2.3 Ngā Kaihautū noted in its report that “as the kaitiaki of natural resources within their regions and as Treaty of Waitangi partners, the equitable partnership with Māori is considered critical to successful future pest management”.
- 6.2.4 Of the submissions received, the Committee notes particularly that Tuwharetoa Trust Board, the Lake Taupo and Lake Rotoaira Forest Trusts, and Te Rūnanga o Ngāi Tahu provided information about the existence of Memoranda of Understanding or other such mechanisms for the formal recognition and provision of partnership. In each case these agreements recognise and provide for the iwi/Māori organisations kaitiakitanga, ownership and/or familial links to the taonga within their region. These

relationships have established a foundation for effective working relationships (discussed under the principle of participation below) and have enabled these groups to contribute as partners early in the development and approval of pest and conservation management strategies. The Committee notes however that these groups are relatively well established and recognised (for example, through legislation), and have the necessary resources with which to engage at this level. Other submitters contended that they were not able to actively pursue such relationships or agreements due to limitations in resource and capability.

6.2.5 Upon reviewing all the information available relevant to the principle of partnership, including the Agency's assessment,⁵ the Committee notes that other than those noted above there are overall insufficient mechanisms available for iwi/Māori involvement as Treaty partners in pest management decision making. It is the Committee's conclusion that significant improvements should be made, particularly by central and local government agencies, to involve iwi/Māori more at a strategic level when developing national and regional pest or conservation management strategies.

6.2.6 The Committee recommends that central and local government agencies with pest and conservation management responsibilities review their policies and provisions with regard to the early engagement of iwi/Māori at a strategic decision-making level.⁶ This engagement needs to provide for iwi and hapū groups regionally, reflecting the territorially based nature of iwi/Māori organisations. In terms of resource consents and conservancies, the identification of appropriate groups is more straightforward as Regional Councils and DoC generally have relationships with the various iwi/hapū groups within those areas. Other agencies or operators will also be able to utilise those networks. The Committee agrees with the conclusion of Ngā Kaihautū in their report on this reassessment that "the future development of such partnerships will mean that Māori have a voice in expressing means to mitigate the risks and enhance the benefits of 1080 use".

6.3 Principle of Participation

6.3.1 This principle, which is closely related to the principle of partnership, essentially requires that Māori be integrally involved in the management of activities of relevance and importance to them.

6.3.2 This issue was at the core of several of the iwi/Māori submissions noting that fulfilling the role of kaitiakitanga is a proactive responsibility requiring iwi/Māori input and participation from planning right through to operation. Ngā Kaihautū noted, when identifying key issues raised by Māori, that "local community involvement was seen as vital; as tangata whenua in each rohe have their own particular relationship with their natural resources, they will also have their own

⁵ Refer to E&R Report section 7.3.4.1.

⁶ Refer to section 11.7 below.

particular views on the use of 1080”. The Ngā Kaihautū report also noted that “such involvement was seen as needing to occur from the earliest stages of planning 1080 operations, with local Māori, in true partnership, involved in setting priorities and designing locally-appropriate pest control activities”. Many felt that in relation to the use and management of 1080 and pest management operations generally, the current regime did not provide for this requirement and that the efforts of the applicants were often less than genuine or adequate.

- 6.3.3 Overall, submitters expressed clearly and consistently that they were disappointed in the lack of early involvement of iwi/Māori in the operational planning, carrying out and monitoring of 1080 operations. In addition, they noted that where input had been provided, their contributions were not always valued or recognised as legitimate. Te Mana Taiao Trust went further, noting that this situation not only further alienated them from their traditional forests, native birdlife and other taonga, but also reinforced feelings of ‘dispossession’ within the iwi.
- 6.3.4 However, where genuine attempts to embrace and promote the Treaty principles have occurred, many Māori concerns have been satisfactorily addressed resulting in extremely positive outcomes. As noted in the previous section, the Lake Taupo and Lake Rotoaira Forest Trusts which manage about 50,000 hectares of Māori-owned land largely planted in commercial forestry, described the existence of such a relationship. The Trustees are responsible for ensuring the performance of the plantations, and protecting native and exotic flora and fauna, a key aspect of which is addressing the damage of pest species which threaten the future of the forests and birdlife. The Trusts have established good operational relationships with the region’s principal pest control operator (EPRO Ltd) and Environment Waikato, the Regional Council which undertakes operations on behalf of AHB. Through these relationships, protocols have been created that ensure meaningful and timely consultation, and that those proposing to use 1080 on Trust lands enter into any consultation in the spirit of good faith. In this way, the Trustees have been able to influence pest control activities and this has allayed many Māori landowner concerns about the risks of 1080.
- 6.3.5 Similarly, Te Ao Mārama Incorporated, representing Ngā Rūnanga Papatipu o Murihiku, provided information on the positive and mutually beneficial relationship developed with Crown agencies responsible for pest and conservation management in Southland. They noted that because of this relationship, Te Ao Mārama have been able to access research and other information on which to make fully informed decisions in relation to pest management operations. The good faith basis on which their relationship is based has also meant that they have been able to influence operations to ensure that cultural and other risks have been mitigated appropriately.
- 6.3.6 The most significant benefit of this type of relationship has been the better overall management of risks (including cultural) and improved outcomes in terms of the management of taonga species and resources. These submitters went further, adding that improved participation in the use and management of 1080 created positive flow-

on effects in terms of encouraging and empowering iwi/Māori groups toward other conservation and sustainable management outcomes. Though regional in their existence, the Committee considers these to be examples of practice which are consistent with the Treaty principle of participation.

- 6.3.7 Upon reviewing the information available, including the Agency's assessment,⁷ the Committee notes the extensive policy and procedural mechanisms established by DoC in order to provide for iwi/Māori participation, particularly with regard to aerial pest control operations. However, the lack of consistency within and among DoC conservancies and other vector management operators is a matter of concern. In addition, in relation to public and other lands not administered by DoC there is a notable variability in the mechanisms available for iwi/Māori to participate effectively in pest management decision making or operations.
- 6.3.8 To address these issues, the Committee seeks more effective consultation with iwi/Māori for aerial operations on public land and the conservation estate. This consultation should be conducted in accordance with best practice guidelines and implemented through the permissions process currently managed by DoC and the Ministry of Health.⁸
- 6.3.9 In addition, due to the high importance attributed by iwi/Māori to the protection of native species and ecosystems, the Committee recommends⁹ that DoC review the implementation of its consultation policy to ensure consistency across all its conservancies and operations.

6.4 Principle of Active Protection

- 6.4.1 Several iwi/Māori submitters noted the inter-generational nature of kaitiakitanga in protecting the environment and the cultural context surrounding it. Case law prescribes that the Crown take positive steps to ensure that Māori interests are actively protected. In the context of this reassessment, the Committee considers the protection of the environment and its associated cultural context, both of which are considered to be taonga, to be consistent with this principle.
- 6.4.2 The applicants have described at length the importance of being able to continue to use 1080 in seeking to protect not only New Zealand's natural environment but the economic benefits obtained from the pastoral and other sectors through bovine Tb control. Iwi/Māori submitters expressed concern about the devastating effect of pest species (such as possums, mustelids and rabbits) and noted that 1080 is an essential tool in the long term protection and enhancement of taonga species and ecosystems.

⁷ Refer to E&R Report section 7.3.4.2.

⁸ Refer to Additional Control 4, see paragraph 11.5.67.

⁹ Refer to section 11.7 below.

As noted earlier a taonga is anything considered valuable or precious to Māori and can be tangible or intangible.¹⁰

- 6.4.3 This support was tempered by many submitters' desire to see the development of equally effective and safer alternatives to ensure that, long term, the requirements of active protection can continue to be met. Several submitters also noted the significant improvements in operational practice and technology around the use of 1080 in recent years and were keen to support continued efforts in this regard.
- 6.4.4 The Committee acknowledges the important ancestral connection that iwi and hapū groups have to taonga, and the passion and commitment with which these groups continue to advocate for their protection. The Committee believes that the measures now taken by the Crown, including the continued, managed use of 1080, go some way towards providing for the active protection of taonga. The Committee also endorses the sentiments expressed by several submitters that continued efforts to research technological improvements and the development of safer and more effective alternatives to 1080 should be actively pursued by the Crown and users. This is reflected in the Committee's recommendation regarding ongoing research.¹¹
- 6.4.5 The Committee also notes the wealth of relevant research and other information available about the impact of 1080 on important species, and considers that significant improvement could be made in the communication back to iwi/Māori communities of the results and outcomes of such research. The Committee also notes that the applicants' efforts to involve iwi/Māori in the development of research programmes could be further improved to further ensure the active protection of taonga species and resources.

¹⁰ In terms of the evidence considered by the Committee a taonga may be possessions or resources such as farms, forests or businesses; land and mountains, waterways such as rivers, lakes, streams; an ecosystem; vegetation for food, such as watercress and rongoa species or medicinal plants; fresh water vertebrates and invertebrates, such as fish, tuna (eels), koaro, upland bullies and koura (fresh water crayfish); aquatic macroinvertebrate communities; trees such as rata; terrestrial plants such as rongoa or medicinal plants, pikopiko, karamuramu; native birds such as tomtits and white robins, and short-tailed bats; native terrestrial invertebrates such as weta, native lizards, skinks and frogs; feral meat such as pig and deer; matauranga (knowledge) and tikanga (principled practices/rituals); the mauri or life force, wairuatanga or spirituality.

¹¹ Refer to section 11.7 below.

7. Hazard classifications

7.1.1 The Agency has classified sodium fluoroacetate (1080) and formulated substances containing 1080. The Committee has adopted the Agency's classifications as set out in the following table:

Substance description and approval number	Trade name products	HSNO hazard classifications
Sodium fluoroacetate (1080) HSNO Approval Number: HSR002771	–	6.1A (oral), 6.1A (inhalation), 6.1C (dermal), 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2B, 9.3A, 9.4A
Soluble concentrate containing 200 g sodium fluoroacetate/litre HSNO Approval Number: HSR002427	1080 Solution Stock Solution 1080	6.1A (oral), 6.1A (inhalation), 6.1D (dermal), 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg HSNO Approval Number: HSR002424	0.15% 1080 Pellets 0.2% 1080 Pellets	6.1B (oral), 6.1C (inhalation), 6.8A, 9.1D, 9.3A
Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg HSNO Approval Number: HSR002423	0.1% 1080 Feral Cat Bait	6.1C (oral), 6.1C (inhalation), 6.8A, 9.1D, 9.3B
Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg HSNO Approval Number: HSR002422	0.04% 1080 Pellets 0.06% 1080 Pellets 0.08% 1080 Pellets 0.08% 1080 Rodent Pellets	6.1C (oral), 6.1C (inhalation) 9.1D, 9.3B
Fish paste containing 10 g sodium fluoroacetate/kg HSNO Approval Number: HSR002425	1.0% 1080 Wasp Paste	6.1B (oral), 6.8A, 6.9B, 9.1D, 9.3A, 9.4A
Apple-based paste containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: HSR002421	Pestoff Professional 1080 Possum Paste 0.15%,	6.1B (oral), 6.8A, 9.1D, 9.3A
Peanut-based paste containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: To be allocated	Pestoff Exterminator Paste (0.15%)	6.1B (oral), 6.8A, 9.1D, 9.3A
Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg HSNO Approval Number: HSR002420	Pestoff Professional 1080 Possum and Rabbit Paste 0.06% Pestoff Professional 1080 Possum Paste 0.08%	6.1C (oral), 9.1D, 9.3B

Substance description and approval number	Trade name products	HSNO hazard classifications
Polymer gel containing 50 g sodium fluoroacetate/kg HSNO Approval Number: HSR002418	5% 1080 Gel	6.1A (oral), 6.8A, 6.9B, 9.1A, 9.3A, 9.4A
Polymer gel containing 100 g sodium fluoroacetate/kg HSNO Approval Number: HSR002426	10% 1080 Gel	6.1A (oral), 6.1D (dermal), 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Polymer gel block containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: HSR 002419	No Possums 1080 Gel Bait	6.1B (oral), 6.8A, 9.1D, 9.3A

- 7.1.2 The Agency's hazard classifications agree with the applicants' hazard classifications with regard to toxicity, except that the Agency has not classified the 'gel containing 1.5 g sodium fluoroacetate/kg' as a class 6.5B contact sensitiser, as the component triggering this classification is present at a very low concentration.
- 7.1.3 The Agency's ecotoxicity classifications differ from the applicants for a number of substances for sub-classes 9.1 (aquatic toxicity), 9.2 (toxicity to the soil environment) and 9.4 (toxicity to terrestrial invertebrates) – these are explained in further detail in Appendix C of the E&R Report (pages 365, 388–389 and 428 respectively).
- 7.1.4 Under the Hazardous Substances (Classification) Regulations 2001 substances can be assigned an acute toxicity classification (class 6.1) according to different pathways of exposure, primarily oral, dermal or inhalation. There are controls assigned to the acute toxicity classification relating to controlling exposure through the various pathways, primarily around labelling and the use of personal protective equipment. There is no direct data available (LC₅₀ values) to classify sodium fluoroacetate (1080) and formulated substances containing 1080 as toxic by inhalation under HSNO. However the Committee notes that the expert view held by the Agency and other competent bodies is that sodium fluoroacetate (1080) dust is highly toxic if inhaled, and consider it appropriate that a 6.1 (toxic by inhalation) classification be assigned to sodium fluoroacetate (1080) and those formulated substances containing 1080 which are likely to generate dust or mist (and which can be inhaled) when used.
- 7.1.5 The substance descriptions have been amended from those substances currently approved because studies carried out have indicated that different bait formulations may alter the risks to non-target species, even though the hazard classifications of the substance remain unchanged. The Committee considers that it is appropriate for the paste containing 1.5g sodium fluoroacetate/kg to be split into two approvals covering apple-based paste and peanut-based paste.¹²

¹² Refer to paragraphs 11.5.31–11.5.35.

8. Current management regime

- 8.1.1 In section 6 (page 65) of the E&R Report the Agency listed the current controls applying to sodium fluoroacetate (1080) and formulated substances containing 1080. These controls were prescribed as part of the approval of these substances under the Act and the Agricultural Compounds and Veterinary Medicines (ACVM) Act 1997, and through requirements for resource consents under the Resource Management Act 1991.
- 8.1.2 The current controls under HSNO comprise the default controls assigned to the substances based on their hazardous properties, with variations and additions to these controls which were applied to these substances at the time of transfer from control under the Pesticides Act 1979 and Pesticides (Vertebrate Pest Control) Regulations 1983 to the framework of the HSNO Act. The Committee have reconsidered the appropriateness of these controls in managing the risks associated with these substances and in general have carried over the current controls. The full set of controls currently assigned to these substances are set out in tables 6.1, 6.2, 6.3, and 6.4 on pages 66–75 of the E&R Report.
- 8.1.3 The current controls were used as a reference point for the evaluation of the application by the Agency in the E&R Report and the risk assessment on the use of 1080 was carried out with the current controls in place.
- 8.1.4 The primary users of 1080 in New Zealand are DoC, AHB and Regional Councils. Each of these agencies has different objectives. AHB uses 1080 exclusively for possum control with a view to eradicating bovine Tb from wild animal populations. Both DoC and Regional Councils use 1080 to control possums but the control of rats and stoats is also very important. 1080 is also used to control other pests such as rabbits, wallabies and feral cats.
- 8.1.5 Regional Councils and DoC have statutory responsibilities for conserving biodiversity values but there are significant differences in the types of areas each agency manages. Regional Council responsibilities generally cover land which is close to urban areas and rural settlements and is therefore more accessible. DoC protection of biodiversity focuses on sustaining key forest ecosystems and protecting habitats of threatened species over large areas of land which are often remote and inaccessible.
- 8.1.6 Given these different objectives, it is not surprising that there are differences in approaches to pest control, both in the methods used and application. The Committee heard submissions which gave accounts of both good and poor management and operational practices, and which highlighted the inconsistencies in the way controls are implemented. These submissions gave the Committee an insight into what operational standards are achievable and should be adopted as best practice.

9. Assessment of the benefits

9.1 Summary

9.1.1 The Committee's view, set out in more detail below, is that the continued use of sodium fluoroacetate (1080) and formulated substances containing 1080 has significant benefits for New Zealand, particularly in relation to the environment and the market economy. These benefits would not be fully realised if the substances were not available or the use of 1080 were restricted to ground-based use only. The aerial application of 1080 is needed to target large areas of rugged and inaccessible terrain.

9.2 Introduction

9.2.1 The Committee reviewed the Agency's assessment in the E&R Report of the potential benefits associated with the use of sodium fluoroacetate (1080) and formulated substances containing 1080 in New Zealand, and discusses these in this section.

9.2.2 The potential benefits of the continued use of sodium fluoroacetate (1080) and formulated substances containing 1080 are identified in Table B1 in Appendix B.

9.2.3 A "benefit" is defined in regulation 2 of the Methodology as "the value of a particular positive effect expressed in monetary or non-monetary terms". Benefits that may arise from any of the matters set out in clauses 9 and 11 of the Methodology were considered in terms of clause 13.

9.2.4 In each case, the Committee's assessment includes a discussion of:

- whether the benefit is monetary or non-monetary (clause 13(a));
- an estimate of the magnitude of the benefit (clause 13(b)) and, where relevant, an assessment of the likelihood of occurrence (see Table B1 in Appendix B);
- consideration of the uncertainty associated with the estimate (clauses 29 (materiality of uncertainty), 30 (need for caution where not resolved) and 32 (range of uncertainty));
- the distributional effects over time, space and groups in the community (clause 13(c)); and
- explicit consideration of the uncertainty bounds and how uncertainty affects the assessment of the benefits (clauses 29 – materiality of uncertainty; and 30 – the need for caution where uncertainty is not resolved).

9.2.5 As a basis for assessing these benefits, the Committee has used the scenarios detailed by the applicants in pages 39–57 of the application and the Agency's analysis in section 7.5.6 of the E&R Report. The applicants and the Agency described two scenarios – the 'with 1080' scenario and the 'without 1080' scenario. The benefits

from the availability of 1080 are assessed where possible as the difference between the benefits available under the two scenarios.

- 9.2.6 The Committee notes that these scenarios are based on a ten year time horizon from 2005–2015. Beyond this time horizon it is difficult to estimate the size and likelihood of benefits. In some areas the expected benefits would undoubtedly be more significant over a longer period of time.

9.3 Environmental benefits

- 9.3.1 The Committee considers that extensive pest control measures are essential to ensure that the condition of New Zealand’s native ecosystems is maintained in order to ensure the ongoing survival of native and valued introduced species and the maintenance of indigenous biodiversity.¹³ The Committee notes that 1080 is the only tool currently available to achieve rapid and effective pest control in difficult terrain.
- 9.3.2 The Committee further considers that ground-based control alone is not sufficient to achieve the high level benefits which result from well-conducted aerial application of formulated substances containing 1080. Ground-based control places significant limitations on the areas able to be treated because of the time and resources involved.

Biodiversity benefits,¹⁴ of protecting vulnerable plant species

- 9.3.3 Few submitters disputed the benefits to vulnerable plants and New Zealand’s overall biodiversity from the use of 1080 to control possums – although some submitters did not consider aerial 1080 application to be an acceptable means of achieving protection of these plants.
- 9.3.4 The impact of other browsers, such as deer, on vulnerable plants was a point of contention. Some submitters considered that damage to vegetation resulting from deer browse was a significant issue; others tended to dismiss it as being of minor importance.
- 9.3.5 The Committee heard from a number of submitters directly involved in conservation activities regarding the increased flowering and vegetative growth of plants such as mistletoe following aerial applications of 1080. These submitters described work they had done to monitor the impacts of deer and other ground-browsing animals. They reported a lack of seedling regeneration on plots accessible to deer compared with plots which excluded them.
- 9.3.6 The Committee considers that sodium fluoroacetate (1080) and formulated substances containing 1080 provide a significant level of protection to vulnerable plants and

¹³ These measures are critical to ensuring the sustainability of native and valued introduced flora and fauna, and the intrinsic value of ecosystems (clauses 9(c)(i) and 9(c)(ii)).

¹⁴ Refer to E&R Report – Table 7.17 page 198 and Appendix F pages 526–530.

therefore make an important contribution to New Zealand's overall biodiversity. It further believes that this level of benefit would not be realised if 1080 were not available or if the use of the formulated substances containing 1080 were restricted to ground-based use only.

Protection of native ecosystems¹⁵

- 9.3.7 Some submitters disputed the adverse effects of pests browsing on New Zealand's overall ecosystem, citing effects of climate and other natural phenomena as the possible cause of observed declines in forest condition. Other submitters, however, described their personal experiences of ecosystem recovery following sustained control of possums and other browsing species. In particular, the Committee heard many observations of greatly improved flowering and fruiting of trees, such as rata, in the years following aerial operations. The applicants provided compelling evidence of the destructive impacts of pests, such as possums, on native vegetation.
- 9.3.8 The Committee is aware that there are significant complexities in monitoring changes in ecosystem condition because of the influence of natural events such as extremes of climate. The available vegetation monitoring data obtained in association with aerial 1080 operations does, however, support the applicants' assertions that native ecosystems benefit significantly from the reduction in browsing by introduced species.
- 9.3.9 The Committee is of the view that the high level of benefit to ecosystems and habitats would not be realised in the absence of the aerial application of 1080. Further, if the use of formulated substances containing 1080 were restricted to ground-based use only, large areas of the native ecosystems/habitats could be expected to undergo significant degradation over time.

Creation of predator-free zones

- 9.3.10 One of the applicants regarded the aerial use of formulated substances containing 1080 on offshore islands as an essential tool in the eradication of pests from these habitats. The Committee was told of the successful programmes undertaken on Kapiti and Rangitoto Islands using aerial 1080. Some submitters also highlighted the success of eradication efforts aimed at establishing 'mainland island' sanctuaries.
- 9.3.11 The Committee accepts that there are benefits from the use of 1080 to habitats on, and the removal of predators from, off-shore islands. While there is an alternative poison which can be applied aurally on off-shore islands (the anticoagulant brodifacoum), that substance carries higher risks of secondary poisoning of non-target species. If use of formulated substances containing 1080 were restricted to ground-based operations only, it would be considerably more difficult to achieve the necessary level of pest control.

¹⁵ Refer to E&R Report – Table 7.17 page 198 and Appendix F pages 526–530.

Reduced predation and competition for food and habitat

Native Birds¹⁶

- 9.3.12 Many submitters expressed concern at the level of predation of native fauna by pest species such as rodents, possums and mustelids. The Committee heard that aerial 1080 application is a necessary tool to treat large areas effectively. The applicants and some submitters noted the occurrence of secondary poisoning of mustelids from consumption of poisoned rodents and possums and the consequential benefits to native species from the decline in numbers of these animals after an aerial operation.
- 9.3.13 It was noted that aerial application of 1080 had to be well-timed with respect to the breeding/nesting periods of vulnerable species, otherwise the numbers of rodents in particular may rebound rapidly (within 3–6 months of an operation). Mustelid numbers also increase, but more slowly than rodents. Hole-nesting birds such as mohua, kaka and kakariki are particularly vulnerable on the nest, with predation of adult females leading to skewed sex ratios in some populations (ie more males than females). Well-timed pest control operations using 1080 have enabled breeding birds to fledge their chicks successfully, with subsequent overall increases in the bird population.
- 9.3.14 The Committee reviewed monitoring studies which indicated improved breeding success of native birds following timely aerial operations using 1080. It noted that large-scale treatment is generally needed to realise such benefits.¹⁷ The Committee recognised the need to control multiple predators (ie rodents, possums and mustelids) at the same time, particularly in years when mast seeding of beech and/or other plants occurs. The Committee notes that 1080 is the only available vertebrate pest control agent able to control multiple pest species.
- 9.3.15 The Committee considers that the continued use of 1080 brings the significant benefit of reduced predation of native birds (particularly threatened species). If the use of 1080 were restricted to ground-based control, some known isolated populations of highly threatened species could be protected. There would, however, be a significantly reduced possibility of enhancing these overall populations over larger areas without the aerial application of 1080.
- 9.3.16 The Committee heard many reports of the damage possums do to native plants which provide food for native birds. Possums and rodents also feed on invertebrates. The Committee was told that the impact of browsing animals on availability of food could result in reduced breeding success and even starvation of birds.
- 9.3.17 The Committee considers that the benefits of reduced competition for food for native birds, and particularly threatened species, are significant. These would not be realised in the absence of large-scale pest control using aerially applied 1080. Ground-based

¹⁶ Refer to E&R Report – Table 7.17 page 198 and Appendix F pages 509–510.

¹⁷ Refer to E&R Report – Table 7.17 page 199 and Appendix F pages 506–509 and 518–519.

control alone would not permit the management of pests over large areas to the extent necessary to reduce competition with native species.

Bats

- 9.3.18 The Committee was informed that possums have been observed preying on bats while roosting. Possums are also known to eat *Dactyloctenium* flowers which provide food (nectar) for short-tailed bats, and to feed on invertebrates, a key food for both short and long-tailed bats. Short-tailed bats are a key pollinator of *Dactyloctenium* and reductions in bat populations may indirectly affect the ongoing survival of this endangered plant. Both bat species are classified as endangered and, given their low reproductive rate, the loss of a few individuals from a population as a result of predation may have a significant impact. Monitoring of bats in relation to 1080 operations has not, however, identified any adverse effects on the populations of these animals.¹⁸
- 9.3.19 The Committee considers that native bat populations are likely to benefit significantly from reduced predation pressure and reduced competition for food where aerial applications of 1080 occur. If 1080 were restricted to ground-based use only, it would be possible to protect known roosting sites from predation using intensive pest control methods. However, it would not be possible to undertake adequate pest control across the larger foraging areas from which the bats obtain their food.

Native lizards and frogs

- 9.3.20 The Committee notes that while the benefits of the use of 1080 to native lizards and frogs have not been directly demonstrated, there is evidence that pests do prey on these species.
- 9.3.21 The Committee considers that the use of 1080 to kill pests such as possums is likely to yield benefits to these vulnerable native species. Ground control operations could protect known populations, but aerial operations are needed to provide for the more widespread maintenance and enhancement of habitat and food supply.

Native invertebrates¹⁹

- 9.3.22 Rodents, possums and wasps are known to feed on native invertebrates. While few specific studies have been undertaken to assess the impacts of mammalian species on terrestrial invertebrates, the Committee considers it likely that a reduction in the numbers of predators will benefit invertebrates. Studies have been undertaken on the effects of wasps on invertebrate abundance in beech forest, and the beneficial impact is significant.

¹⁸ Refer to E&R Report Appendix F page 521, Appendix N pages 749–752.

¹⁹ Including *Powelliphanta* snails; refer E&R Report Appendix F page 518.

- 9.3.23 The Committee notes that ground-browsing animals such as deer, goats and pigs impact on soil invertebrates through trampling and soil compaction. While some submitters suggested that predation of *Powelliphanta* snails increased after the aerial use of 1080, the Committee notes that the research indicated that populations of these threatened snails actually increased after such operations.
- 9.3.24 The Committee considers that benefits accrue to native invertebrates from the aerial use of 1080, as predator numbers need to be reduced over relatively large areas to minimise reinvasion. Ground-based control could be used to protect known locations of threatened species, but would not be effective in providing protection to more widely dispersed species.

9.4 Human health and safety benefits

- 9.4.1 The Committee notes that bovine Tb infection in humans occurs from contact with bovine Tb infected farmed animals or from consumption of unpasteurised milk from infected animals, rather than from contact with possums.
- 9.4.2 The Committee concludes that the benefit from the use of 1080 to reduce possum numbers and consequently the prevalence of bovine Tb infected possums, is small with respect to bovine Tb infection. The benefit applies to a very small number of people and does not persist over time. The benefit is, however, more likely to be realised from the use of 1080 by aerial application than through ground-based use of 1080
- 9.4.3 The Committee notes that the effects of possum numbers on protozoal infection rates are normally controlled by measures in place to protect public water supplies and that these infections often occur from sources other than possums.
- 9.4.4 Overall, the potential benefits to human safety and health of the continued use of 1080 are considered to be minor.

Reduced chance of contracting bovine Tb

- 9.4.5 Few submitters made any reference to the risk of human infection from bovine Tb. The New Zealand Society of Medical Officers of Health confirmed that the use of 1080 to control possums stood to reduce the existing risk of bovine Tb in humans, but noted that bovine Tb is not a disease of high public health significance. In its oral presentation, the Society stated that most human cases of bovine Tb arise from occupational exposures following close contact with infected farm animals on farms or at abattoirs, rather than from human contact with infected possums.
- 9.4.6 According to Ministry of Health sources, only a small percentage of Tb infections in humans are caused by bovine Tb. There are approximately 400 cases of tuberculosis infection (from all sources) in New Zealand each year, of which approximately 12 cases are bovine Tb. The applicants suggested that the continued availability of 1080 to control possums would further reduce the incidence of bovine Tb infections in humans due to reduction in numbers of infected cattle.

- 9.4.7 The Committee accepts that there is likely to be a minor benefit stemming from the reduced likelihood of bovine Tb infection in humans resulting from the continued availability of 1080 as a possum control method. Given that the prevalence of bovine Tb infection in herds is directly related to (Tb-infected) possum numbers, the Committee concludes that this benefit is more likely to result from the use of 1080 by aerial application than from the use of 1080 through ground-based methods alone.
- 9.4.8 The New Zealand Society of Medical Officers of Health did not refer in its submission to consumption of infected milk or dairy products as a potential source of bovine Tb infection, but one submitter stated that there have been no documented cases of infection from these sources. The beneficial effects are considered insignificant, as only raw (unpasteurised) milk can cause an infection.
- 9.4.9 To the extent that possum control reduces the prevalence of infected animals and herds, a benefit is likely to be achieved. Again, however, it is comparatively small. The Committee accepts that this benefit is more likely to result from the use of 1080 by aerial application than from the use of 1080 through ground-based methods alone.
- 9.4.10 The Committee was told that no transmission of bovine Tb from infected meat to humans had been demonstrated. Bovine Tb is destroyed at temperatures usually achieved during cooking of meat, and even uncooked infected meat is unlikely to cause infection.
- 9.4.11 The Committee notes that no submissions relating to this issue were received. It concludes that this benefit is unlikely to occur.

Reduced exposure to diseases and illness carried by pests

- 9.4.12 This issue was raised by the New Zealand Society of Medical Officers of Health. The Society indicated that use of 1080 to control possums in particular, and other pests to a lesser degree, is likely to reduce the incidence of protozoal illnesses, including giardia and cryptosporidium, in the human population. For people with a compromised immune system (for example, organ transplant recipients, people with HIV/AIDS, and people with hereditary immune abnormalities) such infections could be serious. Control of possums assists in reducing the contamination of source water.
- 9.4.13 In their discussion of this benefit, the applicants referred to a wider range of pathogenic organisms than just protozoal infections.²⁰ The applicants concluded it was only indirectly influenced by pest numbers and therefore only of small significance.
- 9.4.14 The Committee concludes the benefit is greater than the Agency's assessment,²¹ but is still relatively small.

²⁰ Refer to E&R Report section 7.5.2 page 201.

²¹ Refer to E&R Report section 4.1C page 225.

9.5 Benefits to Māori

- 9.5.1 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 depends heavily on the cultural context within which it rests, including the vast experiential knowledge system developed around it.
- 9.5.2 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 utilising the most effective tools available for the protection of taonga.
- 9.5.3 The Committee recommends that there be closer iwi/Māori participation in pest management programmes in order to ensure the maximisation of benefits.²² Providing for the recognition and use of iwi/Māori knowledge alongside that of contemporary scientific knowledge will benefit not only Māori but all New Zealanders.

Positive impact on tikanga and mātauranga Māori

- 9.5.4 Māori have a relationship that is inextricably inter-twined with the natural world, spanning centuries of observation and experience from which a distinctive and comprehensive body of knowledge and cultural practice has developed. At the very core of this body of knowledge is an understanding that within the natural world there is an intricate system of relationships (whakapapa) supported by mauri or life-giving principle. The maintenance of these relationships is vital to the health and wellbeing of the natural world and its ability to provide for future generations.
- 9.5.5 The Committee received evidence at the hearings that the introduction and establishment of possums, mustelids and other browsing pests into New Zealand had created an 'imbalance' which placed our unique biodiversity at risk. The pervasive damage caused to native flora and fauna species by these pests poses a significant threat to their ongoing survival. There are also flow-on effects to the critical relationships among species and to the maintenance and continued development of the unique body of Māori knowledge and practice concerning the natural world.
- 9.5.6 On reviewing information provided by the applicants,²³ submitters and the Agency,²⁴ the Committee concludes that the establishment of effective pest management strategies is critical if our native biodiversity and its associated cultural heritage-inspired knowledge system are to flourish for future generations. Several Māori submitters noted that although the use of toxic substances like 1080 was inconsistent with tikanga

²² Refer to paragraphs 11.7.6–11.7.8 et seq.

²³ Refer to Application section 4.3 pages 417–421.

²⁴ Refer to E&R Report section 7.5.3 pages 202–208.

Māori, it was nevertheless an important tool for pest management and generally safer than many other substances currently available. The Committee concludes that the continued use of 1080, including aerially, is important to the overall protection of our unique biodiversity and therefore has a considerable positive impact on the maintenance and development of tikanga and mātauranga Māori.

Protection of taonga species supporting the role of iwi/Māori as kaitiaki

- 9.5.7 As indicated above, submitters generally recognised that browsing pest species placed native ecosystems and species at risk, especially endangered species.
- 9.5.8 Several Māori submitters acknowledged the importance of effective pest management in their efforts to re-establish fully functional native ecosystems. In addition, they noted that the protection and enhancement of taonga species and resources was critical to the maintenance of their unique relationship with those taonga and to their role as kaitiaki.
- 9.5.9 Although several Māori submitters had strong reservations about the use of toxins in the environment, there was a level of acceptance amongst many that 1080 was the most effective tool available at this point in time. Some submitters, particularly those representing iwi with kaitiakitanga responsibility over large areas of whenua and the associated taonga, considered the continued use of aerial 1080 to be a critical tool in their ongoing protection and management.²⁵
- 9.5.10 The views expressed by submitters encouraging the continued use of aerial 1080 to support the efforts of kaitiaki in protecting taonga species was, however, tempered by calls for closer engagement of iwi/Māori throughout the process. The Committee agreed that Māori cultural benefits could be maximised if their experience and role as kaitiaki was better supported and provided for in the planning, implementation and monitoring of aerial operations.
- 9.5.11 As stated above in the discussion on the Treaty principles,²⁶ to address these issues the Committee requires more effective consultation with iwi/Māori for aerial operations on public land and the conservation estate. This consultation should be conducted in accordance with best practice guidelines and implemented through the permissions process currently managed by DoC and the Ministry of Health.²⁷

Protection of iwi/Māori economic interests

- 9.5.12 The Committee acknowledges that iwi/Māori are significant landowners whose substantial pastoral and forestry interests contribute significantly to New Zealand's economy. In addition, iwi/Māori are owners of, or shareholders in, large areas of land

²⁵ Refer to E&R Report page 202–205.

²⁶ Refer to section 6 above.

²⁷ Refer to Additional Control 4, see paragraph 11.5.67.

in native and commercial forestry and make up a high proportion of the forestry sector workforce, thus providing economic benefits to many individuals, organisations and communities.

- 9.5.13 The Committee heard from a number of iwi/Māori submitters about the importance of the ongoing use, including aurally, of 1080 to their continued economic viability. The issues raised, whilst similar to those raised by submitters in the pastoral and forestry sectors generally, seem to the Committee to reinforce the case for better consultative and management processes between iwi/Māori landowners or shareholders and organisations tasked with undertaking pest management operations.
- 9.5.14 The Committee also notes the flow-on effects to iwi/Māori involved in tourism and native ecosystem restoration programmes from the use of 1080 to reduce pest species damage.
- 9.5.15 Having reviewed all the available information, the Committee considers that the continued use of 1080, including aurally, carries significant benefits for the economic interests and future opportunities of iwi/Māori. Once again, the Committee acknowledges that these benefits can be best maximised if the iwi/Māori groups affected are closely involved in the planning, implementation and monitoring of aerial operations.

9.6 Benefits to society and communities

- 9.6.1 The Committee notes that the primary benefits to society and communities from the continuing use of 1080 stem from reduced concern about ecosystem degradation, reduced anxiety in farming communities about bovine Tb infection and increased enjoyment of recreational activities relying on a healthy forest habitat. The Committee concludes that these benefits require the aerial use of 1080 and that ground-based use of 1080 alone, would not fully realise the benefits.

Native ecosystem degradation

- 9.6.2 Many submitters expressed concern that possums and other introduced animals such as rodents, mustelids and feral cats were degrading the native ecosystem and that, in the absence of 1080 (and in particular, aerial use of 1080), these adverse effects would increase. Some submitters included deer in this category.²⁸ The Committee concludes that the benefits in terms of reduced concern about native ecosystem degradation are significant.
- 9.6.3 The aerial application of 1080 was seen by many submitters as the key to pest control and the halting of native ecosystem degradation. While submitters recognised that the use of 1080 as a tool for ground-based control might also help, aerial application was seen as necessary in the more remote and inaccessible areas of New Zealand bush.

²⁸ Refer to paragraph 9.3.4.

Enhanced pride and pleasure from the protection of New Zealand's natural heritage

- 9.6.4 The beneficial effects associated with enhanced pride and pleasure relating to the protection of New Zealand's clean green image are difficult to assess with any precision. There were widely differing perspectives on this issue. Some submitters asserted that New Zealand's clean green image depended on the continued use of 1080 (through reductions in possum and other pest numbers) while others argued that our clean green image was put at risk by the use of 1080.
- 9.6.5 The Committee notes that while concerns about the adverse effect of 1080 on New Zealand's clean green image are associated primarily with aerial drops, the beneficial effect (enhanced pride and pleasure) is a more general concept associated with the reduction in possums and other pests, and is equally applicable to both ground and aerial applications.
- 9.6.6 The Committee found it difficult to weigh the arguments for and against the proposition that the continued use of 1080 contributed to the pride and pleasure New Zealanders could take in their natural environment. On balance, it saw a benefit but did not feel able to rate it as significant because of the division of views involved.

Reduced anxiety about bovine Tb

- 9.6.7 The applicants stated that the threat of discovery of bovine Tb infection amongst their herds was a significant source of concern to the farming community. Many farmers attested to this, some speaking from bitter experience. The concerns encompassed financial loss, emotional impact and disruption to farming practices.
- 9.6.8 Evidence was also provided of the tangible adverse effects on small communities and individual farmers of the discovery of the presence of bovine Tb in farm animals.
- 9.6.9 The Committee notes that these beneficial effects depended heavily on the aerial use of 1080. The initial, swift 'knockdown' of possums is normally followed up by boundary control using a range of methods. With ground-based use of 1080 only, the initial 'knockdown' leading to the removal of reservoirs of bovine Tb would not be possible.
- 9.6.10 The Committee concludes that these beneficial effects will be fully realised only with continuing aerial use of 1080.

Enhanced enjoyment of recreational activities

- 9.6.11 The Committee notes that the effect of enhanced enjoyment of recreational activities is closely linked to perceptions about the health of ecosystems and the protection of New Zealand's natural heritage (paragraphs 9.6.2–9.6.6 above). Many people who enjoy recreation in natural environments value healthy forests and native biodiversity. The realisation of this social benefit is dependent on the realisation of environmental benefits (section 9.3 above). These environmental benefits may be delivered through ground control of possums (using 1080 and other toxins and trapping) as well as

through aerial use of 1080. However, the environmental benefits will be greater from aerial application as larger areas are able to be treated. These social and environmental benefits will be medium to long term but are currently highly dependent on a continuing aerial control programme using 1080.

- 9.6.12 The Committee notes that while many submitters took the view that such enjoyment was possible only with the availability of 1080 in order to maintain the health of the forest, for other submitters the use of 1080 was viewed as a significant adverse effect, detracting from their enjoyment.
- 9.6.13 The Committee concludes that the beneficial effect of enhanced enjoyment of recreational activities due to continued aerial application of 1080 is a significant beneficial effect that would not be fully realised with ground-based use of 1080 only.

9.7 Market economy benefits

- 9.7.1 There are approximately 70,000 cattle herds and 5,000 deer herds in New Zealand. For some decades now, successive governments, local authorities and the farming community have contributed tens of millions of dollars each year to pest control programmes aimed at the eradication of bovine Tb. The use of 1080 to reduce possum populations has been pivotal to these programmes. The Committee was told that the programme is having considerable success and that the current target (less than a 0.2% infection rate – regarded internationally as giving a ‘clean bill of health’) should be achieved by 2015 provided that 1080 can continue to be used.
- 9.7.2 The Committee has assessed the significant beneficial effects on the market economy as being reduced risk of overseas market access restrictions, easing the risk of consumer resistance to New Zealand meat and dairy products, the removal or relaxation of restrictions on livestock movements, reduction in competition for grazing and lower vector control costs to farmers, local authorities and the government. All of these effects depend on a significant reduction in possum and rabbit numbers.
- 9.7.3 The Committee is of the view that these beneficial effects rely heavily on the continuing aerial use of 1080 and that ground-based use of 1080 only would not be sufficient for these effects to be realised.

Reduced likelihood of losing access to/sales in export markets for beef, venison and dairy products

- 9.7.4 This benefit accrues to the country as a whole.
- 9.7.5 The beef, venison and dairy sectors are of huge importance to our economy. The applicants suggested that restrictions on access to New Zealand’s export markets for beef, dairy and venison products could cost \$100 million–\$500 million. Professor Ross

Cullen, on the other hand, notes in his report²⁹ that a number of New Zealand studies on the economic impact of trade restrictions do not support this contention.

- 9.7.6 The Committee is aware that public perceptions are an important element in agricultural trade protectionism and that any increase in the incidence of bovine Tb in New Zealand could be used as a pretext for restricting our access to overseas markets in the important beef, venison and dairy sectors. It is conscious too, of the risk of increased consumer resistance based on reports of problems – real or imagined – in the agricultural sector of exporting countries. Recent incidents involving reports of animal cruelty and animal diseases are evidence enough of the sensitivity of overseas markets. The use of 1080 to combat bovine Tb, including through aerial application, is clearly important in reducing the risk of a loss of confidence in New Zealand produce in markets of real importance to the national economy.
- 9.7.7 While it has not been able to quantify the risks posed by bovine Tb in terms of reduced consumer demand or market access restrictions, the Committee does consider the beneficial effect of reducing these risks to be significant.

Reduced likelihood of restrictions on access to export markets for live cattle and deer

- 9.7.8 The applicants state that “the levels of Tb in New Zealand cattle and deer currently prevent any exports of live animals to Australia and North America, and limit live export trade to other countries” and that the achievement of bovine Tb-free status (99.8% of domestic cattle and deer herds free of bovine Tb for three years) would enable such trade.
- 9.7.9 The applicants did not provide any information about the level of trade that might result, and since many of our trading partners do not have bovine Tb-free status, there is no evidence to support the suggestion that trade is significantly restricted by not having bovine Tb-free status.
- 9.7.10 The Committee does not regard this effect as significant.

Reduction in losses due to bovine Tb

- 9.7.11 This benefit accrues directly to farmers but also impacts on the national economy.
- 9.7.12 Evidence provided by the applicants and submitters indicates that the use of 1080 is an important tool in vector control and controlling bovine Tb infection for individual farmers. Information provided to the Committee indicates that the number of animals currently lost is small. At present, the benefits thus seem generally to be localised in nature.

²⁹ Refer to E&R Report Appendix J (pages 577–585).

- 9.7.13 The Committee notes, however, that while the impacts of occasional small outbreaks may not impact to any great extent on the national economy, a series of regional outbreaks or a widespread outbreak would have a significant cumulative impact in terms of the New Zealand economy. Evidence provided by AHB indicates that during the 1990s, before the current possum control strategy was implemented, a large number of properties over a wide geographical range were affected by bovine Tb. While it is unclear as to how long it would take for this to recur, aerial use of 1080 is clearly an important tool for the national possum control strategy which greatly reduces the possibility of a further major national outbreak in the future.
- 9.7.14 The Committee concludes that the reduction in losses of livestock to bovine Tb is a significant benefit.

Reduced costs to farmers for vector control

- 9.7.15 This benefit accrues to farmers.
- 9.7.16 The costs of disease and vector control for bovine Tb are partially funded through a levy on cattle slaughter and contributions from the deer industry which cover most of the costs of disease control (monitoring and management of bovine Tb) and about 40% of the costs of vector control. The applicants have noted that with the continued use of 1080 there will be a reduction in the number of bovine Tb-infected livestock and a subsequent reduction in the costs associated with vector and disease control by 2015. However, if 1080 is not available, costs to farmers for disease and vector control will increase significantly over the next ten years.
- 9.7.17 The Committee recognises that ground control using 1080 is unlikely to achieve the goal of bovine Tb-free status and that aerial use of 1080 is an essential tool for this purpose.
- 9.7.18 While the Committee notes that for reasons of consistency of approach the timeframe for calculation of benefits is from the present to 2015, in the longer term these benefits are expected to increase. Account also needs to be taken of the avoidance of increased disease control costs arising from the avoidance of new outbreaks of bovine Tb.
- 9.7.19 Therefore, the Committee concludes that the benefits associated with reduced costs of vector control through continued use of 1080, including aerial application, are significant.

Removal or relaxation of restrictions on livestock movements

- 9.7.20 This benefit accrues directly to farmers.
- 9.7.21 Many submitters felt that movement control was a significant issue in terms of bovine Tb control, with some submitters indicating that controlling stock movements was more effective than the use of 1080.

- 9.7.22 The Committee was told that stock movement control practices could be better managed, for example by checking ear tags for infected stock at abattoirs.
- 9.7.23 The applicants indicated that restrictions on the movement of cattle and deer can generate significant costs and loss of income for farmers. Expert advice sought by the Agency³⁰ considered that the applicants' estimate of the cost of movement control was, if anything, an underestimate of the costs to individual farmers and the agricultural sector as a whole.
- 9.7.24 The Committee is of the view that the benefits from the removal or relaxation of restrictions on livestock control will not be realised from ground-based use of 1080 only and that aerial use of 1080 is required for this effect to be realised.
- 9.7.25 The Committee concludes that this benefit is significant.

Reduced competition for grazing from pests

- 9.7.26 This benefit accrues directly to farmers.
- 9.7.27 The applicants referred to the threat to pastoral production in New Zealand from rabbits (and other pests) competing with farm livestock for available feed, and estimated the magnitude of the net benefit associated with the availability of 1080 over a 10-year period as being in the order of \$230 million. The expert advice received by the Agency³¹ questioned the basis of this calculation and suggested this may be an overestimate, partly because it was unclear as to whether or not the impact of RHD (Rabbit Haemorrhagic Disease) had been considered.
- 9.7.28 At the hearings some submitters expressed concern at the declining effectiveness of RHD and argued that aerial drops of 1080 were an essential additional tool for pastoral farmers to control increasing rabbit populations.
- 9.7.29 There is uncertainty associated with the magnitude of this benefit, but in the light of the declining effectiveness of RHD as a means of controlling rabbits, the Committee considers that there is evidence of a net benefit from reduced competition from rabbits for grazing. The Committee further notes that this benefit applies to the aerial use of 1080.
- 9.7.30 The Committee found little evidence that wallabies, possums and hares pose a significant threat to pastoral production and therefore the effect of reduced competition for grazing from these pests is not taken into account.

³⁰ Refer to Appendices J and K of the E&R Report.

³¹ Refer to Appendix J of the E&R Report.

Improved water quality

- 9.7.31 The applicants identified a potential beneficial effect in the form of improved livestock herd health from improved water quality. This is an indirect effect through links between the presence of possum (and other wild animal) and pathogens such as giardia and cryptosporidium. There was, however, no evidence produced to enable the Committee to quantify this possible effect.
- 9.7.32 The Committee decided not to take into account any possible benefits to the health of livestock arising from the continued use of 1080 to improve water quality.

Reduced costs of vector control

- 9.7.33 This benefit accrues to the agricultural sector and central and local government. The Committee is conscious that successive governments have considered the ‘possum problem’ to be of major importance and have contributed large amounts of money to possum control, much of which has been spent on aerial application of 1080. Regional councils also contribute directly to possum control. In 2004–5 the funding for the National Possum Management Strategy was over \$83 million, and in 2005/06 AHB reported spending of \$87 million. The portion of this amount spent on vector control is at present in the order of \$55 million per year. If aerial use of 1080 continues, this figure is expected to reduce to \$35–40 million per year by 2015. Account must also be taken of likely increases in vector control costs if bovine Tb were to get out of control again.
- 9.7.34 While the reduction to 2015 is not large, under the scenarios described in section 4.2 of the application AHB believes that the costs associated with vector control will be significantly reduced by 2025.
- 9.7.35 The Committee accepts the applicants’ view that if ground control methods only (1080, trapping and cyanide) were used, then the longer term benefits would not be realised and the cost of vector control would continue to increase into the future.
- 9.7.36 With the continued aerial use of 1080, the Committee concludes that the benefit of reduced costs to the agricultural sector and regional and national government associated with vector control is significant and will increase over time. In this instance, the Committee considers that the longer term beneficial effects are relevant to the decision.

Reduction in crop damage/losses due to possum browsing (for orchards etc)

- 9.7.37 The applicants noted that possums and rabbits impact on horticulture by browsing fruits and vegetation associated with horticulture. This is confirmed by a range of anecdotal evidence. In addition to browsing fruit vegetable and flower crops, possums also damage shelter belts which adds to the costs and losses faced by growers in the establishment phase. However, 1080 is not often used for pest control in these situations because of proximity to populated areas.

- 9.7.38 While there is anecdotal evidence regarding possum damage, there is little documented and verified data. Possums generally feed close to where they nest, so damage is most common in horticultural blocks close to bush areas. Where 1080 is used to eliminate or reduce possums in these bush or forest areas either by ground control or by aerial control, there is a benefit to the horticultural sector. However, since 1080 is not used often directly in orchards, and this is an indirect benefit, it cannot be directly correlated to the use of 1080.
- 9.7.39 The Committee acknowledges the beneficial effect for horticulture of reduced possum numbers, including through the use of 1080.

Reduction in damage to exotic forestry plantations, particularly seedlings

- 9.7.40 The Ministry of Agriculture and Forestry noted that aerial and ground use of 1080 was important in controlling pests over large areas of plantation forest. This contention was supported by some submitters. However studies on this are inconclusive. There are some who believe that the damage done by possums to seedlings in plantation forest is relatively slight.
- 9.7.41 The Committee has not rated this beneficial effect as significant.

Benefits for tourism as a result of maintenance of healthy forest habitat and native biodiversity

- 9.7.42 The applicants provided information about the value of tourism to the New Zealand economy. Studies show that scenic beauty is important to tourists. It is, however, difficult to place a monetary value on this effect. Some submitters argued that the use of 1080 is important to ensure the quality of the recreational and visitor experience in New Zealand's parks and forests. The Committee agrees with these submitters that New Zealand may become a less attractive destination if there were widespread degradation of our unique ecology.
- 9.7.43 Other submissions commenting on the effects on tourism were, however, more concerned about the impact of the use of 1080 on New Zealand's clean green image (also discussed below in relation to the adverse effects on society and communities).³²
- 9.7.44 The Committee notes Professor Cullen's opinion³³ that the consequences "could be large (in the longer term) if New Zealand fails to maintain healthy forests and native biodiversity". However, the Committee does not consider that the beneficial effects of 1080 and formulated substances on tourism have been demonstrated as being significant in the short to medium term.

³² Refer to section 10.6 below.

³³ Refer to E&R Report Appendix J (pages 577–585).

- 9.7.45 While recognising the possibility of long term benefits to tourism from the reduction of possums, in the absence of any detailed information about such benefits the Committee decided not to rate this benefit as significant.

Benefits to the New Zealand economy from ecosystem services

- 9.7.46 The total value of ‘ecosystem services’ (or the benefits to people that flow from healthy ecosystems) is large, but the marginal impact of suppression of possums is unknown. Little information was given by the applicants on this effect and it was not raised as an issue by submitters.
- 9.7.47 The Committee recognises that current research in this area may provide additional information about the level of benefit from ecosystem services and how these benefits might be delivered.
- 9.7.48 However, at this point the Committee does not consider the beneficial effect in terms of ecosystem services to be significant.

Reduced costs from erosion and flood damage

- 9.7.49 The applicants noted that there is significant annual damage by possums to poplars and willows planted to reduce catchment or soil erosion. Again however, the size of the benefit not been quantified by any research to date.
- 9.7.50 The Committee concludes that while this is an indirect beneficial effect from the continuing use of 1080, in the present context this effect should not be rated as significant.

10. Assessment of the adverse effects (risks and costs)

10.1 Summary

10.1.1 The Committee's view, set out in more detail below, is that the adverse effects of the continued use of sodium fluoroacetate (1080) and formulated substances containing 1080 are primarily associated with aerial application. While the Committee notes the high degree of public concern over adverse human health effects of use of 1080, as well as the concerns of hunters and dog owners, it is satisfied that adverse effects associated with both ground and aerial-based control can be adequately managed by the controls and the recommended improvements to the overall management regime for 1080.

10.2 Introduction

10.2.1 The Committee reviewed the Agency's assessment in the E&R Report of the potential risks and costs associated with the use of sodium fluoroacetate (1080) and formulated substances containing 1080 in New Zealand, and discusses these in this section.

10.2.2 The potential risks and costs of the continued use of sodium fluoroacetate (1080) and formulated substances containing 1080 are identified in Table B2 in Appendix B.

10.2.3 A "risk" is defined in regulation 2 of the Methodology as meaning "the combination of an the magnitude of an adverse effect and the probability of its occurrence, while a cost is defined as "the value of a particular positive effect expressed in monetary or non-monetary terms". Risks and costs that may arise from any of the matters set out in clauses 9 and 11 of the Methodology were considered in terms of clauses 12 and 13, including especially the assessment of consequences and probabilities, the impact of uncertainty and the issues around risk management.

10.2.4 The evidence available was largely scientific in nature and was considered in terms of clause 25(1) of the Methodology, taking into account the degree of uncertainty attaching to that evidence. This evidence comprised the information provided by the applicants, additional information contained in the E&R Report, evidence provided in submissions and at or following the public hearings and the advice of experts (as outlined in paragraph 3.11).

10.2.5 In each case, the Committee's assessment includes a discussion of:

- the nature of the adverse effect (clause 12(a));
- an assessment and evaluation of likelihood and consequences (clause 12(b)), noting that the methods for these assessments follow recognised techniques (clause 24) and are made taking account of the application of controls;
- an assessment of the level of risk as a combination of the likelihood of occurrence and the magnitude of the adverse effect (clause 12(c)) (presented in Table B2 in Appendix B);

- the current risk management proposals and their effect on both the risk and the uncertainty (clause 12(d)); and
- explicit consideration of the uncertainty bounds (clause 12(e)) and how uncertainty affects the assessment of the risk (clauses 25 – scientific and technical uncertainty; 29 – materiality of uncertainty; and 30 – the need for caution where uncertainty is not resolved).

- 10.2.6 Clause 33 of the Methodology requires the Authority to have regard to the extent to which a specified set of risk characteristics exist when considering applications. The intention of this provision is to provide a route for determining how cautious or risk averse the Authority should be in weighing up risks and costs against benefits.
- 10.2.7 Where relevant, the Committee has discussed these characteristics and established a position on its approach to risk.
- 10.2.8 As a basis for assessing these risks and costs, the Committee has used the scenarios detailed by the applicants in pages 39–57 of the application and the Agency’s analysis in section 7.5.6 of the E&R Report. The applicants and the Agency described two scenarios – the ‘with 1080’ scenario and the ‘without 1080’ scenario. The risks and costs from the availability of 1080 are assessed where possible as the difference between the risks and costs available under the two scenarios.
- 10.2.9 The Committee notes that these scenarios are based on a ten year time horizon from 2005–2015. Beyond this time horizon it is difficult to estimate the size and likelihood of adverse effects.

10.3 Adverse effects on the environment

- 10.3.1 The Committee is satisfied that ground-based operations using 1080 present a significantly lower risk to the environment than aerial operations. In the Committee’s view, well-managed ground operations using 1080 present a relatively low risk to the environment and indigenous biodiversity. The Committee acknowledges however that improvements are needed to ensure that aerial applications are carried out at a consistently high level. The Committee proposes changes to the controls and the current management regime to address these.

Manufacture, transport and disposal

- 10.3.2 The Committee noted that there was little concern expressed by submitters regarding risks to the environment from the manufacturing or disposal of sodium fluoroacetate (1080) or formulated substances containing 1080. Controls are placed on manufacturing and disposal facilities under the Resource Management Act. There are associated requirements for discharge consents. The HSNO identification, packaging, emergency management and disposal regulations provide further controls which the Committee considers adequately manage the environmental effects of any accidents or

spillages at a manufacturing facility or arising from the disposal of residues from equipment or PPE washdown or disposal of waste baits.

- 10.3.3 The Committee further noted that few concerns were expressed regarding risks to the environment from transportation of technical grade sodium fluoroacetate or the soluble concentrate to sites where baits are manufactured or to application sites.
- 10.3.4 The HSNO identification and emergency management regulations and the requirements of the Land Transport Rule 45001/1: Dangerous Goods Rule 2005, are intended to, and in the Committee's opinion do, adequately manage the environmental effects of spills which may result from a transport accident in such cases.
- 10.3.5 The Committee notes that 1080 is highly soluble in water and is rapidly leached from baits.³⁴ This could result in localised adverse effects if a major spillage of bait occurred in water. 1080 is, however, biodegradable in water and does not bioaccumulate, in contrast to brodifacoum which is bioaccumulative and degrades only slowly. Rapid dilution of 1080 would occur within a large body of water, further reducing potential impacts. A spillage of baits on land would involve little risk as the baits would be retrieved under standard emergency management procedures.

Ground-based application

- 10.3.6 Apart from those submitters seeking a complete ban on the use of 1080, there seemed to be general acceptance that the use of ground-based methods of application of 1080, particularly when bait stations are used, presents a low risk to non-target species.
- 10.3.7 The Committee notes that the controls previously applied under the Act allowed uncontained application of a number of substances which are currently used in bait stations only. These included *peanut-based paste and polymer gel block containing 1.5g sodium fluoroacetate/kg* (used for possum control); *fish paste containing 10 g sodium fluoroacetate/kg* (used for wasp control); and *fishmeal pellets containing 1.0 g sodium fluoroacetate/kg* (used for feral cat control).
- 10.3.8 The Committee has tightened the controls to ensure that these substances (with the exception of the fishmeal pellets) are applied only in contained ground-based operations to minimise access to the baits by non-target species. The fish-based products in particular are attractive to dogs and cats. The attractiveness of the peanut-based paste to non-target species has generally not been assessed. The polymer gel block is large and contains more 1080 than other individual baits. It thus presents a greater risk to non-target species. The use of *soluble concentrate containing 200 g/litre sodium fluoroacetate* on cut apple bait has also been restricted to contained ground-based applications.

³⁴ Refer to E&R Report Appendix C (pages 357–358).

- 10.3.9 Uncontained ground-based application of baits may result in localised areas of high bait density but given the smaller areas involved, results in an overall reduction in risks relative to aerial application. Spillage of bait from bait stations and bait bags may result in the exposure of non-target species to small quantities of bait and any effects will be highly localised.

Aerial application

Environmental effects resulting from loading of baits into aircraft

- 10.3.10 Some submitters expressed concern about the possible contamination of loading sites leading to the deaths of livestock. These concerns arose from historical events on farm land where airstrips used for loading of carrot bait had not been adequately cleared of spilled bait prior to reintroduction of stock.
- 10.3.11 The Committee considers that its control relating to the decontamination of loading sites will help ensure that there are minimal adverse environmental effects resulting from spills of bait at these sites (see Additional Control 7).

Contamination of soil

- 10.3.12 Concern was expressed regarding the possible effects of 1080 on soil micro-organisms. The Committee did not, however, receive any specific information supporting this concern.
- 10.3.13 The applicants provided information to illustrate that the baits cover only a small proportion of the total treatment area and that, while 1080 will leach from baits during rain, any potential effect will be highly localised and will not persist over time.
- 10.3.14 The Committee notes that 1080 is biodegradable in soil,³⁵ with both soil bacteria and fungi able to detoxify the substance. The Committee considers that the available information on the toxicity of 1080 to soil organisms³⁶ indicates little risk at the concentrations which occur in the soil as a result of aerial application of 1080.
- 10.3.15 The Committee notes that there is little scientific data available on the degradation of 1080 in New Zealand soils at cool temperatures, and recommends that further research be undertaken.³⁷

³⁵ Refer to E&R Report Appendix C (pages 367–374).

³⁶ Refer to E&R Report Appendix C (pages 385–390).

³⁷ Refer to paragraph 11.7.25.

Freshwater vertebrates and invertebrates³⁸

- 10.3.16 Some submitters were worried about baits getting into water during aerial operations, with potential for adverse effects on native aquatic species. Several reports were received of baits lying in streams immediately after aerial operations. Potential effects of concern included toxicity to the organisms and bioaccumulation of 1080 with possible effects on animals. Many submitters considered 1080 to be persistent in water, particularly at cold winter temperatures. These concerns also took in the potential for prolonged exposure to low concentrations of 1080 and the lack of information about the effects of this on aquatic species.
- 10.3.17 The Committee notes that the available scientific data on the degradation of 1080 in water indicate that the substance is biodegradable but that there is still some uncertainty regarding the relevance of some of the test data to the New Zealand environment. The Committee understands that the primary loss of 1080 from baits occurs via leaching over a short period of time, followed by rapid dilution within the water body.
- 10.3.18 Results from both laboratory and controlled field studies have produced no evidence of adverse effects from exposure to toxic baits on aquatic species. In particular, recent studies on native fish (ie eels/tuna, koaro, upland bullies) and freshwater crayfish/koura and aquatic macroinvertebrate communities indicated that there were no adverse effects on these species.
- 10.3.19 The Committee has reviewed the available information on water quality monitoring and notes that water samples rarely contain measurable 1080 residues. None has been measured at a level which would indicate concern for toxicity to aquatic organisms.
- 10.3.20 The Committee notes that any potential exposure of aquatic organisms to 1080 will be short term and episodic, if at all, given that repeated treatments of the same area of forest occur on average at 5–6 yearly intervals in most cases. Prolonged exposure to 1080 is thus unlikely to occur.
- 10.3.21 The Committee notes that 1080 is not bioaccumulative, as indicated by studies in eels/tuna and supported by the information on the high water solubility of the substance. Organisms do take up 1080 from water, but the bait deposited in water results in extremely low concentrations of 1080 and the organisms would be able to metabolise and/or excrete the substance over a short period after exposure.
- 10.3.22 While there is still some uncertainty as to the toxicity of 1080 to untested species, as raised by some submitters, it is not feasible to test all species which may be exposed to 1080. The available aquatic data is in line with that generally required for the assessment of chemicals in the environment when long-term exposure is not anticipated. The Committee notes that, in general terms, 1080 is not highly toxic to fish

³⁸ Refer to E&R Report Table 7.5, Appendix C2 pages 357-364, Appendix E1.3 pages 472-473, Appendix F2.6 pages 530.

and aquatic invertebrates. While algae are particularly sensitive, the ability of algae to rapidly re-colonise after an impact is a significant mitigating factor.

- 10.3.23 The Committee heard from the applicants that improvements in bait application technology (such as the adoption of differential global positioning systems (DGPS) and improved design of bait hoppers) and reductions in bait sowing rates from the high levels prevalent in the 1970s (30 kg bait/ha) to the current average rates of 2–5 kg bait/ha, have led to a reduction in the amounts of bait likely to be deposited in small water bodies within application areas.
- 10.3.24 The Committee notes that large water bodies (more than 3m wide), including flowing streams, present within an application area should be avoided to mitigate potential risks to public health.³⁹ Regional Councils are able to place conditions on resource consents with respect to discharges to water on a site-specific basis. The incidental deposition of bait into water during normal operations, unless through a major unplanned discharge, presents a very small risk to aquatic species. The loss of bait as a result of an operational or equipment failure (for example, a helicopter having to release a hopper of bait for safety reasons) requires notification of a number of people under Additional Control 8⁴⁰ to ensure that appropriate actions are taken to mitigate risks.
- 10.3.25 The Committee also heard from the applicants that a requirement to leave a buffer zone around all water bodies, including those less than 3m wide, would adversely impact on the efficacy of pest control operations. This is on the basis that leaving untreated areas within a larger application area can result in rapid re-invasion of the treated areas after the operation.
- 10.3.26 On the basis of all the information available, the Committee considers that operating in accordance with best practice with respect to sowing rates and application technology should ensure that the risk to aquatic species remains very small.
- 10.3.27 However, the Committee does recommend further research on the degradation rates of 1080 in water under simulated New Zealand conditions.⁴¹

Terrestrial plants

- 10.3.28 Some submitters were concerned that plants might be adversely affected by the aerial application of 1080 baits. The Committee did not, however, receive any specific evidence to substantiate this concern.
- 10.3.29 Concern was also expressed by a number of Māori submitters regarding possible effects on rongoa species used for medicinal purposes. These concerns are addressed in paragraphs 10.5.15–10.5.19 below.

³⁹ Refer to paragraph 10.4.27 et seq.

⁴⁰ Refer to paragraph 11.5.74 et seq.

⁴¹ Refer to section 11.7 below.

10.3.30 The Committee notes that several studies have been undertaken on the uptake of 1080 by plants, including the native species pikopiko/hen and chicken fern, karamuramu/*Coprosma robusta* and broadleaf.⁴² While some plants do take up 1080 when it is present in the soil, only very small amounts are present in the plant for a short period. No adverse effects on plants have been reported from the use of 1080 baits in the field. Toxicity tests with 1080 incorporated into the soil have shown that 1080 can be toxic to plants only at concentrations which are much higher than could occur in the field. Overall, the Committee considers the risks to plants to be slight.

Native birds

10.3.31 Many submitters were concerned that native bird populations might be adversely affected by the aerial use of 1080. It appears that some at least of these concerns were based on historical events where very high sowing rates of unscreened carrots (30–40 kg bait/ha) were used.

10.3.32 Other submitters reported their personal observations of increased bird abundance following the use of aerial 1080. These submitters acknowledged that some individual birds are killed as a result of ingesting 1080 but asserted that, overall, populations of birds benefit.

10.3.33 The Committee notes instances where the applicants and other users of 1080 have involved the local community in monitoring operations. An example of this was provided by DoC in relation to bird counts conducted with local iwi after the Hokonui aerial operation in 2003/4.⁴³

10.3.34 The applicants⁴⁴ explained that while robins and tomtits are most vulnerable to 1080 poisoning, these birds are able to breed more than once a year and have relatively large broods. The net result is an overall increase in populations of these birds in breeding seasons subsequent to an aerial 1080 operation.

10.3.35 The applicants and the Agency summarised the available data on the monitoring of birds before and after aerial 1080 operations.⁴⁵ The more recent data are derived from specific studies where birds have been radio-tagged or banded and then re-sighted after an operation. These studies demonstrate that bird populations are not adversely affected by well-conducted aerial 1080 operations.

10.3.36 The applicants also explained during the hearings that the lack of a ‘dawn chorus’ is not attributable to the use of 1080 so much as the result of ongoing predation by introduced species. This has been most clearly demonstrated on off-shore islands and mainland

⁴² Refer to E&R Report Appendix C pages 383–384. Refer E&R Report Appendix E pages 468–474.

⁴³ Refer to <http://www.ermanz.govt.nz/news-events/focus/1080/hearings/addinfo51.pdf>

⁴⁴ Refer to E&R Report Appendix N pages 743–745.

⁴⁵ Refer to E&R Report Appendix F pages 485–510.

island sanctuaries where 1080 has been used to eradicate pests. At these sites bird populations are thriving.

- 10.3.37 The Committee considers that the key to managing potential risks to birds (and other native species) is to ensure that operations are carried out in accordance with best practice. The Committee wants to ensure that all users of formulated substances containing 1080 adhere to the high standards set by the applicants in this regard.
- 10.3.38 To that end, the Committee intends to ensure that current best practice is reflected in the controls imposed and through recommendations to the users of 1080.⁴⁶
- 10.3.39 The Committee notes that cut apple bait prepared from soluble concentrate containing 200 g/litre sodium fluoroacetate is highly attractive to birds.⁴⁷ This type of bait is currently approved for aerial application, but the Committee is now restricting the use of prepared cut apple baits to contained ground-based application in order to minimise risks to non-target species.⁴⁸ DoC currently allows cut apple bait to be used only in bait stations on land under its management.
- 10.3.40 The Committee noted that many submitters' concerns arose from the use of poorly prepared carrot baits which had resulted in high bird mortalities. While this can be attributed to poor past practices, the Committee notes that DoC imposes specific requirements regarding the size of carrot bait in order to minimise exposure of non-target species to small fragments of highly toxic carrot. The Committee acknowledges DoC's practice in this regard and believes that all carrot bait should be of a minimum size and screened to remove small pieces prior to use.⁴⁹ The larger baits require lower sowing rates and, with fewer baits per hectare, there will be reduced exposure of non-target species to the baits.
- 10.3.41 In addition, the Committee will require anyone formulating or reformulating substances containing 1080, or wishing to use alternative food bait with the soluble concentrate, to notify the Authority and provide information demonstrating that the changes do not present a greater risk to non-target species than current baits (Additional Control 10).⁵⁰
- 10.3.42 The Committee considers that the controls and recommendations for adoption of best practice by all users of 1080 will reduce the risks to bird populations to acceptable levels.

⁴⁶ Refer to section 11 below.

⁴⁷ Refer to E&R Report Appendix N page 731.

⁴⁸ Refer to paragraph 11.5.37 below.

⁴⁹ Refer to paragraphs 11.5.38–11.5.39 below.

⁵⁰ Refer to paragraph 11.5.82 below.

Native bats⁵¹

- 10.3.43 While some submitters expressed general concern about the possible adverse effects of 1080 on native species, few specifically mentioned bats.
- 10.3.44 Short-tailed bats are omnivores and feed on the forest floor, and are therefore potentially at risk from exposure to 1080. Studies on cereal and carrot baits suggest however that bats will not eat either bait, even in the absence of other food. Long-tailed bats are aerial insectivores and thus will not be exposed to carrot or cereal baits.
- 10.3.45 Bat populations have been monitored in areas which have a history of prolonged pest control using a range of tools, with no adverse effects observed.
- 10.3.46 The Committee considers that the controls and recommendations for adoption of best practice by all users of 1080 will ensure that the risks to bat populations stay at an acceptable level.

Native terrestrial invertebrates

- 10.3.47 A number of submitters were concerned about the toxicity of 1080 baits to invertebrates.
- 10.3.48 The Committee reviewed the data presented by the applicants and the Agency.⁵² Invertebrates which feed on baits containing 1080 may be killed or sub-lethally poisoned. A major study concluded that the accessibility of the baits to invertebrates extended for a distance of no more than 20 cm from each bait. The results from this and other studies indicate that only a very small number of the total invertebrates present on the forest floor within an application area will be adversely affected. In another study assessing the presence of invertebrates on baits held up in the forest canopy, only a very small number (0.35%) of the invertebrates trapped were confirmed as having ingested bait.
- 10.3.49 Based on a study on weta, sub-lethally poisoned invertebrates are able to metabolise and excrete 1080 and so residues remain in their tissues for a short time only.
- 10.3.50 The issue of secondary (indirect) poisoning of animals which feed on invertebrates containing 1080 residues is discussed below.
- 10.3.51 The Committee considers the adverse effects of 1080 on invertebrate populations to be very small.

⁵¹ Refer to E&R Report Appendix N pages 749–752.

⁵² Refer to E&R Report Appendix F pages 510–517.

Native lizards and frogs

- 10.3.52 Some submitters expressed concern regarding the effects of 1080 baits on native lizards and frogs, but did not produce any specific evidence to support their concerns.
- 10.3.53 The Committee notes that of the range of animals tested for sensitivity to 1080, reptiles and amphibians are among the least sensitive.⁵³ Controlled trials exposing native frogs to 1080 residues in water and to cereal bait containing 1080 were inconclusive due in part to the small numbers of animals used and their tendency to hide under leaf litter, making observation difficult. These studies reflect the difficulties associated with testing many native species. Monitoring of frog populations after 1080 operations has not indicated adverse effects, but again, the small numbers involved make conclusions difficult.
- 10.3.54 The current low sowing rates of bait in forest environments reduce the likelihood of lizards and frogs being exposed to 1080 baits.
- 10.3.55 There is some evidence that skinks may feed on moistened cereal bait.⁵⁴ The Committee also notes that skinks may be vulnerable to ‘prey-switching’ by stoats and cats in areas where rabbit populations undergo large-scale changes resulting from periodic pest control.
- 10.3.56 The Committee has amended the control on use of carrot bait to ensure that it is screened to remove small pieces prior to application of the bait.⁵⁵
- 10.3.57 The Committee considers that the controls, coupled with its recommendations for the adoption of best practice by all users of 1080, will adequately manage risks to lizards and frogs.

Exposure of soil and plants to the stock solution

- 10.3.58 Few submitters commented on the possibility of localised adverse effects resulting from spillages of soluble concentrate containing 200g sodium fluoroacetate/litre at operational sites where coated apple and carrot baits are prepared.
- 10.3.59 The Committee concludes that the control requiring decontamination of operational sites prior to being decommissioned (Additional Control 7)⁵⁶ will ensure very low localised risk to soil organisms and plants.

⁵³ Refer to E&R Report Appendix C page 414–415.

⁵⁴ Refer to E&R Report Appendix N pages 754–755.

⁵⁵ Refer to paragraph 11.5.38 below.

⁵⁶ Refer to paragraph 11.6.10 below.

Indirect (secondary) exposure

- 10.3.60 Many submitters were concerned about the secondary poisoning of animals from eating either carcasses containing 1080 residues or live kill of poisoned animals. Dogs are particularly sensitive to very small residues of 1080 in carcasses.⁵⁷ Some submitters suggested that, if the ongoing use of 1080 were approved by the Committee, all animal carcasses should be required to be removed from the application area.
- 10.3.61 The applicants stated that it would be impractical for all carcasses to be removed from an area. However, carcasses (and baits) are removed from walking tracks and other areas where people have ready access such as around huts and picnic areas.
- 10.3.62 The Committee notes that 1080 residues in the carcasses of poisoned possums may be very slow to break down, especially under winter conditions and/or when the carcasses are sheltered from the weather. The Committee gave careful consideration to the length of time that warning signs should remain in place so that people who are taking their dogs into an area are aware of the risks. The signage requirement has been amended to extend the period during which signs must remain in place, and to include specific reference to the hazards of poisoned carcasses.⁵⁸
- 10.3.63 Several studies⁵⁹ have investigated whether small birds such as robins and tomtits are killed from primary or secondary poisoning. The results are inconclusive due to short retention times for food in their gut and the ability of these birds to regurgitate food. Predatory birds such as ruru/morepork have been found dead after 1080 operations. However, based on studies with radio-tagged birds, the Committee concludes that there is no evidence of adverse effects on populations of these birds as a result of secondary poisoning.⁶⁰
- 10.3.64 The Committee notes that secondary poisoning can occur irrespective of whether formulated substances containing 1080 are applied by aerial or ground-based methods, though the scale of the effect is smaller in the case of ground-based application. As discussed in section 9.3 of this decision, secondary poisoning of pest species such as stoats and feral cats is a beneficial effect resulting from operations targeting rodents and possums.

10.4 Adverse effects on human health and safety

- 10.4.1 The Committee acknowledges the high degree of public concern in relation to the adverse effects of 1080 on human health. The Committee considers that the risks of

⁵⁷ Refer to paragraphs 10.6.39–10.6.41 and 10.7.6–10.7.9 below.

⁵⁸ Refer to paragraph 11.5.10 et seq.

⁵⁹ Refer to E&R Report Appendix N pages 735–736.

⁶⁰ Refer to E&R Report Appendix F pages 485–486 and Table F1 pages 487–505.

adverse effects are managed by the controls. The Authority will be actively monitoring compliance with these controls.

- 10.4.2 The Committee deems the occupational health risks arising from the transport, manufacture and use of 1080 to be low, assuming compliance with controls such as those covering the use of personal protective equipment.
- 10.4.3 Adverse effects on public health relate to three main areas – direct exposure to baits, contamination of drinking water and contamination of food (farmed and feral meat and animal products, aquatic animal species, aquatic and terrestrial plants, rongoa and honey). The Committee notes that concerns regarding the adverse human health effects of 1080 arise primarily from the aerial application of formulated substances containing 1080.
- 10.4.4 The Committee considers that existing controls are adequate to control the adverse effects on public health. The Committee also recommends that more effort should be put into ensuring that the controls are complied with by all users of 1080 through implementation of best practice guidelines and standards.

Health effects of 1080

- 10.4.5 The Committee heard the concerns of many submitters regarding the potential for long term health effects from chronic exposure to 1080. A number of submitters spoke of their personal experiences of ill health, attributing exposure to 1080 as the cause of such illnesses as cancer and endocrine disruption. Reference was also made to published papers linking 1080 to endocrine disruption. Studies that specifically looked at endocrine disruption from 1080 did not however produce evidence of this. No carcinogenicity studies on 1080 have yet been carried out.
- 10.4.6 The Committee considers that the risks of adverse effects are managed by the controls in place which are designed to prevent exposure. The Authority will be actively monitoring compliance with these controls.

Occupational Exposure

- 10.4.7 Occupational exposure to sodium fluoroacetate (1080) and formulated substances containing 1080 arises from exposure during transport; manufacture of soluble concentrate and 1080 products in the factory; mixing of soluble concentrate with carrots, apple, or oats; loading of aircraft hoppers; application; and disposal.

Transport

- 10.4.8 Sodium fluoroacetate (1080) and formulated substances containing 1080 are required to be transported in accordance with HSNO requirements and the requirements of the Land Transport Rule: Dangerous Goods 2005 (Rule 45001/1).

- 10.4.9 These controls include the need for an approved handler qualification (including the use of trained drivers) for handling and transfer of the substances, extensive identification requirements (including labelling, transport signage, emergency information and safety data sheets) and packaging requirements (the use of UN Dangerous Goods approved containers with suitable outer packaging and stowage). Vehicles are also required to carry emergency equipment to deal with spillage or contamination.
- 10.4.10 The Committee considers that the controls relating to the transport of sodium fluoroacetate (1080) and formulated substances containing 1080 are adequate to prevent exposure to personnel involved in transport.

Manufacture

- 10.4.11 Some submitters expressed concern about occupational health issues associated with the manufacture of formulated substances containing 1080 and the mixing of soluble concentrate in the field.
- 10.4.12 The manufacture of soluble concentrate in the factory involves the mixing of sodium fluoroacetate (1080) with water. The pellet baits, pastes and gels are then manufactured by mixing the soluble concentrate with other ingredients. Both of these operations are carried out in a factory.
- 10.4.13 The Committee notes that the Department of Labour has published Guidelines for the Safe Use of Sodium Fluoroacetate (1080) which provides advice on the safe use of sodium fluoroacetate (1080) and formulated substances containing 1080. The Department of Labour also set a Biological Exposure Index (BEI)⁶¹ and a Workplace Exposure Standard (WES)⁶² for sodium fluoroacetate and recommendations for appropriate personal protective equipment (PPE) for the various exposure scenarios.
- 10.4.14 The results of some occupational exposure studies exceed the BEI, but it is unclear whether these exposures were due to non-compliance with the PPE requirements. One submitter reported that BEIs have rarely been exceeded during the manufacture of bait in recent years. Another submitter claimed that two individuals who had been involved with the mixing of soluble concentrate in the field without the appropriate use of PPE developed cancer. The Committee found no evidence to suggest that 1080 is carcinogenic.
- 10.4.15 The Committee considers that when the Department of Labour guidelines are complied with, including the requirements for PPE (as required under the Act), any adverse effects associated with occupational exposure to 1080 will not be significant. Moreover, the requirement for sodium fluoroacetate (1080) and any formulated substances containing 1080 to be under the personal control of an approved handler (a

⁶¹ Biological Exposure Index is an indication of exposure, measured through the concentration of 1080 in urine.

⁶² Workplace Exposure Standard is the concentration of 1080 in air which must not be exceeded..

person who is trained in the handling and safe use of the substances) will further limit the risk of occupational exposure. The Committee considers that these controls represent sound occupational practice.

Disposal and spillages

10.4.16 There is potential for occupational exposure through disposal of off-specification products, packaging materials, surplus and retrieved baits and contaminated carcasses. As these materials generally contain low concentrations of 1080 and disposal is required to be carried out in accordance with HSNO control procedures, the Committee considers the occupational health risk from disposal activities to be insignificant. In the case of spillages, there should always be a fully trained approved handler present or contactable who would ensure that appropriate remedial action is taken.

Handling of 1080 in the field

10.4.17 The biological exposure monitoring undertaken for workers involved in ground-based operations indicates that there is little risk of exposure to 1080.

10.4.18 The Committee acknowledges that there have been some studies carried out which indicate that occupational exposure to 1080 from aerial operations is potentially significant. Exposure in the field could result from loading operations where bags of (pellet) baits are opened and emptied into hoppers for aerial distribution and workers are exposed to dust from the formulated substances containing 1080.

10.4.19 However, the Committee considers that exposure can be minimised through adherence to safe work practices as set out in the Department of Labour Guidelines for the Safe Use of sodium fluoroacetate (1080), which includes the appropriate use of PPE and attention to good occupational hygiene (for example, washing before eating, drinking, or toilet breaks). Provided these controls are complied with, the Committee does not consider the occupational health risk to be significant.

Exposure of the public

Direct exposure to 1080 baits

10.4.20 Some submitters expressed concern about the risk to human health from direct exposure to 1080-containing baits, but relatively few expressed concern about the risks involved in ground applications of 1080.

10.4.21 The likelihood of direct public contact with bait applied by ground-based methods is reduced by controls (in particular those relating to signage, consultation and notification). Compliance with boundaries of an operation during ground treatments is highly likely and it is also highly unlikely that baits would be laid in public areas and walking tracks. Exposure to members of the public is also further reduced in contained baiting operations.

- 10.4.22 The Committee concludes that the current controls relating to ground-based applications of 1080 are sufficient to control the adverse effects from exposure to formulated substances containing 1080.

Aerial application

- 10.4.23 There were some expressions of concern about the risks to human health from direct exposure of the public to formulated substances containing 1080, particularly where these substances were aerially dropped. The concerns arose from doubts as to whether operators could be trusted to adhere to the rules (for example, keeping bait well clear of picnic areas and public walking tracks) and concerns about the reliability of signage. Submitters gave examples of failure of operators to comply with controls.
- 10.4.24 The applicants and other submitters expressed the view that the controls now in place for aerial operations, in particular signage while baits are toxic and the avoidance of areas where the public may have access, are able to prevent misapplication of bait and consequently the human health risks are low. Improved operational practices, such as the use of modern navigational guidance systems in aircraft, also reduce the risk of misapplication of baits.
- 10.4.25 The Committee notes the depth of public feeling on these issues. Submissions reflected a sharp division of views, with some submitters concerned about the health risks while others expressed confidence that the controls would adequately manage all health risks. The Committee acknowledges that some cases of misapplication have occurred but does not consider such incidents to have been common, particularly in recent years. The Committee also notes that there are very few reports of incidents which have resulted in adverse effects on human health (apart from deliberate misuse).
- 10.4.26 The Committee concludes that the controls on aerial application, when followed by competent operators, are adequate to protect the public from direct exposure to 1080 baits. However, the Committee also acknowledges the high degree of public concern and will monitor compliance with the controls through the watch list. There will also be provision for public reporting of incidents (see Additional Control 12).⁶³

Contamination of drinking water

- 10.4.27 Risks to the public from contamination of a drinking water supply can arise from contamination by 1080 baits, contamination from carcasses of poisoned animals being carried into water (most likely during subsequent rain) or the accidental spillage of baits into water.
- 10.4.28 A wide range of submissions was received in relation to contamination of drinking water. They included concerns about 1080 treatment of public drinking water catchments. Many submitters were opposed to the use of 1080 in drinking water

⁶³ Refer to paragraph 11.6.12 et seq below.

catchments. Some submissions expressed concern about the sampling procedure for testing water before reconnection of the intake, in particular around the storage and transportation of the samples. Other submitters questioned the ability of the authorities to identify all private water sources. Some submissions raised the potential for contamination of surface or ground water used for drinking.

10.4.29 Some submitters also questioned the relevance of the breakdown rate for 1080 in water based on laboratory findings, given the low ambient temperatures in minor water ways during the likely season of application.

10.4.30 Submissions from Regional Councils, pest control companies and the Association of Medical Officers of Health expressed confidence that the processes in place to manage the risk from contamination of public water supplies are appropriate and work well.

Community drinking-water supply

10.4.31 By far the most public concern has been expressed with respect to the indirect exposure of members of the public to 1080 from contamination of public drinking-water supplies through aerial drops. However, there are extensive controls in place to safeguard against such contamination. If there is any possibility of contamination, arrangements are made for the provision of alternative water supplies.

10.4.32 Testing of samples of surface water sources and public supplies has not found concentrations of 1080 above the Ministry of Health's PMAV.⁶⁴

10.4.33 The Committee considers that the controls in place to prevent contamination, coupled with the dilution which would result if such contamination occurred, mean that the health risk is very low.

Small private supplies

10.4.34 The Committee acknowledges that for other sources of water supply, in particular private water supplies including stream and roof supplies, the controls are not necessarily so robust. Prevention of exposure relies more on the accurate identification of such sources and prior consultation and notification.

Direct stream use

10.4.35 Concerns have also been expressed about the risk to members of the public who may take surface water for consumption during aerial 1080 operations. The Committee notes that controls such as signage and public notification are intended to address this concern. In addition, dilution of any bait which falls into a waterway would be

⁶⁴ Provisional Maximum Acceptable Value, which is the minimum standard set by the Ministry of Health for the protection of consumers for lifetime consumption of drinking water.

expected to reduce the contamination to a concentration which is unlikely to cause a risk to health.

- 10.4.36 The Committee notes that the applicants during the course of the hearing clarified that the breakdown of 1080 in the aquatic environment would be better described as dilution. They stated that the important thing was that 1080 residue levels in surface water are usually too small to be detected.
- 10.4.37 As to concerns voiced about the importance of identifying all water supply sources, particularly private supplies, the Committee noted that such issues are addressed by means of the permissions process as Regional Council and public health officials are charged with identifying all risks.
- 10.4.38 The Committee again acknowledges the high degree of public concern around this issue which will be monitored through compliance with the controls through the watch list. There will also be provision for public reporting of incidents (see Additional Control 12).⁶⁵

Contamination of food supply

Farmed animals, milk or dairy products

- 10.4.39 The public may be exposed to 1080 contamination if they consume meat from domestic stock (cattle, deer, sheep, goats) that have received sub-lethal doses of 1080. The applicants presented data to indicate that 1080 is metabolised within 5 days and therefore concluded that human exposure could occur only if animals ingest baits directly and are then immediately slaughtered for human consumption. Contamination of animals via consumption of stock water is considered very unlikely due to the low concentrations and rapid degradation of 1080 in waterways.
- 10.4.40 A number of submitters expressed concerns about the potential for the use of 1080 to give rise to contamination of human foods (meat and milk/dairy products); other submitters raised concerns regarding contamination of the food chain in general.
- 10.4.41 The Agency noted that the potential health risk from exposure of members of the public to contaminated farmed animals or from milk and dairy products is addressed by the extensive controls put in place by the New Zealand Food Safety Authority (NZFSA).
- 10.4.42 The Committee concludes that the health risk from exposure to 1080 from farmed meat or dairy products is adequately addressed by the controls.

⁶⁵ Refer to paragraphs 11.6.12 et seq below.

Feral meat

- 10.4.43 The health risks associated with consumption of feral meat are similar to that for farmed meat (discussed above).
- 10.4.44 Many submissions raised the concern about contamination of feral meat, particularly deer and pork. Concerns about contamination of wild meat sources were raised as an important issue by some Māori. Some hunters stated that a significant proportion of their diet is obtained from feral meat.
- 10.4.45 There are controls in place under the ACVM Act to prevent the contamination of recovered farm animals and feral animals. These controls are under the control of the NZFSA. The Agency notes the health risk may be slightly higher for private kill, as there is less oversight on this from the NZFSA. It is possible that contaminated meat could be taken from wild animals due to the influence of the latency period. The Committee considers, however, that residue levels in feral animals are likely to be very low. The Committee also notes that signage and public notification controls address such issues.
- 10.4.46 The Committee considers that the tighter controls imposed in this decision will provide assurance to the public in this area.

Aquatic animal species

- 10.4.47 While it is possible that members of the public may be exposed to 1080 in aquatic food sources, the potential health risk from consumption of contaminated wild freshwater food sources is seen by the Committee as low.
- 10.4.48 The Committee emphasises the importance of good consultation and information arrangements to ensure members of the public (including iwi/Māori), are aware of areas where 1080 has been used.

Vegetation for food or medicinal (rongoa) purposes

- 10.4.49 It is possible that members of the public may be exposed to 1080 in aquatic or terrestrial plants and herbs. A number of investigations have been carried out which indicate however that the uptake of 1080 by plants and plant tissue residues is very low.
- 10.4.50 A number of submitters raised this issue as a concern, focussing particularly on the use by Māori of traditional foods and medicines (rongoa). Particular concern was expressed in relation to the consumption of watercress by young children. The effects of 1080 on the plants and their value as traditional food and medicine is discussed below.⁶⁶

⁶⁶ Refer to paragraphs 10.5.15–10.5.19 below.

- 10.4.51 Based on its review of the information available, the Committee concludes that residues of health significance from land plants appear unlikely. For contamination of watercress to be a concern, the 1080 would need to be present in the water in greater concentration than is likely to occur. The Committee recommends however that studies be carried out on the possible effects of accumulation of 1080 in aquatic plants such as watercress.

Honey

- 10.4.52 The Committee notes that there have been historical instances of contamination of honey by 1080. While some of the formulated substances containing 1080 are classified as ecotoxic to terrestrial invertebrates (toxic to bees), none of the currently approved formulations is attractive to bees as they contain no sweeteners. The risk of exposure of honeybees (and hence contamination of honey) to formulated substances containing 1080 is therefore very low.

10.5 Adverse effects on the relationship of Māori to the environment

- 10.5.1 The Committee recognises that the concerns raised by iwi/Māori about the negative effects of continued use of 1080 relate largely to its aerial application.
- 10.5.2 The Committee also acknowledges, however, the significant damage and degradation caused to taonga by the existence of browsing and other pest species and the need to continue pest management control.
- 10.5.3 The Committee considers that the application of additional controls and recommendations requiring reports on aerial operations, improved consultation with and participation of iwi/Māori in pest management operations and an increased focus on research, will aid in the mitigation of adverse effects.

Negative impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment

- 10.5.4 A key acknowledgement made by most parties throughout this reassessment application is that the establishment of effective pest management strategies is critical if our native biodiversity is to flourish for future generations. Several submitters noted that 1080 is an important tool in this. However, several iwi/Māori submitters considered the use of 1080 (particularly aerial application) to be inconsistent with tikanga and mātauranga Māori. In particular, they expressed concern that the aerial application of toxins on Papatūānuku (the primordial mother) compromised her ability to maintain the physical and spiritual value and integrity of flora, fauna and other taonga (including waterways).
- 10.5.5 They were also concerned that the deterioration of the environment would inevitably contribute to the loss over time of the depth of knowledge held by iwi/Māori in relation to that environment.

- 10.5.6 On reviewing all of the available information the Committee acknowledges the complexity of this issue. A significant body of research and other information about the physical effects of the aerial use of 1080 was brought to light in the application and through the hearings. The relevance of this research in relation to the physical environment is discussed in the assessment of environmental effects above.
- 10.5.7 The protection and enhancement of the relationships or whakapapa within the environment and its supporting vitality are viewed as critical to the health and wellbeing of the natural world and its ability to continue to provide sustenance for future generations. Browsing pests as well as substances like 1080 are seen to threaten this supporting vitality or mauri. To this end the Committee recommends⁶⁷ further research and closer dialogue between agencies and iwi/Māori about the potential non-biophysical effects of browsing pests and the use of toxins like 1080 on the environment.

Undermining of the roles and responsibilities of kaitiaki

- 10.5.8 It has been acknowledged in previous sections that iwi/Māori have an extensive traditional and contemporary knowledge of New Zealand's natural environment and that this knowledge is practically applied through kaitiakitanga.
- 10.5.9 Throughout this reassessment process the question has been raised as to whether the continued aerial use of 1080 was not undermining kaitiakitanga. Specifically, submitters noted that the core of their role as kaitiaki was to protect and enhance the mauri of native or valued species and other taonga for the benefit of future generations. Though recognising the negative impact of pest species on their ability to undertake this role, they were also concerned about potential negative impacts from the continued long term aerial use of 1080.
- 10.5.10 Similarly, some submitters were concerned about the absence of information or research about the cumulative effects of 1080 on taonga of particular interest to them. These submitters considered this information critical to their ability to make informed decisions and implement appropriate kaitiaki mechanisms to address specific problems.
- 10.5.11 A significant volume of scientific and other evidence was considered during this reassessment process, including the results of research and monitoring studies conducted on a range of species and in various regions. Having reviewed this and other relevant information, the Committee considers that any adverse effect to kaitiakitanga caused by the use of 1080 needs to be carefully weighed against the likely adverse effect of not using it. There is evidence that, if left unchecked, the browsing pest problem could devastate our native biodiversity. In addition, the applicant and many submitters recognised that of the substances currently available

⁶⁷ Refer to section 11.7 below.

for the control of browsing pest species, 1080 is one of the safer and more effective options.

- 10.5.12 However, the Committee also recognises the importance of the role of iwi/Māori as kaitiaki and the benefits which could be gained if they were better able to actively participate in the development and operation of pest management programmes. Their extensive body of knowledge and experience pertaining to the natural environment is valuable, alongside that of contemporary scientific knowledge and experience, to the development of innovative tools and processes for ensuring that the mauri of the environment is maintained and improved.
- 10.5.13 When assessing the avenues available for the involvement of iwi/Māori, the Committee came to the view that DoC's policy regarding consultation with iwi/Māori sets a high standard. However, the submissions received from iwi/Māori indicate inconsistency in their use and application. Due to the significance of the relationship between iwi/Māori and lands administered by DoC, a consistently high standard of iwi/Māori involvement is important. Therefore, the Committee has made a recommendation⁶⁸ encouraging the DoC to review the implementation of its consultation policies and procedures to ensure a consistently high standard of approach among conservancies.
- 10.5.14 Putting the consistency issue aside, the Committee believes similarly high standards could usefully be applied by other agencies or users undertaking aerial 1080 operations. The Committee has indicated its desire to see more effective consultation with iwi/Māori prior to aerial 1080 operations, in accordance with best practice guidelines and intends that this should be implemented through the permissions process. Details of the consultative effort undertaken, including its outcomes in terms of any modification of operation design or timing, will be required to be reported to the Authority in accordance with Additional Control 12.⁶⁹

Negative impact on the physical and spiritual health and wellbeing of iwi/Māori

- 10.5.15 The importance of protecting the productivity and life-sustaining quality of water and plants used in the traditional healing practice of rongoa was noted as a key concern by many iwi/Māori submitters. This concern was raised specifically with reference to the use of 1080 aerially and its effects on the intrinsic qualities of both water and rongoa species. Though research might indicate the absence of significant biophysical effects, compromising of intrinsic qualities includes the potential for the diminishment of mauri. Submitters implied that a negative impact on mauri would have flow-on effects in terms of the healing or life-giving qualities of the affected taonga (ie water or rongoa species).

⁶⁸ Refer to section 11.7 below.

⁶⁹ Refer to paragraph 11.6.12 et seq below.

- 10.5.16 A number of submitters also raised concerns about the potential effect of 1080 on the quality and availability of wild foods (plants and animals) that continue to be utilised by iwi/Māori communities for both whanau sustenance and manaaki manuhiri (host responsibilities). Submitters felt that their ability to continue to utilise these sources of food would be reduced because of the potential effects of 1080 on those species. As an important tikanga principle and practice, both in terms of the process of collecting wild foods and in meeting their cultural obligations to provide for visitors, the Committee recognises that a reduction in the quality and availability of such foods would be a significant problem for iwi/Māori.
- 10.5.17 In assessing this issue the Committee also considered the impact of browsing pests like possums on the quality and availability of wild foods. The applicants and many submitters referred to the devastating effect of such pests on a whole range flora and fauna species which potentially places entire ecosystems at risk over time. Already pests of this kind have impacted upon the availability of several wild food species, particularly birds. If possums were left uncontrolled, the ability of future generations to enjoy traditional wild food species would come under significant threat. In other words, pests also diminish mauri.
- 10.5.18 On reviewing the information provided by the applicants, submitters, the Agency and Ngā Kaihautū, the Committee considers that improved communication and involvement by iwi/Māori in pest management strategies would mitigate some of the risks raised by submitters. As discussed above, improved consultation prior to aerial operations will enable iwi/Māori groups to be better informed and have some influence over pest management operations.
- 10.5.19 In addition, the Committee also noted submitters' calls for more research on the impacts of 1080 on fauna and flora of particular significance to rongoa practitioners. A recommendation that such research be undertaken in collaboration with rongoa practitioners has been made by the Committee to assist in addressing the absence of information on this issue.⁷⁰

Negative impact on the economic development potential of iwi/Māori

- 10.5.20 A number of submitters noted concerns that the use of 1080 aerially impinges on the realisation of their economic potential with regard to wild foods and the possum product industry. Some considered the by-kill and other effects on deer and pig unacceptable, on the basis that hunting these species had become an important part of their way of life.
- 10.5.21 Other submitters noted that aerial 1080 operations removed the opportunity for local people to be employed in pest management operations involving ground-based methods. Some submitters sought the re-establishment of a bounty scheme for possum trapping/hunting. These issues are further discussed in section 10.6 below.

⁷⁰ Refer to section 11.7 below.

10.6 Adverse effects on society and communities

- 10.6.1 The adverse effects on society and communities from the continuing use of 1080 are primarily associated with its aerial use.
- 10.6.2 The Committee considers that the significant adverse effects to society and communities resulting from the use of aerial 1080 are: the loss of opportunity to hunt; concern for the welfare of non-target animals; and concern about ecosystem damage.

Loss of opportunity to hunt due to reduced deer populations

- 10.6.3 The Committee considers that, notwithstanding the mechanisms for reducing the level of impact, the adverse effect of the loss of opportunity to hunt due to reduced deer populations is significant.
- 10.6.4 The Committee notes that this adverse effect (which includes loss of amenity and loss of food source) pertains solely to aerial use of 1080. With ground-based control only, this adverse effect would not be realised.
- 10.6.5 A large number of written and oral submissions expressed concern about the loss of opportunity to hunt due to reduced deer populations from by-kill during 1080 aerial operations. Hunting was seen as having amenity and cultural values as well as providing food for the table.
- 10.6.6 The Committee has considered the deer hunters' concerns under the following headings:
- the availability of areas for hunting;
 - restrictions on access and taking deer following 1080 drops;
 - by-kill of deer during 1080 operations;
 - the use of deer repellent to minimise by-kill.

Background

- 10.6.7 The Committee notes the discussion on the management of deer in New Zealand in the E&R Report.⁷¹ The key points from this summary are that:
- there are nine species of introduced deer in New Zealand;
 - wild deer are an important and valued species to recreational hunters;
 - wild deer eat the new undergrowth in forests and slow reforestation;
 - deer are “wild animals” under section 2 of the Wild Animal Control Act 1977 (which provides for “the control of wild animals generally and for their

⁷¹ Refer to E&R Report pages 167–171.

eradication locally where necessary and practicable”, and for co-ordination of commercial and recreational hunters “to ensure concerted action against the damaging effects of wild animals on vegetation, soils, water and wildlife”);

- subject to the provisions of section 8(1) of this Act any wild animal may be hunted or killed by any person in any part of New Zealand;
- the Conservation Act 1987 allows the Minister to approve general statements of policy for areas of land managed by DoC for the purposes of the Wild Animal Control Act (section 17(c)(1)).

DoC’s deer policy

10.6.8 DoC’s over-riding goal for deer control⁷² is:

“To reduce the impacts of deer, along with other threats, on public conservation lands so as to maintain and enhance forest regeneration and indigenous ecosystem protection”.

10.6.9 While the policy statement applies primarily to deer control on public conservation lands it includes actions to restrict the feral range of deer across all lands. The policy recognises that commercial and recreational hunters value deer as a hunting resource and that commercial hunting in particular provides effective control in those areas that are suitable for hunting by helicopter. Further, DoC will endeavour to encourage both commercial and recreational hunting on public conservation lands where this is consistent with management for conservation. The policy states explicitly that commercial and recreational hunters will generally have open access to public conservation lands.

Areas under active DoC management for deer

10.6.10 DoC actively targets deer in ten areas.⁷³ The largest of these areas is the Takahe Area in the Murchison Mountains, where 500,000 hectares is managed. The other main areas are Northland and an area east of the Wanganui river, both of which are deer-free areas. The total area of conservation land where deer are targeted comprises 540,000 hectares. All active management of deer is done by shooting from the ground or air.

⁷² <http://www.doc.govt.nz/templates/MultiPageDocumentTOC.aspx?id=39968>

⁷³ Refer to additional information from DoC at Hamilton 21 May 2007 <http://www.ermanz.govt.nz/news-events/focus/1080/hearings/addinfo33.pdf>. The ten listed areas are the Murchison Mountains, Northland, Auckland/Waikato, Taranaki, Kaweka Mountain Beech project; Resolution Island, Secretary Island, Te Urewera Mainland Island (MI), Hurunui MI, Boundary Stream MI.

Availability of areas for recreational hunting

- 10.6.11 The Committee notes from the Agency's E&R Report⁷⁴ that DoC regulates recreational hunting by issuing hunting permits. Recreational hunters have open access to almost all public conservation lands with few restrictions on what deer they can kill and when they can kill them. Some restrictions do exist, for example, when buffer zones are set for pesticide use. For popular herds such as Fiordland wapiti and Blue Mountains fallow deer, systems of ballots and bag limits are in place.
- 10.6.12 There are eight recreational hunting areas (RHAs) in New Zealand,⁷⁵ originally established by the New Zealand Forest Service when there was a deer eradication policy on other public lands. While this situation no longer applies (other public conservation land is now available to hunters), many hunters use the RHAs because they have been managed for particular herds.
- 10.6.13 The total feral deer range on public conservation land is 6.7 million hectares. Of this, an area of 1.5 million hectares is subject to control using 1080. This means that over 5 million hectares, or 70% of the range, is available to deer hunters without restrictions associated with use of 1080.
- 10.6.14 Thus there are significant areas of public conservation land within the feral deer range available to hunters where 1080 is not used. This can provide alternative hunting areas during periods where hunters may be displaced from their usual hunting areas by 1080 operations.

Restrictions on access and taking deer following 1080 drops

- 10.6.15 The Committee acknowledges the concerns expressed by many deer and pig hunters that the use of 1080 has an important adverse effect on their ability to hunt and enjoy the outdoors. This adverse effect is in the form of restrictions on access to favoured hunting spots and limitations on the time before deer can be taken following 1080 aerial drops. While some areas may be off limits for extended periods during and following aerial 1080 drops, it was argued that in most circumstances alternative areas are available to hunters.

By-kill of deer during 1080 operations

- 10.6.16 The Committee notes that there is some considerable uncertainty about how much by-kill of deer occurs from aerial drops and that only a limited amount of scientifically-based evidence is available. At the same time, there was anecdotal evidence presented by submitters that in some circumstances the by-kill of deer can significantly impact on the hunting potential of an area.

⁷⁴ Refer to E&R Report page 169.

⁷⁵ Pureora, Kaimanawa, Aorangi, Lake Sumner, Oxford, Whakatipu, Blue Mountain and Kaweka.

The use of deer repellent to minimise by-kill

- 10.6.17 Hunters have questioned why deer repellent is not used for all aerial drops of 1080, and have implied that it is a question of cost since it adds approximately \$6 per hectare to the total cost of the operation.
- 10.6.18 AHB has indicated that it is happy to consider using deer repellent for all its operations on areas where hunting is undertaken so long as it is legally possible to do so.
- 10.6.19 DoC received advice from the Minister of Conservation (21 March 2005⁷⁶) that deer repellent may be used in the gazetted RHAs as long as its use does not have negative consequences for indigenous biodiversity, and provided that the additional cost does not jeopardise the efficacy of possum control in the RHA or adjoining areas. The increased costs are a factor when there is a fixed operating budget, with the potential for a reduction in the area able to be treated with 1080.
- 10.6.20 DoC will therefore consider use of deer repellent for aerial drops on RHAs. However, DoC has stated that for reasons relating to the legal status of deer under the Wild Animal Control Act, deer repellent cannot be used outside the RHAs because of the statutory provisions under which the land is held and managed.
- 10.6.21 The Committee was told that deer repellents are comparatively new and their efficacy has not been fully established. Further, deer repellent is currently only available for use with carrot bait, which is unsuitable for aerial drops in many areas as it may increase the risks to other species.
- 10.6.22 The Committee notes that the submission from the New Zealand Deerstalkers' Association supports the use of 1080 for pests but believes that current use of 1080 poses unacceptable risks to game animals and hunting dogs. The Association supports the ongoing use and development of deer repellents as a means of increasing the acceptability of 1080 aerial drops.
- 10.6.23 The Committee notes that information received in submissions and during the hearings suggests that there have been circumstances where a lack of good communication between deerstalkers and pest control agencies has caused concern and anxiety. Therefore, the Committee recommends that AHB, DoC and Regional Councils consult with the New Zealand Deerstalkers' Association on either a national or a regional basis prior to undertaking aerial drops in areas where deer are present and hunting occurs, and that this consultation include explicit consideration of whether or not use of deer repellent is appropriate on a 'case by case' basis.

⁷⁶ Refer to Minister of Conservation's statement (<http://www.ermanz.govt.nz/news-events/focus/1080/hearings/addinfo80.pdf>).

- 10.6.24 Notwithstanding the mechanisms for reducing the level of impact, the Committee concludes that the adverse effect of the loss of opportunity to hunt due to reduced deer populations is significant.
- 10.6.25 The Committee is of the view that the loss of opportunity resulting from aerial use of 1080 is less significant in the case of pig and game hunting.

Anxiety resulting from disagreement between community and pest control agencies

- 10.6.26 Following review of the written and oral submissions the Committee notes that there is considerable anxiety in the community about current pest control strategies. Part of this anxiety relates to concerns about the way that pest control agencies address by-kill. The Committee notes that many manifestations of this anxiety can be traced to inadequate communication between relevant pest control agencies and the public.
- 10.6.27 The general areas of disagreement include:
- the ‘acceptable’ level of by-kill;
 - the best way to minimise by-kill;
 - the most appropriate method for pest control (strategic level);
 - the parameters used to determine the specific method (for a particular area).
- 10.6.28 A more specific area of disagreement between deerstalkers and DoC is about where deer repellent should be used.
- 10.6.29 The Committee notes that information provided by submitters suggests that there is a lack of confidence in some particular operators.
- 10.6.30 The Committee believes that most of the conflict rises from the aerial application of 1080, and that this adverse effect can be ameliorated (though not removed) by appropriate and meaningful consultation and dialogue with communities, including listening to community concerns and taking account of community perspectives. The issue of risk communication is addressed in section 11.7 of this decision. The Committee further notes that communication should be applied to policy decisions as well as operational decisions, and that pest control agencies should ensure that communities have an opportunity to provide input at early stages of planning.
- 10.6.31 Many Regional Councils undertake possum control as vector managers on behalf of AHB. In most Regional Council areas a resource consent is required before 1080 operations can be carried out. In most areas public notification is required, but in a few areas this is not the case.
- 10.6.32 Notification is undertaken as part of RMA processes, and varies considerably between regions and particular activities. Some submitters made useful suggestions to improve notification processes.

- 10.6.33 The Committee notes that DoC has a range of standard operating procedures (SOPs) that are used to govern pest control operations on its land. One of these relates specifically to consultation and notification of operations⁷⁷ This SOP makes it clear that notification of pesticide operations will always be required but the level of consultation must fit the context of the operation and the community. It gives three consultation options:
- consult on options for control (where the method of control has not been determined) and on effects (where control method has been selected);
 - consult on effects of the operation with all occupiers of land included in and adjoining the proposed treatment area, and all grazing licence holders;
 - notification only, that is inform local community, stakeholders, visitors and users about all pest operations on lands managed by DoC.
- 10.6.34 The DoC SOP makes it clear that consultation involves a willingness to adapt the proposed operation as a consequence of the information gained from the consultation. Notification may be used in circumstances where previous experience has shown that the community is comfortable with the control method and potential effects.
- 10.6.35 The Committee is aware of a recent initiative (Minister of Conservation's monthly newsletter, June 2007) to establish a Ministerial Panel to explore management of deer, chamois, thar and pigs. The Panel has representatives from Forest and Bird, Landcare Research, New Zealand Deerstalkers' Association and the Game and Forest Foundation of New Zealand. The Panel has been tasked with preparing a public consultation document and reporting by December 2007.⁷⁸ The Deerstalkers have welcomed the Panel. The Committee sees this as a positive step toward reducing concerns by involving stakeholders in reviewing management options.
- 10.6.36 The Committee considers that the adverse effect of anxiety resulting from disagreements between the community and pest control agencies regarding appropriate pest control methods is significant.

Anxiety resulting from perceived loss of control over own environment

- 10.6.37 Submitters raised concerns about loss of control over their own environment as a result of 1080 operations, with specific reference to aerial operations. These included the risk of dust (or pellet) drift (during aerial application), a negative perception of 1080 use in overseas export markets, a lack of research into residual effects, a lack of robust monitoring, and economic costs from the loss of stock and farm dogs due to 1080.

⁷⁷ DoC Standard Operating Procedure 'Consultation and Notification of Pesticide Operations' NH 3007: Version 2.0.

⁷⁸ <http://www.doc.govt.nz/templates/news>.

Negative experience in recreational and rural areas due to pest control

10.6.38 While noting that both ground and aerial 1080 operations may limit access to some areas for a period of time, the Committee does not consider that any evidence has been provided to link pest control (either using 1080 or other methods) to other negative recreational experiences. The Committee further notes that similar limitations (though they may be of lesser duration) will result from the use of other vertebrate poisons. The Committee concludes that this effect is not significant.

Grief caused by pet suffering or mortality resulting from pest control operations

10.6.39 The Committee heard from a number of submitters who had lost dogs due to 1080 poisoning. This included working and domestic (pet) dogs. (Dogs are particularly susceptible to poisoning by 1080 both directly from eating 1080 baits and indirectly through scavenging possum, rabbit or other carcasses.)

10.6.40 The Committee is sympathetic to the grief felt by these submitters. It notes however that some management options are available to minimise the likelihood of dog deaths. These include signage, notification processes and the exclusion of people and dogs from areas where 1080 has been aerially dropped for an appropriate period. The Committee notes that following aerial drops in many cases carcasses are monitored to determine the length of the exclusion period, and encourages this practice. Farmers noted that they generally use muzzles to safeguard working dogs (this is primarily relevant to aerial drops on private land).

10.6.41 The Committee was encouraged to hear that antidotes to 1080 are available.⁷⁹ It believes that the new management regime will help reduce the likelihood of dogs being lost to 1080 poisoning.

Concern for animal welfare

10.6.42 While possums are perceived as a major environmental threat and risk to the farming industry (as carriers of bovine Tb), they should, nevertheless, be treated as humanely as possible and pest control managers should use every endeavour to ensure that their suffering is minimised. While noting that the public regards trapping and shooting as the most acceptable methods of control, the Committee acknowledges that neither of these methods of killing possums is wholly reliable in terms of reducing suffering.

10.6.43 Work is being undertaken on the improvement of baits to ensure that a lethal dose is delivered to the target animal. This is consistent with the Authority’s ethical framework which requires that account be taken of concern for animal welfare.

10.6.44 The Committee notes that there is a high level of public concern for the welfare of animals that are the target of pest control operations (primarily possums and rabbits).

⁷⁹ Refer to submissions 9356 and 9347.

- 10.6.45 The Committee recognises that in addition to issues of by-kill from 1080 operations, non-target animals may receive a sub-lethal dose which can then cause ongoing suffering over a long period. The Committee notes that this applies to all vertebrate pest control methods.
- 10.6.46 The Committee heard evidence from deerstalkers who expressed particular concern about deer deaths from experience of finding carcasses and evidence of slow and painful deaths.⁸⁰ While the direct effect on hunting is considered above,⁸¹ there is an additional adverse effect on society and communities through concern or anxiety about the way in which non-target animals die.
- 10.6.47 The Committee concludes that concern for the welfare of non-target animals exposed to 1080 is a significant adverse effect.

Concerns about incidents around 1080 operations

- 10.6.48 A number of submitters told of personal experiences related to 1080 operations that had caused them discomfort and stress. These included incidents where they believed that aerial drops had been off target or where notification procedures had been inadequate or guidelines had not been followed correctly.
- 10.6.49 The Committee is of the view that while this is primarily a compliance issue (relating to controls, including permissions, under the Act and Regional Council controls under resource management legislation) there is a further communication issue that should be addressed through adoption of best practice guidelines.⁸²
- 10.6.50 Given proposed processes for amelioration the Committee does not consider that this adverse effect is significant.

Concern resulting from perceptions of ecosystem degradation

- 10.6.51 A concern about perceptions of ecosystem degradation was common to submitters who support the continued use of 1080 and submitters who are opposed.
- 10.6.52 New Zealanders are concerned about our natural environment and are united in wanting their children and grandchildren to be able to enjoy the benefits that they perceive themselves as having enjoyed. However people differed in their views about how to protect these values.
- 10.6.53 The Committee notes that this concern is felt deeply by many New Zealanders. Notwithstanding that many see 1080 as less of a problem than possums in this regard,

⁸⁰ The Committee viewed a documentary 'A Shadow of Doubt', produced by the Graf Boys.

⁸¹ Refer to paragraphs 10.6.3–10.6.25 above.

⁸² Refer to section 11.7 below.

the Committee rates the adverse effect of concern resulting from perceptions of ecosystem degradation as significant.

Concern that the use of 1080 is adversely impacting on New Zealand's clean green image

- 10.6.54 The Committee listened to several submitters who expressed concern that the use of 1080 is adversely impacting on New Zealand's clean green image. The concept of a clean green image is the expression of a value held by most New Zealanders. The impact of the use of 1080 on this image is also discussed as a beneficial effect from the perspective of people who believe that the use of 1080 contributes to enhanced pride and pleasure in the protection of New Zealand's natural heritage.
- 10.6.55 The Committee acknowledges that such concerns are felt regardless of whether there is any evidence to support the existence of any adverse effect, but that without further research or evidence it is not possible to estimate the significance of this concern. The Committee notes that concerns about the impact of 1080 on New Zealand's clean green image are balanced by concerns about the damage done by pests.

Concerns about sabotage

- 10.6.56 During the hearings the issue of sabotage was raised. In some cases local groups have attempted to sabotage 1080 operations (both aerial and ground-based operations) by removing signs and circulating misinformation. The Committee is concerned that these activities have the potential to result in the public being inadvertently exposed to 1080, but considers that this is beyond the scope of the reassessment.

10.7 Adverse effects on the market economy

- 10.7.1 The Committee does not consider any adverse effects on the market economy arising from the ground or aerial-based use of 1080 to be significant.
- 10.7.2 The Committee considered the loss of livestock from poisoning and concludes that this is not a significant adverse effect. The Committee also considered the adverse effect of reduced opportunities for employment from trapping and hunting. The Committee acknowledges the growing value of the possum fur industry but concludes that there is no evidence to suggest that the use of 1080 is having any adverse impact on this industry since there remain significant opportunities (existing and unexploited) available for possum hunters.

Loss of livestock from poisoning

- 10.7.3 The applicants reported isolated cases of the loss of livestock to accidental poisoning, mostly associated with bovine Tb control operations which take place on or close to productive rural land. The causes of accidental poisoning in these instances are attributed to human error, such as restocking too early, gates left open or damaged fencing allowing stock access to poison operational areas.

- 10.7.4 One submitter referred to “numerous documented cases of domestic farm animals being accidentally poisoned by 1080, especially where poison drops border farmland”. A number of news reports were also supplied to the Committee regarding stock deaths suspected to be caused by 1080.
- 10.7.5 While accidental livestock deaths from 1080 poisoning do occur, the Committee notes that only small numbers of sheep and cattle are reported killed. The effects are considered to be localised and short term and to have very little impact on the market economy. The Committee does not consider that this adverse effect is significant.

Loss of working dogs from poisoning

- 10.7.6 The applicants note that dogs are particularly susceptible to 1080, through direct poisoning and indirect poisoning by scavenging on poisoned carcasses. There have been isolated incidents of working dogs poisoned by accidental exposure to 1080 which the applicants attribute to human error such as allowing dogs access to areas recently poisoned, gates left open or damaged fencing.
- 10.7.7 There were a number of submissions referring to the poisoning of working dogs by 1080. Some submitters who had lost working dogs believed that it was their responsibility to protect their dogs, while others felt that it was difficult to protect their dogs because of the long period after operations that poisoned possum carcasses remained accessible to dogs. Some submitters felt that using muzzles to protect working dogs was impractical, while others supported their use and were comfortable that it was a sensible, humane and effective way of protecting their dogs.
- 10.7.8 Submitters also commented on measures that would mitigate the risk of working dogs being poisoned, including good signage, radio and print advertising in areas where 1080 drops are being made and mail drops to registered dog owners. Livestock farmers acknowledged the risk to working dogs but still strongly advocated the use of 1080 because of the benefits from controlling pests.
- 10.7.9 The Committee acknowledges the distress that is felt and the costs incurred when working dogs are poisoned. However, the number of working dog deaths reported is low, and a number of submitters who acknowledged the issue still supported the continued use of 1080. Any adverse effects on the market economy are not considered to be significant as they are small, localised and short term.

Costs associated with the temporary removal of stock

- 10.7.10 The applicants noted that livestock is required to be excluded from areas undergoing treatment and that temporary removal of stock from such land is likely to create a financial cost to farmers. With the increased precision of aerial dropping and the likelihood of operations on or near farmland being ground-based operations, the impacts of temporary removal are likely to be infrequent and short term, with the main costs being farmer’s time.

- 10.7.11 There were no submissions on this issue. Any adverse effects on the market economy are not considered to be significant as they are infrequent, localised and short term.

Negative impact on market values and access for agricultural and horticultural products

- 10.7.12 Some submitters argued that contamination of meat and dairy produce with 1080 is of great concern, particularly for our European markets. The use of 1080 is seen by some as a threat to New Zealand's reputation as a supplier of high quality agricultural products, with trade barriers relating to the use of 1080 more likely than trade barriers relating to the threat of bovine Tb.
- 10.7.13 Contamination of farmed meat and dairy produce is unlikely to occur as livestock are excluded from treatment areas and feral deer meat for human consumption is subject to strict protocols that require the animal to be sourced from 1080-free areas.
- 10.7.14 While it is difficult to assess the impact of increasing environmental awareness and concerns about sustainability on international markets, the Committee did not rate this concern as significant.

Negative perceptions of large scale aerial application of pesticide and impact on tourist spending

- 10.7.15 The Committee notes that there is no evidence of any adverse effect on the market economy from negative perceptions impacting on tourist spending. While pest control operations may occur in areas valued by tourists, most such operations are in areas that are remote, and only small numbers of tourists are likely to be aware of these operations and affected by them. This issue was not raised by submitters.
- 10.7.16 The Committee does not consider that this adverse effect is significant.

Negative financial and commercial impacts from restrictions on hunting

- 10.7.17 Recent studies have shown that the recreational hunting resource has economic value, especially in small towns. The Committee acknowledges that hunters may face restrictions on entry to particular areas following 1080 operations and that there may be a subsequent impact on the local economy in these areas. However, hunters may choose to use different areas, with a subsequent positive impact on the local economy in those areas. The Committee concludes that any adverse effect from reduced hunter spending as a result of certain areas being temporarily closed is not significant.

Negative impact on possum fur industry

- 10.7.18 The Committee notes the information provided by submitters regarding the potential for increased markets for possum fur. The applicants noted that at the time of submitting the application for reassessment of 1080 the possum fur industry was not thought to be a significant export earner for New Zealand. Recent interest in possum fur (and high

prices received) may mean that this situation will change. The fur industry relies mainly on trapping, primarily on easily accessible land areas, as fur is plucked from recently killed possums.

- 10.7.19 Some submitters suggested that the introduction of a bounty might be a way of reducing possum numbers. DoC has addressed this issue and calculated that on the basis of past experience a bounty in the range of \$2–\$10 would be unlikely to sufficiently reduce possum numbers to a level at which forest and birdlife damage could be considered acceptable. Two factors that contribute to this result are that trappers seeking the bounty would target easy areas first, so that the more inaccessible areas would not receive any attention.
- 10.7.20 However, the Committee heard from DoC and AHB that there does not need to be a conflict between the use of 1080 and the possum fur industry since most major 1080 aerial operations are on land areas that it is either impossible or very uneconomic to cover using ground control methods. Further, the Committee concurs with the Agency and the applicants that even with continued use of 1080 the number of possums available to the fur industry is not likely to decrease to the point where that industry becomes non-viable.
- 10.7.21 The Committee does not consider that the adverse effect of reduced number of possums being available for the fur industry is significant. However, the Committee encourages the applicants to be proactive in working with the fur industry to ensure that where possible fur hunters are able to access the resource during the long lead in time before proposed operations. Similar arguments apply to the possum meat industry.

Reduced opportunities for employment from trapping and hunting for control of possums and other pests

- 10.7.22 As noted above, the Committee has formed the view that a process of improved co-operation between pest control agencies (AHB, DoC, Regional Councils and others) and commercial interests involved in the possum fur (and meat) trade is a key to increasing employment in these areas.
- 10.7.23 Currently there is a significant amount of employment of contractors for possum control. These contractors use a range of techniques to reduce possum numbers. The Committee heard evidence at the hearings that in most cases AHB and Regional Councils put proposed operations out to tender without specifying the mechanism to be used to reduce possum numbers.
- 10.7.24 Aerial drops are mainly used in more inaccessible areas where trappers and hunters are less able to meet the terms of the tender. The Committee heard an example of a tender where ground-based contractors were unable to meet the conditions because of the nature of the terrain and subsequent attempts to tender the work failed through lack of applicants.

- 10.7.25 The Committee concludes that under the present circumstances, while there might be some local areas where aerial drops of 1080 reduce possum numbers to the extent that there is less work available for contractors, this does not constitute a significant adverse effect.
- 10.7.26 The Committee heard that farmers employ rabbit shooters from time to time. While 1080 may be required to be used more extensively in the future as the efficacy of RHD declines, it is unlikely to have the effect of reducing employment from the current level.
- 10.7.27 The Committee does not consider that this adverse effect is significant.

Negative impact on trade in feral venison and other game animal-based industries

- 10.7.28 The Committee heard a range of views on the viability of the trade in feral venison and other game-based industries. The Committee accepts the view of the Agency⁸³ that while a reduction in the number of animals available may have been one factor in the effective collapse of trade in feral venison, there is no evidence that the use of 1080 was responsible for this.
- 10.7.29 The Committee concludes that this adverse effect is not significant.

⁸³ Refer to E&R Report pages 191–192.

11. New management regime

11.1 Introduction

- 11.1.1 Section 8 of this decision provides an overview of the current management regime for 1080 and formulated substances containing 1080.
- 11.1.2 For the most part, ground-based operations using 1080 seem to be well managed, and the Committee is of the view that only minor changes to the controls for ground application are required.
- 11.1.3 Aerial operations using 1080 do however involve greater risks. They are also the subject of widespread public concern and anxiety. The Committee notes that there are a number of research gaps on the effects of 1080 in relation to its aerial application.
- 11.1.4 The Committee has determined that in relation to aerial use of 1080, there are three areas where changes need to occur:
- the Authority will establish a watch list to actively monitor all aerial 1080 operations. The Authority will require reports on all aerial 1080 operations to be provided to it, and will report annually on the outcome of those operations;
 - existing controls have been strengthened and new ones added to further mitigate the risks involved in aerial drops. These include:
 - setting a maximum application rate;
 - requiring public notification of any aerial application;
 - prohibiting aircraft from flying over public drinking water supplies;
 - requiring aircraft to have suitable navigational guidance systems;
 - requiring consultation with iwi/Māori;
 - a number of actions are recommended to promote best practice in relation to pre-operation consultation and notification and the management of aerial operations.
- 11.1.5 In addition, the Committee is strongly recommending that more research is undertaken into other possum control methods that would obviate the need for aerial drops of 1080, and in areas where there remains a lack of knowledge and a degree of public concern about the effects of 1080.

11.2 The Authority watch list

- 11.2.1 This section contains more information about the Committee's decision to put aerial drops of 1080 on a watch list.

- 11.2.2 The purpose of the watch list is to:
- provide the Authority with a national picture of aerial operations that will be held centrally and made available to the public;
 - enable members of the public to register concerns about current and future aerial operations and have those concerns monitored and actioned as appropriate;
 - enable the Authority to undertake an audit of aerial operations to monitor best practice and consistency;
 - ensure that the Authority has the information it needs for any future reassessment it may wish to undertake.
- 11.2.3 The watch list will be set up with effect from 1 January 2008 specifically for 1080 but may well be used for other substances in the future.
- 11.2.4 Information placed on the watch list will be publicly available. The mechanics and logistics of the list will be finalised by the Authority in time for the start date of 1 January 2008.
- 11.2.5 To ensure that the information included in the watch list is both comprehensive and accurate, the Committee is imposing a control requiring information about each aerial operation to be provided to the Authority.
- 11.2.6 The details of the information required are set out in Additional Control 12.⁸⁴ In general terms, the information must include:
- the reasons for the operation;
 - details of the notification and consultation undertaken;
 - details of the operation – location, dates etc;
 - possum numbers before and after the operation;
 - incident reports;
 - details of pre- and post-operation monitoring of fauna, including species of particular importance to Māori;
 - details of post operation monitoring of water quality; and
 - an overall assessment of the outcome of the operation.
- 11.2.7 The Authority will publish an annual report on aerial 1080 operations using this information.
- 11.2.8 The explanation of this additional control is set out in more detail in paragraphs 11.6.12–11.6.14 below. The Committee acknowledges that this control could impose an additional burden on 1080 aerial operators. However, the Committee is satisfied

⁸⁴ Refer to paragraph 11.6.12 below.

that the additional control is necessary to provide the Authority with more information about aerial operations and to provide members of the public with a place to provide information or raise concerns about such operations. (It should be noted however, that in the event of incidents or non-compliance, the first point of contact for the public should be the relevant operator.)

- 11.2.9 The Committee notes that for the most part the applicants already hold this kind of information about aerial operations. Therefore, in the Committee's view the additional control does not impose undue compliance costs.

11.3 Strengthening controls

- 11.3.1 The Committee has determined that the controls attached to sodium fluoroacetate (1080) and formulated substances containing 1080 are those prescribed by the regulations made under the Act and which are assigned to these substances on the basis of their hazard classifications.
- 11.3.2 In accordance with section 77 and 77A of the Act, the Committee considers that the changes to the controls set out below, assigned on the basis of the substances' hazard classifications, should be made to sodium fluoroacetate (1080) and formulated substances containing 1080.
- 11.3.3 Under section 77(3), (4) and (5), the default controls determined by the hazardous properties of the substance may be varied (substituted, added, or deleted) in certain circumstances, taking into account whether the adverse effects are greater or less than the adverse effects that would normally be associated with substances given the same hazard classifications. In substituting or deleting controls, the adverse effects of the substance must not be significantly increased.
- 11.3.4 Under section 77A, the Authority may impose as controls any obligations and restrictions that it thinks fit. Before imposing a control under this section, the Authority must be satisfied that, against any other specified controls that apply to the substance:
- (a) the proposed control is more effective in terms of its effect on the management, use and risks of the substance; or
 - (b) the proposed control is more cost-effective in terms of its effect on the management, use and risks of the substance; or
 - (c) the proposed control is more likely to achieve its purpose.
- 11.3.5 The full set of controls which apply to sodium fluoroacetate (1080) and formulated substances containing 1080 are set out in Appendix A, Tables A1 and A2. This section of the decision contains a discussion of the changes (additions, substitutions, variations and deletions) made to the controls as part of the consideration of this application for reassessment of 1080.
- 11.3.6 The Committee's changes to controls are discussed in the following sections:

- section 11.4 – changes to controls on sodium fluoroacetate (1080);
- section 11.5 – changes to controls which apply to both ground-based methods of application and aerial application of formulated substances containing 1080 (ie changes to controls which will apply irrespective of the method of application);
- section 11.6 – changes to controls which apply only to aerial application of formulated substances containing 1080.

11.4 Changes to controls on sodium fluoroacetate (1080)

11.4.1 The following changes to controls apply to the import or manufacture of sodium fluoroacetate (1080), which is the technical grade active substance used for the manufacture of formulated substances containing 1080.

Additional Control 1 – Prohibition on the use of sodium fluoroacetate (1080)

11.4.2 An additional control is imposed under section 77A which prohibits the use of sodium fluoroacetate (1080) for any purpose other than for research or development (not involving use in the outdoor environment) or as an ingredient or component in the manufacture of another substance or product.

11.4.3 This additional control effectively means that sodium fluoroacetate (1080) is not permitted to enter the outdoor environment (unless it is in a formulated substance containing 1080 with its own approval under the Act).

Deletion of toxic and ecotoxic property controls in the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001

11.4.4 Since sodium fluoroacetate (1080) is not permitted to enter the environment, the following toxic and ecotoxic property controls in the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 which relate to the use of a hazardous substance that is discharged or laid in the environment are deleted:

Control Code ⁸⁵	Regulations
T3 and E5	Regulation 5–6 – Requirements for keeping records of use
T8	Regulation 28 – Controls on vertebrate poisons
E2	Regulations 46–48 – Restrictions on use within application area
E3	Regulation 49 – Controls relating to protection of terrestrial invertebrates
E4	Regulations 50–51 – Controls relating to protection of terrestrial vertebrates

Variation of approved handler requirements for sodium fluoroacetate (1080)

11.4.5 Regulation 9 (Control Code T6 and E7) of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 requires sodium fluoroacetate (1080) to be either

⁸⁵ References to Control Codes relate to the coding system used in the ERMA New Zealand Controls Matrix.

locked up or under the personal control of an approved handler. The purpose of this control is to ensure that a person handling sodium fluoroacetate (1080) is trained in its safe use and management and understands the controls which apply to the substance.

- 11.4.6 This control, which provides for exceptions to the approved handler requirements in certain situations when transporting sodium fluoroacetate (1080), is varied under section 77A in order to reduce compliance costs and to avoid duplicating the requirements of other legislation.
- 11.4.7 Sodium fluoroacetate (1080) is therefore required to be under the control of an approved handler unless the requirements set out in regulation 9A (see Table A1, Appendix A) are met. These requirements are considered to be a cost-effective way of ensuring the safe management of sodium fluoroacetate (1080) during the stated modes of transport.

Deletion of the requirement for secondary containment for sodium fluoroacetate (1080) in the Hazardous Substances (Emergency Management) Regulations 2001

- 11.4.8 Regulations 35–41 (Level 3 emergency management requirements for secondary containment (Control Code EM12)) are deleted under section 77(4)(a).
- 11.4.9 The regulations require secondary containment systems for pooling substances and do not apply to sodium fluoroacetate (1080) given that it is a solid. Having regard to the requirements of section 77(4)(a), the Committee considers that because it is a solid, the adverse effects of sodium fluoroacetate (1080) will thus be less than the adverse effects of other (liquid) substances with the same hazard classifications and therefore the control is deleted.

Setting of exposure limits for sodium fluoroacetate (1080)

- 11.4.10 Regulations 11–27 (Control Code T1) of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 provide for the setting of an acceptable daily exposure (ADE) value or a reference dose (RfD) value for a substance if:
- it is likely to be present in an environmental medium (air, water, soil or a surface that the substance may be deposited onto) or food or other matter that might be ingested; and
 - it is a substance to which people are likely to be exposed to during their lifetime; and
 - exposure is likely to result in an appreciable toxic effect.
- 11.4.11 If an ADE/RfD value is set for a substance, a potential daily exposure (PDE) value for each exposure route must also be set for the substance. The PDE is a measure of the relative likelihood of a person actually being exposed to the substance through a particular exposure route given daily living patterns.

- 11.4.12 The following ADE value is set for sodium fluoroacetate (1080):
ADE = 0.02 µg sodium fluoroacetate (1080)/kg bw/day.
- 11.4.13 The following PDE values are set for sodium fluoroacetate (1080):
PDE_{FOOD} = 0.006 µg sodium fluoroacetate (1080)/kg bw/day;
PDE_{DRINKING WATER} = 0.010 µg sodium fluoroacetate (1080)/kg bw/day;
PDE_{INHALATION} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day; and
PDE_{DERMAL} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day.
- 11.4.14 The Committee notes the ongoing public concern about the potential for contamination of water supplies during aerial application of formulated substances containing 1080. The TEL_{water} value set below is based on the Ministry of Health Provisional Maximum Acceptable Value (PMAV) in drinking water (Drinking-water Standards for New Zealand 2005 – Ministry of Health). The PMAV represents the concentration of sodium fluoroacetate (1080) in water that, on the basis of present knowledge, is not considered to cause any significant risk to the health of the consumer over their lifetime of consumption of that water. The Committee considers that setting a TEL_{water} value based on the Ministry of Health's PMAV is appropriate at this time.
- 11.4.15 The PMAV is set by the Ministry of Health as a minimum standard for protection of consumers for lifetime consumption of drinking water. The Committee notes the intention of the Ministry of Health to review the PMAV for sodium fluoroacetate (1080) and recommends that the TEL_{water} value set below be reviewed when the Ministry of Health has completed its review of the PMAV.
- 11.4.16 The following TEL value is set for sodium fluoroacetate (1080):
TEL_{water} = 3.5 µg sodium fluoroacetate (1080)/litre water.
- 11.4.17 Regulations 11–27 (Control Code T2) of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 provide for the setting of a workplace exposure standard (WES). The WES is designed to protect persons in the workplace from the adverse effects of toxic substances. It is an airborne concentration of a substance (expressed as mg substance/m³ of air or ppm in air), which must not be exceeded in a workplace and applies to every place of work where the substance is being used.
- 11.4.18 When setting a WES value, the Authority is required under regulation 30, to either adopt a WES proposed for the substance concerned by Department of Labour as part of its administration of the Health and Safety in Employment Act 1992 or arrive at the value by taking into account matters set out in regulation 30(2). In this case, as Department of Labour has set a WES value for sodium fluoroacetate (1080), the Committee therefore adopts the Department's WES value as follows:
Sodium fluoroacetate (1080) (skin, bio) [CAS No: 62-74-8] – 0.05 mg/m³.

- 11.4.19 The ‘skin’ notation indicates that there is potential for sodium fluoroacetate (1080) to be absorbed through the skin (as an additional route of exposure); and the ‘bio’ notation indicates that occupational exposure to sodium fluoroacetate (1080) can be estimated by biological monitoring of urine.
- 11.4.20 Regulations 32–45 (Control Code E1) of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 provide for the setting of environmental exposure limits (EELs). An EEL establishes the maximum concentration of an ecotoxic substance legally allowable in a particular environmental medium (for example, soil or sediment or water), including deposition of a substance onto surfaces.
- 11.4.21 No EELs are set for sodium fluoroacetate (1080) at this time, either through applying the default EEL, adopting an established value, or calculating an EEL from an assessment of available ecotoxicological data. The Committee notes that EELs may be set at a later date when the policy for the setting of EELs under section 77B has been established. The default EELs specified under regulation 32 are accordingly deleted.

11.5 Changes to controls on ground and aerial application of 1080

- 11.5.1 The following changes to controls apply to the import or manufacture of formulated substances containing 1080 and to their use when applied by ground-based methods and aerial application. The full set of controls which apply to formulated substances containing 1080 (when applied by both ground-based methods and aerial application) are set out in Table A2, Appendix A and comprise those controls assigned as a result of their hazard classifications, with the changes set out in this section.
- 11.5.2 The Committee felt that the adverse effects associated with the ground-based application of formulated substances containing 1080 are for the most part, being managed by the current controls assigned to these substances based on their hazard classifications and other controls. These other controls include the additional notification requirements for neighbours, more specific signage with respect to the toxicity of carcasses, the need for DoC’s permission for operations on land under the Department’s management and the need for Ministry of Health permission on land where water supplies or public health may be at risk.

Setting of exposure limits for formulated substances containing 1080

- 11.5.3 The exposure limits as set out in section 11.4 above also apply to formulated substances containing 1080.

The following TEL value is set for formulated substances containing 1080:

$TEL_{\text{water}} = 3.5 \mu\text{g sodium fluoroacetate (1080)/litre water.}$

The following WES value is set for formulated substances containing 1080:

Sodium fluoroacetate (1080) (skin, bio) [CAS No: 62-74-8] – 0.05 mg/m³.

- 11.5.4 The TEL_{water} value set above is based on the PMAV set by the Ministry of Health as a minimum standard for protection of consumers for lifetime consumption of drinking water. The Committee notes the intention of the Ministry of Health to review the PMAV for sodium fluoroacetate (1080) and recommends that the TEL_{water} value set above be reviewed when the Ministry of Health has completed its review of the PMAV.
- 11.5.5 As noted above, no EELs are set for sodium fluoroacetate (1080) at this time but may be set at a later date when the policy for the setting of EELs under section 77B has been established. The default EELs specified under regulation 32 are accordingly deleted.

Approved handler requirements for formulated substances containing 1080

- 11.5.6 Regulation 9 (Control Code T6 and E7) of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 requires formulated substances containing 1080 to be either locked up or under the personal control of an approved handler. The purpose of this control is to ensure that a person handling formulated substances containing 1080 is trained in its safe use and management and understands the controls which apply to the substance.
- 11.5.7 The requirement for formulated substances containing 1080 to either be under the control of an approved handler or locked up does not apply after the substance has been applied or laid.
- 11.5.8 This control, which provides for exceptions to the approved handler requirements in certain situations when transporting formulated substances containing 1080, is varied under section 77A in order to reduce compliance costs and to avoid duplicating the requirements of other legislation.
- 11.5.9 Formulated substances containing 1080 are therefore required to be under the control of an approved handler unless the requirements set out in regulation 9A (see Table A2, Appendix A) are met. These requirements are considered to be a cost effective way of ensuring the safe management of formulated substances containing 1080 during the stated modes of transport.

Variation of signage requirements for formulated substances containing 1080 – Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

- 11.5.10 Subclauses (2), (3)(b) and (d), (4) and (5) of Regulation 28 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001 are varied under section 77A for formulated substances containing 1080.
- 11.5.11 Regulation 28(2) requires that signs be erected at every normal point of entry at least three days before a substance is applied or laid.

- 11.5.12 At the time of transfer (and approval) of formulated substances containing 1080 into the HSNO regime, the Authority's Transfer of Substances Standing Committee removed the requirement for signs to be in place "at least three days" before a substance is applied or laid. This was in response to submissions received on the three-day requirement which indicated that it was an impractical requirement which would not reduce risks to the public.
- 11.5.13 The Transfer of Substances Standing Committee at the time also noted that the Medical Officers of Health and DoC are able to set additional conditions on the use of formulated substances containing 1080 through the requirement for permissions under section 95A of the Act. This was considered to be a more effective way to manage the signage requirement than requiring signs to be erected "at least three days" before a substance is applied or laid.
- 11.5.14 The Committee is satisfied that regulation 28(2) should be varied under section 77A, as the varied control will be more effective in terms of its effect on the management, use and risks of formulated substances containing 1080.
- 11.5.15 Regulation 28(3)(d) requires that signs must comply with Part 3 of the Hazardous Substances (Identification) Regulations 2001. As the regulation is written, this means that all information displayed on a sign, including identification of the person applying the substance, their contact details and the date on which the substance is to be applied must be visible from 10 metres.
- 11.5.16 In the Committee's view, the 10 metre requirement is intended to address other matters such as stating that hazardous substances are present, their general type of hazard and their general type of classification. If required to be adhered to in the case of use of formulated substances containing 1080 for information relating to date of application and contact details, signs will be considerably larger than is desirable and will lose their visibility and clarity with respect to the priority identification information and will not effectively manage risks to the public. For this reason, the visibility distance for information required in relation to formulated substances containing 1080 by regulation 28(3)(a) and (c) of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001, is varied under section 77A to a distance of not less than 2 metres.
- 11.5.17 However, in respect of regulation 28(3)(b), the Committee is of the opinion that the 10 metre requirement should apply to one other matter not currently required on signs, namely the hazards posed by poisoned carcasses to dogs. The Committee notes that ACVM and DoC currently require signs to indicate that both bait and carcasses are poisonous to dogs but considers that it is appropriate that this risk should also be managed by way of a control under the Act.
- 11.5.18 The Committee is therefore satisfied that regulation 28(3)(b) and (d) should be varied under section 77A as set out above and that these variations are more effective in terms of its effect on the management, use and risks of the substances as they will

help to limit the likelihood of the substances coming into contact with members of the public and non-target species in places of public access.

- 11.5.19 Regulations 28(4) and (5) relate to the period of time during which signs must remain in place. For formulated substances containing 1080, the Committee varies these requirements under section 77A to provide that signs must remain for at least a minimum period of six months or until the earlier of retrieval of the bait or it is demonstrated that the bait has ceased to be toxic. This latter requirement will also relate to bait in carcasses.
- 11.5.20 In addition, the Committee re-imposes an additional mandatory requirement under section 77A for signs to be removed after completion of an operation. This requirement was imposed by the Transfer of Substances Standing Committee on transfer of the substances into the HSNO regime based on the premise that signs should only remain in place for so long as the hazard remains present in the environment. The Committee is satisfied that these variations/additions are more effective in terms of their effect on the management, use and risks of the substances than the existing regulations.

Application rates for ground-based application of formulated substances containing 1080

- 11.5.21 No application rate is set for the ground-based application of formulated substances containing 1080. The application rate for the aerial application of formulated substances containing 1080 is discussed in paragraphs 11.6.2–11.6.6 below.
- 11.5.22 The Committee did not consider that imposing an application rate for ground-based application of formulated substances containing 1080 was necessary because there is greater control over where it is laid.

Deletion of controls relating to the protection of terrestrial invertebrates from the use of formulated substances containing 1080 – Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

- 11.5.23 Regulation 49 (Control Code E3) relates to controls to protect terrestrial invertebrates. This regulation applies to substances that are ecotoxic to terrestrial invertebrates (class 9.4 substances) and prescribes controls to restrict the use of such substances in situations where they may pose a high risk to honeybees.
- 11.5.24 While some of the formulated substances containing 1080 are classified as ecotoxic to terrestrial invertebrates (9.4A classification) none of them is attractive to bees as they contain no sweeteners. Therefore, regulation 49(1)(a) does not apply as the substances are not in a form to which bees are “likely to be exposed”.
- 11.5.25 As a result, the Committee is satisfied, having regard to section 77(4)(a), that the adverse effects identified for these substances are less than the adverse effects which would usually be associated with substances given the same hazard classification and that the control can be deleted.

Deletion of controls relating to protection of terrestrial vertebrates from the use of formulated substances containing 1080 – Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

- 11.5.26 Regulation 50 is deleted under section 77(4)(b). The *soluble concentrate containing 200 g sodium fluoroacetate/litre*, when mixed with oats, potentially falls within the ambit of this regulation (“coated on seed”). However, the regulation is concerned with setting an EEL for the substance so that if ingested, it would not be likely to cause adverse effects in terrestrial vertebrates. Given that the substance is to be specifically used to control possums and other vertebrates, it would not be appropriate to set an EEL under this regulation.
- 11.5.27 The Committee is satisfied that the benefits of using *soluble concentrate containing 200 g sodium fluoroacetate/litre*, when mixed with oats justify deleting the regulation under section 77(4)(b) and that the deletion does not, in the Committee’s opinion, significantly increase the adverse effects of using the substance, particularly given the imposition, under this approval, of other controls on its use.

Methods of release, bait size and colour of formulated substances containing 1080 – Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

- 11.5.28 Under regulation 51, where substances are used outdoors as bait and are known to inhibit growth or reproduction or cause death of one or more vertebrate species, the Authority must specify one or more of the following:
- colour;
 - methods of release;
 - repellents or attractants to be used with the substance;
 - bait size;
 - degree of palatability.
- 11.5.29 In accordance with this regulation, the Committee sets the following methods of release, bait size and colours for the stated formulated substances containing 1080:

Substance	Method(s) of release and (where applicable) bait size	Colour
Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg	Aerial application or ground-based application	Blue or green
Soluble concentrate containing 200 g sodium fluoroacetate/litre	<p>This substance may only be used when mixed with the following food baits and released by the following methods:</p> <p><u>When mixed with prepared (cut) apple:</u></p> <ul style="list-style-type: none"> – to a maximum concentration of 2.0 g sodium fluoroacetate (1080) per kg apple. <p>Contained ground-based application</p> <p><u>When mixed with prepared (cut) carrot (except when used for rabbit control through ground-based application):</u></p> <ul style="list-style-type: none"> – to a maximum concentration of 2.0 g sodium fluoroacetate (1080) per kg carrot; – bait must be screened so that bait has a mean weight of 6 g or larger; and – chaff (pieces <0.5 g) must be less than 1.5% of the total weight of carrot. <p>Aerial application or ground-based application</p> <p><u>When mixed with oats:</u></p> <ul style="list-style-type: none"> – to a maximum concentration of 0.6 g sodium fluoroacetate/kg (1080) per kg oats <p>Aerial application or ground-based application</p>	Blue or green
Peanut-based Paste containing 1.5 g sodium fluoroacetate/kg	Contained ground-based application	Blue or green
Apple-based Paste containing 1.5 g sodium fluoroacetate/kg	Ground-based application	Blue or green
Apple-based paste containing 0.6 – 0.8 g sodium fluoroacetate/kg Polymer gel containing 50 g sodium fluoroacetate/kg Polymer gel containing 100 g sodium fluoroacetate/kg Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg	Ground-based application	Blue or green
Fish paste containing 10 g sodium fluoroacetate/kg	Contained ground-based application	Blue or green
Polymer gel block containing 1.5 g sodium fluoroacetate/kg		

Colour of baits for formulated substances containing 1080

11.5.30 For all formulated substances containing 1080, baits must be coloured either blue or green. The previous requirement under the Pesticides Act (and related regulations)

that baits had to be dyed green was based on the effectiveness of the colour in reducing the visual attractiveness of the baits to birds. More recent research with New Zealand native birds indicated that blue may also be an effective visual deterrent for North Island robins and weka. There have also been problems with attaining a green colour in certain bait formulations. Specification of the bait colour as either blue or green provides a visual deterrent to birds which allows some flexibility in bait colour depending on the characteristics of the bait and the specific circumstances of any particular operation.

Method(s) of release for formulated substances containing 1080

- 11.5.31 The formulated substance *peanut-based paste containing 1.5 g sodium fluoroacetate/kg* is restricted to use in contained ground-based application.
- 11.5.32 The previous approval for *paste containing 1.5 g sodium fluoroacetate/kg* covered both peanut-based pastes and fruit (apple)-based paste approved for use in ground-based application.
- 11.5.33 Testing has shown that peanut is more attractive to native bats than some of the other types of bait and current practice is that peanut-based paste is used only in bait stations. The attractiveness of the peanut-based paste to other non-target species has not been studied.
- 11.5.34 Having regard to this uncertainty over attractiveness of the peanut-based paste to non-target species, and the differing risk profiles of the peanut and apple-based pastes, the Committee has decided that they should be separately approved under this decision with a control added to restrict the peanut-based paste to use in contained ground-based application. This effectively restricts its use to bait stations, which accords with current practice.
- 11.5.35 The Committee is of the opinion that this will be a more effective way of managing the risks posed by the peanut-based substance. It is also consistent with the approach taken with Additional Control 10⁸⁶ which requires formulation changes to be notified to the Authority and could lead to changes to controls on approved substances if information provided shows changes to the risk profile.
- 11.5.36 Two other formulated substances containing 1080 are also restricted to contained ground-based application, consistent with current practice, to minimise the exposure of non-target species to the baits:
- Fish paste containing 10 g sodium fluoroacetate/kg;
 - Polymer gel block containing 1.5 g sodium fluoroacetate/kg.

⁸⁶ Refer to paragraphs 11.5.82–11.5.84 below.

11.5.37 Further, the Committee has decided that when *soluble concentrate containing 200 g sodium fluoroacetate/litre* is mixed with cut apple to a maximum toxic loading of 2.0 g sodium fluoroacetate per kg of prepared apple, it must only be used in contained bait stations because cut apple is attractive to a range of non-target species.

Bait size of formulated substances containing 1080

11.5.38 When *soluble concentrate containing 200 g sodium fluoroacetate/litre* is mixed with prepared (cut) carrots to a maximum toxic loading of 2.0 g sodium fluoroacetate (1080) per kg of carrot, it must be manufactured to the following specifications:

- bait must be screened so that bait has a mean weight of 6 g or larger; and
- chaff (pieces <0.5 g) must be less than 1.5% of the total weight of carrot.

11.5.39 This applies whichever of the two approved methods of release are used. The rationale for this is that small pieces of bait contain a higher toxic loading than larger pieces and present a higher risk to non-target species. This is due to their small size (they are more readily ingested and have a high toxic loading) and the fact that a greater number of baits per hectare increases the likelihood of exposure. The requirements do not, however, apply when the carrot bait is being used for rabbit control through ground-based application.

Packaging requirements for formulated substances containing 1080

11.5.40 The packaging requirements for formulated substances containing 1080 set out in the Schedules to the Regulations are varied as follows.

11.5.41 The minimum packaging requirements that must be complied with are varied by substituting Schedule 2 of the regulations for Schedule 1 for the following formulated substances containing 1080 when packaged in quantities of more than **0.5 kg**:

- Soluble concentrate containing 200 g sodium fluoroacetate/litre;
- Polymer gel containing 50 g sodium fluoroacetate/kg;
- Polymer gel containing 100 g sodium fluoroacetate/kg.

11.5.42 The tests in Schedule 2 correlate to the packaging requirements of UN Packing Group II (UN PGII).

11.5.43 The minimum packaging requirements that must be complied with are varied by substituting Schedule 3 of the regulations for Schedule 2 for the following formulated substance containing 1080 when packaged in quantities of more than **3.0 kg**:

- Fish paste containing 10 g sodium fluoroacetate/kg.

11.5.44 The tests in Schedule 3 correlate to the packaging requirements of UN Packing Group III (UN PGIII).

- 11.5.45 The minimum packaging requirements that must be complied with are varied by substituting Schedule 4 of the regulations for Schedule 3 for the following formulated substances containing 1080 when packaged in **any quantities**:
- Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg;
 - Apple-based paste containing 1.5 g sodium fluoroacetate/kg;
 - Peanut-based paste containing 1.5 g sodium fluoroacetate/kg;
 - Polymer gel block containing 1.5 g sodium fluoroacetate/kg.
 - Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg;
 - Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg;
 - Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg.
- 11.5.46 The requirement for packaging for these substances is varied under section 77(4)(b) to substitute references to the above Schedules. The requirement for these substances to be packaged according to the Schedules in the regulations is based on the 6.1 acute oral toxicity classification of these substances. However, under the UN requirements for transport, the substances would be required to be packaged according to UNRTDG Packaging Groups based on assessment of rat toxicity data, which is less than the dog toxicity data used to classify 1080. These variations in the packaging requirements for these substances are made to align with national standards for the transport of dangerous goods.
- 11.5.47 Having regard to the requirements of section 77(4)(b), the Committee considers that the benefits of these formulated substances containing 1080 are such that the controls should be varied to retain the benefits and that the variations will not significantly increase the adverse effects of the substances. Therefore the packaging requirements can be changed as indicated above. Further, the Committee notes that the requirements of the Identification Regulations will ensure that people handling the substances or attending an incident involving the packaged substances will be made adequately aware of the risks posed by the substances.

Deleted requirements for secondary containment for formulated substances containing 1080 – Hazardous Substances (Emergency Management) Regulations 2001

- 11.5.48 Regulations 35–41 (Control Code EM12) relating to level 3 emergency management requirements for a secondary containment system to be installed at any fixed location applies to the *soluble concentrate containing 200 g sodium fluoroacetate/litre* where it is held in quantities greater than or equal to 100 litres.
- 11.5.49 Regulations 35–41 are deleted under section 77(4)(a) for other formulated substances containing 1080 as they are used in solid form. Having regard to the requirements of section 77(4)(a), the Committee considers that because they are solids, the adverse effects of the other formulated substances containing 1080 will thus be less than the adverse effects of other (liquid) substances with the same hazard classifications. Therefore the control is deleted for all formulated substances containing 1080 except for the *soluble concentrate containing 200 g sodium fluoroacetate/litre* where it is held in quantities greater than or equal to 100 litres.

New requirement to record the unique identifier for containers for formulated substances containing 1080 – Hazardous Substances (Tracking) Regulations 2001

- 11.5.50 A control has been added to all formulated substances containing 1080 to require packages to be marked with a unique identifier (see Additional Control 2 below) to facilitate ‘trace-back’ of individual packages in the event of an incident involving controlled vertebrate poisons. A corresponding variation is thus made to Schedule 2 (information to be included in record of tracked substance) (Control Code TR1) to require a record to be kept of the unique identifier for the container that contains the tracked substance when the substance is obtained, transferred to another place, or disposed of.

Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004

- 11.5.51 The above regulations prescribe a number of controls relating to tank wagons and transportable containers that carry a hazardous substance. The controls only apply to the *soluble concentrate containing 200 g sodium fluoroacetate/litre* and must be complied with as relevant.

Schedule 8 to the Hazardous Substances (Dangerous Goods And Scheduled Toxic Substances) Transfer Notice 2004 – stationary container systems

- 11.5.52 The controls relating to stationary container systems⁸⁷ are varied under section 77(3) and (4) to apply to *soluble concentrate containing 200 g sodium fluoroacetate/litre*.
- 11.5.53 The Committee considers that the variations are necessary to ensure that the risks associated with transporting or storing large quantities of the substance are properly managed.

Additional Control 2 – Requirement to mark packaging of formulated substances containing 1080 for sale with a unique identifier

- 11.5.54 A control is added to all formulated substances containing 1080 to facilitate the ‘trace-back’ of individual packages in the event of an incident involving controlled vertebrate poisons.
- 11.5.55 This additional control complements the requirement to keep records of the unique identifier (Control Code TR1). This control is justifiable given the widespread use of vertebrate poisons, the large number of people potentially involved in their application and the number of occasions that have required this ‘trace-back’ mechanism to be used by regulatory agencies in the past.

⁸⁷ Schedule 8 to the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (Supplement to the New Zealand Gazette, 26 March 2004, No. 35, page 767), as amended.

- 11.5.56 The Committee is therefore satisfied that the suite of controls imposed under this approval will be more effective in terms of their effect on the management, use and risks of the formulated substances containing 1080 as a result of adding this control.

Additional Control 3 – Restrictions on supply and acquisition of substances

- 11.5.57 The requirement for any person who wishes to sell or otherwise supply formulated substances containing 1080 to have a controlled substances licence is added in accordance with section 77A(2)(b).
- 11.5.58 A controlled substances licence is required from both the Agricultural Compounds and Veterinary Medicines (ACVM) Group of the New Zealand Food Safety Authority and ERMA New Zealand for all formulated substances containing 1080 (see Additional Control 5 below).
- 11.5.59 The intention of the licence requirement is to ensure that a person is a ‘fit and proper’ person and has knowledge of the relevant legislation relating to the safe use of the substance (ie has an approved handler test certificate).
- 11.5.60 Controlled vertebrate poisons such as formulated substances containing 1080, fall into the group of substances where it is considered appropriate that access be restricted to responsible individuals. For this reason, the Committee is satisfied that this additional control, together with Additional Control 5, is more effective in terms of its effect on the management, use and risks than other controls and thus may be added under section 77A.

Additional Control 4 – Permissions required for application or use of formulated substances containing 1080

- 11.5.61 The requirement to obtain a permission prior to the application of formulated substances containing 1080 ensures that the risks associated with any general or particular use of the substance can be appropriately addressed and any additional controls required to manage the risks are imposed (by way of conditions imposed on the permissions under section 95A). For example, an application for a permission allows the risks arising due to the intended location of the operation to be considered by those with appropriate local knowledge of the intended application site.
- 11.5.62 Currently, the Authority has delegated the power to issue permissions under section 95A to DoC and the Ministry of Health.
- 11.5.63 DoC is delegated the power to issue permissions when formulated substances containing 1080 are to be applied or otherwise used on land managed by DoC.
- 11.5.64 The Ministry of Health is delegated the power to issue permissions when formulated substances containing 1080 are to be applied or otherwise used in a catchment area from which water is drawn for human consumption or in any other area where a risk to public health may be created if the substance is used or applied.

- 11.5.65 In situations where formulated substances containing 1080 are to be applied or otherwise used on land managed by DoC that is a catchment area from which water is drawn for human consumption or is in any other area where a risk to public health may be created if the substance is used or applied, a permission is required from both DoC and the Ministry of Health.
- 11.5.66 The Committee is satisfied that it is appropriate to add this control under section 77A(2)(a), as it will be more effective in terms of its effect on the management, use and risks of the substances than other controls that apply under this approval. In particular, proper and effective use of the permissions regime is seen by the Committee as an essential tool in ensuring best practice in respect of key aspects of aerial application of formulated substances containing 1080 such as consultation and notification. The Authority intends to review the terms of the delegations to DoC and Ministry of Health for the granting of permissions to ensure consistency.
- 11.5.67 One matter in particular which the Committee wishes to see addressed as part of a review of the permissions delegations is the implementation of best practice consultation with iwi/Māori whose land or other interests might be affected by the use of 1080, particularly when applied aerially. The Committee wishes to provide for better engagement with iwi/Māori and improved outcomes in terms of the management of taonga species and resources, and will be looking for this to be ensured as far as possible when permissions are granted for the aerial use of 1080. Many iwi/Māori submitters were concerned that “consultation” appeared to be given variable meanings, from notifying and informing at one end of the spectrum to acting/deciding together at the other end. The Committee notes the interpretation of “consultation” in ERMA New Zealand guidance,⁸⁸ namely that the overall aim of good consultation is to provide easily understood information about the proposal; obtain the necessary information and understanding of Māori perspectives and views as they relate to specific issues associated with the proposal and discuss, where issues are raised by Māori, ways of minimising, mitigating or remedying any potential adverse effects and enhancing any potential benefits. The Committee expects that those seeking permission from DoC or the Ministry of Health for aerial application of 1080 will be required to demonstrate consultation with Māori to at least this standard.

Additional Control 5 – Licence required for possession of formulated substances containing 1080

- 11.5.68 The requirement to obtain a controlled substances licence is added in accordance with section 77A(2)(b).
- 11.5.69 In addition to holding an approved handler certificate, no person may possess formulated substances containing 1080 unless they have a licence (controlled substance licence) granted under section 95B of the Act that is obtained from the Authority before the person takes possession of the substance. Exceptions to this

⁸⁸ User Guide *Working with Māori under the HSNO Act 1996: A Guide for Applicants* (ER-UG-01-4 04/05).

requirement are if the person is under the immediate supervision (meaning within eye and ear shot at all times) of a person who has a licence or if regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001 is deemed complied with in certain transport situations through the provisions of regulation 9A (Control Code T6 and E7, above).

- 11.5.70 The main purpose of the licensing requirement is to add a ‘fit and proper person’ consideration to an approved handler qualification. This requirement is generally restricted to those substances which could be used for illegal purposes and which could present significant security concerns.
- 11.5.71 Formulated substances containing 1080 fall into the group of substances for which it is considered appropriate to require a controlled substance licence and the Committee is satisfied that this additional control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls that apply under this approval.
- 11.5.72 Controlled substances licences are issued by test certifiers under delegation from the Authority through a process which covers both the HSNO Act and ACVM Group requirements.
- 11.5.73 Additionally, the ACVM Group requires that, as part of the approval under the ACVM Act, certain vertebrate toxic agents may only be sold to and used by persons holding controlled substances licences (see Additional Control 3 above).

Additional Control 8 – Misapplied, lost or spilt substances

- 11.5.74 A requirement to report to Regional Councils and the Authority is added if formulated substances containing 1080 are misapplied, lost or spilt.
- 11.5.75 While incidents involving hazardous substances are required under the Act to be reported to HSNO enforcement agencies, this control specifically clarifies who is responsible for reporting misapplications, losses or spillages arising from the use of formulated substances containing 1080. Notification must be to the listed agencies and owners and occupiers as well as to the Authority.
- 11.5.76 The Committee is satisfied that this control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval as it enables the appropriate agencies and the Authority to monitor and be notified of any accidents or poor practices relating to the use of these substances. This will also ensure that the appropriate action is taken to address the issue and manage any adverse effects that may arise.
- 11.5.77 The obligation to report such incidents to the Authority complements Additional Control 12 relating to reporting on aerial application of formulated substances containing 1080.

Additional Control 9 – Unauthorised persons to stay clear of application area of substances

- 11.5.78 A control is added to enable an enforcement officer to order a person (who is not lawfully assisting in the application) to leave the area in which formulated substances are being applied.
- 11.5.79 The intent of this control is to ensure that people whose personal safety is at risk, or who are interfering with an operation, or who are likely to be directly in the flight path of an aerial operation can be asked to leave the operational area.
- 11.5.80 For the purposes of this control, **vicinity** is taken to mean an area within which someone may be directly affected by, or having a direct effect on, the operation.
- 11.5.81 The Committee is satisfied that this control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval as it helps to ensure an appropriate level of personal safety for those who may be at risk from an operation whether voluntarily or not. In the case of the former, an enforcement officer may take appropriate action to order someone to leave the area.

Additional Control 10 – Notification of changes of composition of formulated substances containing 1080

- 11.5.82 Any changes to the composition or proposed use of formulated substances containing 1080 must be notified to the Authority in writing before it is used such notification to include the following information, as applicable:
- the name of substance;
 - details of the original formulation;
 - details of the revised formulation clearly identifying the changed ingredients, their function in the bait, and their concentration and CAS number if appropriate;
 - the physical form, if different from the original;
 - bait colour;
 - changes in bait size;
 - the intended use(s) of the substance (to include target species, method(s) of release);
 - the physical properties of the substance (for example, flashpoint, pH) if different from the original;
 - the impurity profile and source of the ‘active’ ingredient, if different from the original;

- any information on the effect that the formulation change may have on the risk profile of the substance, including the results of palatability trials undertaken on both target and non-target species.

11.5.83 This control is added under section 77A as the Committee is satisfied it is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval.

11.5.84 Changes in formulations and other matters such as bait size may alter the risk to non-target species, even though there are no changes to the hazard classifications. In order to ensure that there is as much information available as possible on the impact on and risks to non-target species, changes to formulations of existing substances must be notified to the Authority so that any changes to the risk profile of substances can be tracked and managed. Depending on the nature and extent of the changes, it may be necessary for this approval to be amended (or a new approval obtained) before the substance may lawfully be used.

Additional Control 11 – Notification of ground-based and aerial operations

11.5.85 The Committee has added a control requiring the notification of immediate neighbours in any operations involving the ground-based or aerial application of formulated substances containing 1080 within two months prior to the proposed application.

11.5.86 The Committee considers that landowners and occupiers adjacent to the site of a proposed ground-based application should be advised with sufficient prior notification (but no more than two months) before the proposed ground application. The notification should include similar matters to those required for the public notice of aerial applications (see Additional Control 6 above).

11.5.87 The Committee is satisfied that this control should be added under section 77A as it is more effective in terms of its effect on the management, use and risks of ground-based application of formulated substances containing 1080 than other controls under this approval.

11.5.88 Specifically, the control ensures that potentially affected persons are notified of the approximate time and place of a proposed application in their area and enables them to obtain further information if they require. In this way, the control aids more effective communication of risks relating to ground use of formulated substances containing 1080 to local communities and other potentially affected groups/persons. This control will come into force on 1 January 2008 so as to give operators sufficient time to implement it.

11.6 Changes to controls on the aerial application only of 1080

11.6.1 The following changes to controls apply to the use of formulated substances containing 1080 only when aerially applied. The full set of controls which apply to formulated

substances containing 1080 (when they are aerially applied) are those controls assigned as a result of their hazard classifications, with the changes set out in this section and section 11.5 above.

Restrictions on use within application area – Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001

- 11.6.2 In recognition of the need to limit adverse effects within the target area, regulations have been prescribed to restrict the use of a substance within the target area. These include the requirements to set an application rate for any substance designed for biocidal action.
- 11.6.3 The existing application rate for aerially applied formulated substances containing 1080 is 30 g 1080/ha.
- 11.6.4 The Committee notes that application rates per hectare have come down significantly over the past few decades and that the current practice for possum and rabbit control is application rates of 2.4–7.5 g 1080/ha and 2–8 g 1080/ha respectively.⁸⁹ The Committee accepts DoC's view provided at the hearings that it is appropriate to leave the rate at its current level so as to allow a sufficient degree of operational flexibility particularly when considering simultaneous multi-species pest control (for example, rats, possums and wallabies). Further, DoC advised the Committee that on occasions when pest numbers are high, double-sowing is necessary.
- 11.6.5 The Committee therefore sets an application rate not exceeding 30 g sodium fluoroacetate(1080)/ha for the following substances when aerially applied:
- Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg;
 - Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg;
 - Soluble concentrate containing 200 g sodium fluoroacetate/litre.
- 11.6.6 The Authority intends to monitor application rates through the reports provided under Additional Control 12.

Additional Control 6 – Restriction on aerial application of certain substances

- 11.6.7 A control is added under section 77A requiring a notice to be published in a newspaper which is available in the areas in which the substance will be applied. The notice must be placed at least 2 months before the operation and set out the date, area and identity of operator.
- 11.6.8 The Committee is satisfied that this control should be added under section 77A as it is more effective in terms of its effect on the management, use and risks of ground-based

⁸⁹ Additional information supplied by the applicants, 22 December 2006.

application of formulated substances containing 1080 than other controls under this approval.

- 11.6.9 Specifically, the control ensures that potentially affected persons are notified of the approximate time and place of a proposed aerial application in their area and enables them to obtain further information if they require. In this way, the control aids more effective communication of risks relating to aerial use of formulated substances containing 1080 to local communities and other potentially affected groups/persons.

Additional Control 7 – Requirements for aircraft carrying out aerial application

- 11.6.10 This additional control specifies requirements for aircraft used to apply formulated substances containing 1080 that are approved for aerial application. The additional control:

- prohibits flying over public drinking water supplies and other protected waterways or areas;
- requires aircraft to have suitable navigational guidance systems in order to ensure accuracy of application. Normally, this will be achieved by use of a differential global positioning system;
- requires the decontamination of aircraft and ground loading or storage areas (with fencing/signage options if decontamination of ground areas is not possible).

- 11.6.11 The Committee is satisfied that all these requirements are appropriately added as controls under section 77A on the basis that they are more effective in terms of its effect on the management, use and risks of aerial application of formulated substances containing 1080 than other controls under this approval. Combined, the requirements will ensure greater accuracy of application, and will help to limit the likelihood of traces of the substances coming into contact with aircraft/airport personnel or members of the public in places of public access.

Additional Control 12 – Provision of information to Authority

- 11.6.12 As already mentioned above the Committee noted that aerial drops of 1080 involve significant risks and cause widespread public concern and anxiety. It accordingly imposes a control requiring information to be provided to the Authority by way of reports after each aerial operation. This control is a key element in the Committee's decision to put 1080 (particularly its aerial use) on a watch list (see section 11.2 above).
- 11.6.13 The Committee is satisfied that this control should be added under section 77A as it is more effective in terms of its effect on the management, use and risks of aerial application of formulated substances containing 1080 than other controls under this approval. In many cases, the production of post-operation reports of this type is increasingly becoming standard industry practice.

11.6.14 Specifically, the control is in response to the concerns expressed by many submitters in relation to aerial (as opposed to ground) applications and will provide a central repository for information on aerial operations. It also supports the Committee's desire to ensure best practice and a more consistent approach nationwide, in the planning, carrying out and reporting of aerial operations. This control will come into force on 1 January 2008 so as to give operators sufficient time to implement it. Further details are set out in Table A2, Appendix A.

11.7 Recommendations to encourage best practice and greater consistency in relation to communication and consultation

11.7.1 Public perceptions about the aerial use of 1080 vary considerably across communities. While few people are comfortable about large scale application of 1080, many see it as necessary to ensure continuing reduction and maintenance of bovine Tb-free herds and to prevent further degradation of native forest ecosystems and protect indigenous biodiversity. However, others perceive it as having an adverse effect on flora and fauna. This highlights the need for good communication.

11.7.2 The Committee considers that improvements can be made in the following areas:

- improved communication and consultation (including signage) by all users of aerially applied 1080 at all stages of an operation;
- early engagement of communities (including iwi/Māori in particular) in strategic planning for pest control and conservation management programmes to ensure they have a voice in relation to the pest management issues that affect them;
- post-operational reporting to the Authority is required under the watch list control (Additional Control 12). As a matter of good practice, operators should also report results to interested parties.

11.7.3 The Committee acknowledges the ethos of continuous improvement described by the applicants, and is keen to ensure that all those involved in the aerial use of formulated substances containing 1080 operate to similarly high standards.

11.7.4 The Committee is of the view that the processes outlined in DoC's Standard Operation Procedures (SOPs) provide a sound basis for best practice (for example, communication and consultation, signage) for pest control operations and recommends that where practical and appropriate all operators undertaking aerial application of 1080 should adopt similar practices and procedures.

Prior communication and consultation

11.7.5 The Committee notes that a number of submitters asked that interest groups be consulted at two levels. First, at the level of establishing a pest control programme for an area (including determining methods of control), and secondly, at the activity level where a particular operation is being planned.

Programme level

- 11.7.6 The Committee recognises that it is more difficult to make specific recommendations about public consultation at the strategic level since this planning may not necessarily include determining the method of control to be used. However, the Committee recommends that where possible, users of 1080 should consult with relevant interested groups about preferred methods of pest control. This may include establishing preferred methods of control for particular areas which might be used as part of the tendering process. The Committee is of the view that adherence to good communication and consultation processes should be built into the tender process.
- 11.7.7 Given the significant and unique relationship between iwi/Māori and DoC-administered lands, a consistently high standard of iwi/Māori involvement is important. The Committee recognises DoC's high standard of consultative requirement with iwi/Māori for 1080 operations but is concerned to ensure consistency of approach among conservancies. The Committee thus recommends that DoC reviews the implementation of its consultation policies and procedures to ensure a consistently high standard of approach across all of its 1080 operations.
- 11.7.8 The Committee also acknowledges the concerns raised by iwi/Māori with regard to their ability as Treaty of Waitangi (Tiriti ō Waitangi) partners, to participate at a more strategic level in relation to pest and conservation management initiatives generally (for example, in the development of pest and conservation management strategies). To this end, the Committee recommends that central and local government agencies with pest and conservation management responsibilities review their policies and provisions with regard to the early engagement of iwi/Māori in the strategic policy and planning development for pest and conservation management.

Operational level

- 11.7.9 A number of submitters reported personal experiences where they considered that consultation had been inadequate prior to an aerial 1080 operation. The Committee considers that consultation should be started as early as possible in the preliminary planning stages of any operation.
- 11.7.10 The Committee notes that DoC has established a SOP for the Consultation and Notification of Pesticide Operations as one of a suite of SOPs for promoting best practice and ensuring consistency across the Department.⁹⁰
- 11.7.11 The SOP applies to all animal pest operations undertaken by:
- DoC staff on land managed by the Department and on private land;
 - external organisations, groups and contractors on land managed by the Department.

⁹⁰ Refer to paragraph 10.6.33 et seq.

- 11.7.12 This SOP is used in conjunction with DoC's Consultation Guidelines which gives specific advice as to how to consult to obtain the best possible information to support decision making. The SOP and the guidelines are reviewed and modified by the Department on a regular basis.
- 11.7.13 The Committee is of the view that the process outlined in the DoC SOP provides a sound basis for best practice communication and consultation for animal pest control operations and recommends that all users of 1080 should collectively develop a national SOP for consultation and notification.
- 11.7.14 The Committee notes that information received in submissions and during the hearings suggests that there have been circumstances where a lack of good communication between deerstalkers and pest control agencies has caused concern and anxiety. Therefore, the Committee recommends that AHB, DoC and Regional Councils consult with the New Zealand Deerstalkers' Association on either a national or a regional basis prior to undertaking aerial drops in areas where deer are present and hunting occurs, and that this consultation should include explicit consideration of whether or not use of deer repellent is appropriate on a 'case by case' basis.

Communication during and after a 1080 operation (ground and aerial)

- 11.7.15 As a corollary to adequate prior consultation, there are other elements to effective communication including measures which are put in place during and after bait has been applied/laid. These ensure that risks are adequately communicated throughout the period baits and carcasses remain toxic.
- 11.7.16 The signage requirements (Control Code T8) mean that warning signs must remain in place for 6 months or until it can be demonstrated that baits and carcasses no longer present a risk to dogs. These signs provide people with sufficient information to allow them to take whatever steps they think are necessary to manage risks to themselves or their dogs.
- 11.7.17 The DoC SOP for consultation and notification includes specific signage requirements, including the maintenance of a sign register. The sign register is used to ensure that signs are regularly checked to ensure they remain legible and in stay in place, or are replaced if damaged or removed by unauthorised persons. The Committee considers that such a register is an effective tool which should be adopted by all users of 1080.

Post-operational reporting: communicating results

- 11.7.18 The Committee considers that reporting the results of pest control operation back to interested parties is an essential part of the risk communication process. Such reporting would include an overview of whether the operational targets were achieved (whether aimed at bovine Tb vector control or biodiversity outcomes), what worked and what didn't work, whether any complaints were made, the nature of those

complaints and what actions were taken to resolve them; whether any new information was learned from the operation which could contribute to ongoing improvements by other users of 1080.

- 11.7.19 While the Committee has imposed a formal requirement for information to be provided after all aerial operations (Additional Control 12), this does not remove the onus on an operator to provide good quality feedback to local communities and other interested groups.

Summary of best practice recommendations

- 11.7.20 The Committee's recommendations relating to best practice in the use of 1080, identified above, are summarised as follows:
- 11.7.21 Recommendation that central and local government agencies with pest and conservation management responsibilities should review their policies and procedures regarding the early engagement of:
- iwi/Māori at a strategic decision making level; and
 - other relevant interested groups about the preferred methods of pest control. This may include establishing preferred methods of control for particular areas which might be used as part of the tendering process.
- 11.7.22 Recommendation that DoC reviews the implementation of its consultation policies and procedures to ensure a consistently high standard of approach across all of its conservancies in respect of 1080 operations, particularly as regards consultation with iwi/Māori (noting the significant and unique nature and relationship between iwi/Māori and DoC-administered lands).
- 11.7.23 Recommendation that AHB, DoC and Regional Councils consult with the New Zealand Deerstalkers' Association on a national or a regional basis, as appropriate prior to undertaking aerial drops in areas where deer are present and hunting occurs. This consultation should include explicit consideration of whether or not use of deer repellent is appropriate on a 'case by case' basis.
- 11.7.24 Recommendation that all agencies or operators undertaking aerial application of 1080 should adopt similar (best) practices and procedures to those outlined in DoC's SOPs on communication, consultation and signage and collectively develop a Code of Practice (which could be an approved code of practice under the HSNO Act) or SOP in relation to consultation and notification on 1080 operations.
- 11.7.25 The Authority intends to monitor implementation of these recommendations and will include its assessment of the outcomes in its annual report on aerial applications of 1080.

Recommendations for further research

- 11.7.26 The Committee noted that in the E&R Report⁹¹ the Agency identified a number of areas where there were data limitations and recommends to the agencies involved in pest control that the following further research should be undertaken in relation to the use and effects of 1080:
- alternatives to the use of 1080 for pest control;
 - improvements to the use of 1080, for example, such as methods of application and application rates;
 - the specific technical areas set out in the table below.
- 11.7.27 The Committee also recommends that any reports written either on specific research projects or field monitoring should include the trade name of the product used, not just generic names such as ‘Wanganui No 7’ or ‘RS 5’ cereal baits. ERMA New Zealand keeps details of bait formulations and needs to be able to link research/monitoring data back to the specific formulation used, as these may change over time.
- 11.7.28 The Authority intends to maintain a watching brief on the research activities recommended above and will report on progress in these areas in its annual report on the use of 1080.

⁹¹ Refer to page 349 for environmental fate and ecotoxicity data limitations.

Table 11.1: Recommended further research

Test method	Purpose of test	Test parameters	Rationale for recommendation
Stability of 1080 in stored environmental samples under different temperature and duration of storage	Measure the effect of varying time/temperature combinations on the loss of 1080 from stored environmental samples (water, soil, bait, animal tissue) and where possible to determine whether any loss observed is due to degradation or another process.	To include storage of samples at –20°C over short and longer term (>6 weeks); also ambient temperatures representative of typical NZ conditions.	<p>The Committee considers that it is essential that the issue of the stability of 1080 in stored environmental samples is resolved (as identified in the E&R Report Appendix C page 350 and pages 457–458).</p> <p>The results must be disseminated to all laboratories in New Zealand that undertake 1080 analyses. It is a fundamental matter for addressing the quality assurance of ongoing sampling/monitoring for 1080 residues.</p>
OECD Guideline 309 Aerobic mineralization in surface water – simulation biodegradation test	Measure the time-course of mineralisation (biodegradation) of a test substance at low concentrations in natural surface water and quantify the degradation kinetics.	<p>This test method uses:</p> <ul style="list-style-type: none"> • two test concentrations ≤ 100 $\mu\text{g/litre}$ based on anticipated environmental concentrations (1080 concentrations have been measured up to 3.5 $\mu\text{g/litre}$ but most < 1 $\mu\text{g/litre}$ (with LOD 0.1 $\mu\text{g/litre}$ the feasible test concentrations would be 1 and either 5 or 10 $\mu\text{g/litre}$) • natural surface water with or without suspended sediment (the latter is optional); • radio-labelled test substance needed to determine ultimate degradation (radio-labelled 1080 is available internationally); • ‘environmental temperature’ allows choice of relevant temperature (5° and 10°C would probably be suitable based on winter conditions in NZ forest). 	<p>The applicability of the existing aquatic degradation data on 1080 to the New Zealand forest was identified in the E&R Report as being limited. The presence of significant amounts of aquatic plant material limit the relevance to water bodies in forests where 1080 is applied and significant aquatic plant growth is not likely due to low light and high water velocity.</p> <p>The test results provided were not derived from a standard international test method and provide limited information on the rate of degradation under expected New Zealand conditions of aerial 1080 use.</p> <p>The Committee considers that robust data obtained from the recommended test would allow more confident extrapolation across a range of temperature conditions relevant to the use of the substance.</p> <p>The tests should be undertaken by a laboratory with extensive experience with the test protocol.</p>
OECD Guideline 307 Aerobic and anaerobic transformation in soil	Measure 1) the rate of degradation of the test substance and 2) the nature and rates of formation and decline of transformation products to which plants and soil organisms may be exposed.	<p>This test method uses:</p> <ul style="list-style-type: none"> • one soil type to determine degradation pathway; • at least three additional soil types are required to determine rates of transformation, based on soil types most likely to be exposed. 	<p>The existing data on soil degradation are limited in scope and applicability and was not conducted in accordance with international test methods.</p> <p>The soil types chosen would need to be representative of key forest areas which receive aerial 1080 treatment, and address variability in soil organic matter, clay content,</p>

Test method	Purpose of test	Test parameters	Rationale for recommendation
		<p>Test temperature 20°C and 10°C are recommended in the test guideline, but if conditions warrant, lower temperatures may also be appropriate (5° would address cool winter NZ forest conditions).</p> <p>Additional tests using variation in soil moisture content would provide further information.</p>	<p>microbial biomass and pH to the extent practicable.</p> <p>Only aerobic tests would be necessary.</p> <p>The Committee considers that robust data obtained from the recommended test would allow more confident extrapolation across a range of soil conditions relevant to the use of the substance.</p> <p>The tests should be undertaken by a laboratory with extensive experience with the test protocol.</p>
<p>Effect of 1080 on Rongoa Māori</p>	<p>Assess the effects of 1080 on plant species of particular significance to the practice of rongoa Māori (Māori medicine produced from native plants).</p>		<p>Though there is some existing data on the effect of 1080 on native plant species (pikopiko, karamuramu, broadleaf) there is an absence of information relating to plants used specifically for the practice of rongoa.</p> <p>Partnership with rongoa practitioners will be critical in the development and undertaking of this research. The research should not simply focus on biophysical effects, but should include an investigation of other effects.</p>

12. Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

12.1 Introduction

- 12.1.1 The overall evaluation of risks, costs and benefits was carried out having regard to clauses 22 and 34 of the Methodology and in accordance with the tests in clause 27 of the Methodology and section 29 of the Act. Risks were evaluated taking account of all proposed controls including default controls plus proposed variations to the existing controls (see section 11 of this decision).
- 12.1.2 Clause 34 of the Methodology sets out the approaches available to the Authority in evaluating the combined impact of risks costs and benefits ie weighing up risks, costs and benefits.

Precautionary approach

- 12.1.3 Section 7 of the Act requires the Committee to take into account the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects. In identifying and assessing the risks, the Committee used scenarios to set upper and lower bounds on the assessment of individual risks. The assessment was based on the higher value of the risk, thus incorporating a precautionary approach.
- 12.1.4 Clause 29 of the Methodology notes that where there is scientific and technical uncertainty the Authority must consider the materiality of the uncertainty to the decision. If such uncertainty cannot be resolved, clause 30 requires the Authority to take into account the need for caution in managing the adverse effects of the substances. The Committee acknowledges that there is some uncertainty as to the magnitude and likelihood of some of the adverse effects but this uncertainty has been taken into account by the Committee in assessing the adverse and beneficial effects and establishing the new management regime.

Approach to risk

- 12.1.5 Clause 33 of the Methodology requires the Authority to have regard to the extent to which a specified set of risk characteristics exists when considering individual risks. In evaluating risks assessed as being significant (non-negligible) the Committee considered these characteristics and considered their impact on the magnitude of the adverse effect.
- 12.1.6 Clause 33 also provides guidance on how cautious or risk averse the Authority should be in weighing up overall adverse effects (risks and costs) and beneficial effects (benefits). The factors to be considered are whether:
- exposure to the risk is involuntary;

- the risk will persist over time;
- the risk is subject to uncontrollable spread and is likely to extend its effects beyond the immediate location of incidence;
- the potential adverse effects are irreversible; and/or
- the risk is not known or understood by the general public and there is little experience or understanding of possible measures for managing the potential adverse effects.

12.1.7 The Committee has addressed these factors for each of the individual risks assessed as being significant in Table 12.2. The Committee does not consider that any additional caution over and above the conservative approach adopted in the Agency's E&R Report is required.

Likely effects of unavailability of 1080

12.1.8 Section 29 of the Act requires the Committee to take into account the likely effects of the substance being unavailable. As noted in section 9.1.1 above, if the substances were not available then the benefits that have been assessed would not be realised. The Committee also recognises that the adverse effects would vary (for example, possum numbers would increase, with associated adverse effects). The Committee has incorporated the likely effects of the substance being unavailable into its assessment of adverse and beneficial effects in the same way that the Agency did in its E&R Report. Thus, the assessment of beneficial and adverse effects has built into it consideration of the difference between the 'with 1080' scenario and the 'without 1080' scenario.

Aggregation and comparison of risks, costs and benefits

12.1.9 A summary of the significant effects, the magnitude of those effects should they occur, the likelihood of the effects being realised and their associated level of adverse or beneficial effect (risk, cost or benefit) as determined by the Committee, is provided in Tables 12.1 and 12.2 below.

12.1.10 As there are a number of non-negligible adverse effects, clause 27 of the Methodology applies. The Committee took into account the extent to which the risks and any costs associated with the use of sodium fluoroacetate (1080) or formulated substances containing 1080 may be outweighed by the benefits, several of which were determined to be significant.

12.1.11 Clause 34 sets out the process for evaluating the combined impact of risks, costs and benefits. In this instance, the use of common units of measurement is not feasible due to the widely differing nature of the effects. Therefore, the Committee has used a ranking approach based on the level of risk/benefit matrix in Appendix C. This matrix allows for a comparison of the significance of the risks and benefits in this application. Using this approach, the beneficial and adverse effects of the substances

have been combined for each area of impact, firstly for ground-based application only and then for aerial-based application.

- 12.1.12 The Committee considers that, for the purposes of this decision, any potential effect that is rated as 'A' or 'B' on the magnitude and likelihood matrix (see Appendix C) is not significant.
- 12.1.13 The Committee was unable to determine common units of measurement for these effects (clause 34(a)). However, applying clause 34(b), the effects have been grouped and analysed according to area of impact (effects on the biological and physical environment, human health and safety, relationship of Māori to the environment, effects on society and communities, and effects on the market economy). The results of this analysis are set out below.

Table 12.1: Overall evaluation of beneficial effects

Beneficial Effect	Magnitude of effect	Likelihood	Level of benefit
Beneficial effects on the biological and physical environment – aerial application			
Biodiversity benefits of protecting vulnerable plant species	Massive	Very likely	F
Protection of native ecosystems	Major	Extremely likely	F
Creation of predator-free zones	Major	Likely	F
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel	Massive	Extremely likely	F
Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel)	Major	Likely-extremely likely	F
Reduced competition for food supply and some habitat resources for native birds particularly threatened species	Major	Very likely	F
Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats	Major	Likely	F
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs)	Moderate	Unlikely- likely	E
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food	Minor	Likely	E
Protection of <i>Powelliphanta</i> land snails from predation	Major	Very likely	F
Beneficial effects on the biological and physical environment – ground-based application			
Biodiversity benefits of protecting vulnerable plant species	Minor	Very likely	E
Protection of native ecosystems	Minor	Unlikely	D
Creation of predator-free zones	Moderate	Likely	E
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel	Major	likely	F
Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel)	Minor	Unlikely	D
Reduced competition for food supply and some habitat resources for native birds particularly threatened species	Minor	Very unlikely	C
Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats	Minor	unlikely	D
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs)	Minimal	Unlikely	C
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food	Minimal	Unlikely	C
Protection of <i>Powelliphanta</i> land snails from predation	Minor	Unlikely	D
Beneficial effects on the relationship of Māori to the environment – aerial application			
Positive impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment	Major	Very likely	F
Protection of taonga species and resources from browsing by pest species supporting the ongoing roles and responsibilities of iwi/Māori as kaitiaki	Major	Extremely likely	F
Protection of iwi/Māori economic interests	Moderate	Very likely	F
Beneficial effects on society and communities – aerial application			
Reduced concern about native ecosystem degradation	Moderate to major	Unlikely	E

Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

Beneficial Effect	Magnitude of effect	Likelihood	Level of benefit
Reduced concern about bovine Tb risk (stress to farming communities)	Minor	Unlikely	D
Enhanced enjoyment of recreational activities	Minor	Likely	E
Beneficial effects on the market economy – aerial application			
Reduced likelihood of losing access to/sales in export markets for beef, venison and dairy products	Major	Unlikely	E
Reduction in loss of livestock to bovine Tb	Minimal	Unlikely	C
Reduced costs to farmers for vector control	Minimal	Likely	D
Removal or relaxation of restrictions on livestock movements	Minor	Unlikely	D
Reduced competition for grazing from pests	Minor to moderate	Very unlikely	C–D
Reduced costs of vector control (government and pest control agencies)	Minimal	Unlikely	C

Table 12.2: Overall evaluation of adverse effects

Adverse Effect	Magnitude of effect	Likelihood	Level of risk	Committee's approach to risk	Level of risk adjusted to take account of approach to risk
Adverse effects on the biological and physical environment					
Transport of 1080 baits from manufacturing site to application site					
Environmental effects resulting from an accident during transportation of packaged goods by from the manufacturing site to the application site	Minimal-moderate	Improbable	A-C	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>If a major spill into a water body occurred, the spread may be uncontrollable but would be mitigated by dilution. If a spill occurred on land, the risk is controllable by retrieving and/or containing the spill.</p> <p>There is extensive knowledge and experience amongst emergency response personnel in managing spills.</p>	<p>Given the existing controls and the Committee's approach to risk, the level of risk has been adjusted to:</p> <p>A where spill is on land</p> <p>B where spill is into water.</p>
Aerial application of pellets and coated baits containing 1080					
Effects on native birds following direct exposure to pellets during aerial operations and coated baits	Minimal-major	Improbable-very unlikely	A-E	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>The effects are not uncontrollable and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>Given the existing and new controls and recommendations to all users of formulated substances containing 1080 to adopt best practice, and the Committee's approach to risk, the level of risk is assessed as A-D.</p>
Effects on native mammals (bats) following direct exposure to pellets during aerial operations and coated baits	Major	Very unlikely	E	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>The effects are not uncontrollable and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>Given the existing and new controls, recommendations to all users of formulated substances containing 1080 to adopt best practice, and the Committee's approach to risk, the level of risk is assessed as D</p>
Effects on native herpetofauna (frogs and lizards) following direct exposure to pellets during aerial operations	Minimal-major	Improbable	A-D	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p>	<p>Given the existing and new controls and recommendations to all users of</p>

Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

Adverse Effect	Magnitude of effect	Likelihood	Level of risk	Committee's approach to risk	Level of risk adjusted to take account of approach to risk
				<p>The effects are not uncontrollable and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>substances containing 1080 to adopt best practice, and the Committee's approach to risk, the level of risk is assessed as A-C.</p>
Ground-based application					
Uncontained application methods					
<p>Environmental effects resulting from exposure of soil, plants and native fauna following uncontained application (hand sowing directly to the ground or via mechanical spreader) of substance containing 1080 during ground-based operations</p>					
Native bats	Moderate	Very unlikely	D	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>The effects are not uncontrollable and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>Given the existing and new controls and recommendations to all users of substances containing 1080 to adopt best practice, and the Committee's approach to risk, the level of risk is assessed as C.</p>
Native birds	Minimal-moderate	Highly improbable – Very unlikely	A-D	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>The effects are not uncontrollable and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>Given the existing and new controls and recommendations to all users of substances containing 1080 to adopt best practice, and the Committee's approach to risk, the level of risk is assessed as A-C.</p>
Native lizards and frogs	Minimal-moderate	Improbable	A-C	<p>Exposure of organisms to the substance is involuntary.</p> <p>The risk will not persist over time as 1080 is biodegradable.</p> <p>The effects are not uncontrollable</p>	<p>Given the existing and new controls and recommendations to all users of substances containing to adopt</p>

Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

Adverse Effect	Magnitude of effect	Likelihood	Level of risk	Committee's approach to risk	Level of risk adjusted to take account of approach to risk
				<p>and would be irreversible only in the event of the loss of a species or a significant population.</p> <p>Risks are generally well understood by users of formulated substances containing 1080 and can be managed, but are less well understood by the general public.</p>	<p>best practice, and the Committee's approach to risk, the level of risk is assessed as A-B.</p>
Adverse effects on human health and safety					
<p>Adverse human health effects (both short and long term) from exposure of occupationally exposed persons during the handling of:</p> <p>(a) sodium fluoroacetate (1080) during the manufacture of soluble concentrate;</p> <p>(b) soluble concentrate during the manufacture of formulated substances containing 1080;</p> <p>(c) soluble concentrate during the manufacture and handling of treated carrot and apple baits in the field.</p>	<p>Minor</p>	<p>Very unlikely</p>	<p>C</p>	<p>The Committee noted that in respect to the approach to occupational exposure risks:</p> <p>(a) the risk is voluntary;</p> <p>(b) the risk will not persist over time (exposure is not ongoing and the effect will not persist across generations since 1080 is not mutagenic);</p> <p>(c) the risk is not uncontrolled in scope and location;</p> <p>(d) the potential effects may be irreversible but information was incomplete on this aspect;</p> <p>(e) there is good understanding in the occupational setting for managing the effect (protective equipment etc) and little risk of public exposure.</p>	<p>Taking into account the Committee's approach to risk and the expectation that compliance with controls will prevent excessive exposure, the level of risk is assessed by the Committee as B (Minor-Improbable).</p>
Adverse effects on the relationship of Māori to the environment					
<p>Negative impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment</p>	<p>Moderate</p>	<p>Likely</p>	<p>E</p>	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk may persist over time but is not subject to uncontrollable spread. The potential adverse effects are likely to be reversible as alternatives are available. There is some understanding and experience of options for managing the potential adverse effects.</p>	<p>Given the existing and additional controls and recommendations, and the Committee's approach to risk, any change in the level of adverse effect is dependant on the outcomes of the recommended research therefore no change in the level of risk is assessed as E.</p>
<p>Undermining of the roles and responsibilities of kaitiaki</p>	<p>Moderate</p>	<p>Likely</p>	<p>E</p>	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk may persist over time but is not subject to uncontrollable spread. The potential adverse effects are reversible if iwi/Māori are given appropriate opportunity to participate in management and decision making.</p>	<p>Given the existing and additional controls and recommendations, and the Committee's approach to risk, a significant improvement in the involvement of</p>

Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

Adverse Effect	Magnitude of effect	Likelihood	Level of risk	Committee's approach to risk	Level of risk adjusted to take account of approach to risk
				<p>There is good understanding and experience of options for managing the potential adverse effects.</p>	<p>iwi/Māori throughout the processes for the use and management of 1080 would occur. This would change the likelihood of this adverse effect to improbable giving a revised level of risk as C.</p>
<p>Negative impact on the physical and spiritual health and wellbeing of iwi/Māori caused by the compromising or contamination of traditional healing practices and wild foods</p>	Moderate	Very unlikely	D	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk may persist over time but is not subject to uncontrollable spread. The potential adverse effects are likely to be reversible as alternatives become available and given time and opportunity for the restoration of mauri.</p> <p>There is little understanding and experience of options for managing the potential adverse effects.</p>	<p>Given the existing and additional controls and recommendations, and the Committee's approach to risk, any change in the level of adverse effect is dependant on the outcomes of the recommended research therefore no change in the level of risk is assessed as D.</p>
<p>Negative impact on the economic development potential of iwi/Māori</p>	Minimal	Unlikely	C	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk may persist over time but is not subject to uncontrollable spread. The potential adverse effects are likely to be reversible as alternatives are available. There is some understanding and experience of options for managing the potential adverse effects.</p>	<p>Given existing and additional controls and recommendations; and the Committees approach to risk many of the concerns raised can be ameliorated. In addition the Committee notes the potential for a greater risk to the economic potential of Māori if 1080 were unavailable. This would change the likelihood of this adverse effect to improbable giving a revised level of risk as B.</p>
Adverse effects on society and communities					
<p>Loss of opportunity to hunt due to reduced deer populations (includes loss of amenity and loss of food source)</p>	Minor	Very unlikely	C	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk will persist over time but is not subject to uncontrollable spread. The potential adverse effects are reversible as alternatives are available. There is good understanding and experience of measures for managing the potential adverse effects.</p>	<p>Consideration of the Committee's approach to risk did not lead to any change in the level of risk assessed as C.</p>

Overall evaluation of significant adverse and beneficial effects (risks, costs and benefits)

Adverse Effect	Magnitude of effect	Likelihood	Level of risk	Committee's approach to risk	Level of risk adjusted to take account of approach to risk
Anxiety resulting from disagreement between hunting community and government/pest control agencies	Minor	Unlikely	D	<p>There is little uncertainty about the magnitude or likelihood of this effect.</p> <p>Exposure to the adverse effect is involuntary.</p> <p>The risk will persist over time but is not subject to uncontrollable spread. The potential adverse effects are reversible. Management options include the development of communication channels and procedures for ensuring all parties are considered.</p>	<p>The Committee considers that the adverse effect can be ameliorated by improved consultation and communication. The Committee is pleased to see that the Minister of Conservation has convened a Ministerial Panel to address some of these issues and has reassessed the risk as</p> <p>Minor</p> <p>Improbable</p> <p>B.</p>
Concern for animal welfare	Minor	Very Unlikely	C	<p>Exposure to the adverse effect is involuntary.</p> <p>The risk will persist over time but is not subject to uncontrollable spread. The potential adverse effects are reversible. It is difficult to determine the effect of management options on effects such as anxiety and concern, however, management options include the development of communication channels and procedures for ensuring all parties are considered.</p>	<p>Consideration of the Committee's approach to risk did not lead to any change in the level of risk assessed as</p> <p>C.</p>
Concern resulting from perceptions of ecosystem degradation	Moderate	Unlikely	E	<p>The risk will persist over time but is not subject to uncontrollable spread. The potential adverse effects are irreversible. It is difficult to determine the effect of management options on effects such as anxiety and concern, however, management options include the development of communication channels and procedures for ensuring all parties are considered.</p>	<p>Consideration of the Committee's approach to risk did not lead to any change in the level of risk assessed as</p> <p>E.</p>

12.2 Overall evaluation: sodium fluoroacetate (1080)

12.2.1 With the controls imposed, sodium fluoroacetate (1080) is able to be used only for research and development or in the manufacture of formulated substances containing 1080. The adverse effects are restricted to occupational exposure during the manufacture of formulated substances containing 1080 and are well managed by the existing controls. The benefits of the use of sodium fluoroacetate (1080) arise from the use of the formulated substances containing 1080, which are discussed below in the overall evaluation of risks costs and benefits associated with the use of formulated substances containing 1080.

12.3 Overall evaluation: biological and physical environment

Ground-based application of formulated substances containing 1080

12.3.1 The Committee identifies nine beneficial effects associated with ground-based application of formulated substances containing 1080 as significant, although they are of lesser significance than the equivalent effects associated with aerial use. These beneficial effects are:

- biodiversity benefits of protecting vulnerable plant species (level of beneficial effect E – high);
- protection of native ecosystems (level of beneficial effect D – medium);
- capacity to create and maintain predator-free zones (level of beneficial effect E – high);
- reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel (level of beneficial effect D – medium);
- reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel) (level of beneficial effect F – extreme);
- reduced competition for food supply and some habitat resources for native birds particularly threatened species (level of beneficial effect C – low);
- reduced predation of, and competition for food supply for native short-tailed and long-tailed bats (level of beneficial effect D – medium);
- reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs) (level of beneficial effect C – low);
- protection of native invertebrates (particularly threatened species) from predation and reduced competition for food (level of beneficial effect C – low); and
- protection of *Powelliphanta* land snails from predation (level of beneficial effect D – medium).

12.3.2 The Committee assesses two significant adverse effects associated with uncontained ground-based use of formulated substances containing 1080. These are:

- environmental effects resulting from exposure of threatened species of native birds following uncontained application (hand sowing directly to the ground or via mechanical spreader) of formulated substances containing 1080 during ground-based operations (level of adverse effect C – low); and
- environmental effects resulting from exposure of native bats following uncontained application (hand sowing directly to the ground or via mechanical spreader) of formulated substances containing 1080 during ground-based operations (level of adverse effect C – low).

12.3.3 Thus the Committee concludes that, taking into account the controls listed in Appendix A, the beneficial environmental effects of the use of formulated substances containing 1080 for ground-based application outweigh the adverse effects.

Aerial application of formulated substances containing 1080

12.3.4 The Committee identifies ten significant beneficial effects to the biological and physical environment associated with the aerial use of formulated substances containing 1080. These are:

- biodiversity benefits of protecting vulnerable plant species (level of beneficial effect F – extreme);
- protection of native ecosystems (level of beneficial effect F – extreme);
- creation of predator-free zones (level of beneficial effect F – extreme);
- reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel (level of beneficial effect F – extreme);
- reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel) (level of beneficial effect F – extreme);
- reduced competition for food supply and some habitat resources for native birds particularly threatened species (level of beneficial effect F – extreme);
- reduced predation of, and competition for food supply for native short-tailed and long-tailed bats (level of beneficial effect F – extreme);
- reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs) (level of beneficial effect E – high);
- protection of native invertebrates (particularly threatened species) from predation and reduced competition for food (level of beneficial effect E – high); and
- protection of *Powelliphanta* land snails from predation (level of beneficial effect F – extreme).

12.3.5 The Committee identifies three significant risks associated with the aerial application of formulated substances containing 1080. These are:

- effects on threatened species of native birds following direct exposure to pellets and coated baits during aerial operations (level of adverse effect C-D low-medium);
- effects on native mammals (bats) following direct exposure of to pellets during direct aerial operations and coated baits (level of adverse effect D – medium); and
- effects on native herpetofauna (frogs and lizards) following direct exposure to pellets during aerial operations (level of adverse effect C – low).

Distribution of risks and benefits

12.3.6 The benefits accrue to all New Zealanders through maintenance and enhancement of the natural environment and indigenous biodiversity.

12.3.7 Short-term benefits to species and ecosystems extend for a number of years after each individual operation, but to realise the overall long-term benefits the ongoing availability of formulated substances containing 1080 is essential for the foreseeable future (until alternative technologies are developed to the point where there is no longer a need to use these substances).

Uncertainty

12.3.8 The Committee notes that when dealing with the natural environment, multiple factors affect the responses of species and ecosystems to both management actions (such as pest control operations) and natural perturbations such as extreme weather events. For the benefits to be fully realised, all aerial users in particular of formulated substances containing 1080 must comply with the controls on the use of these substances and consider the timing of their operations to ensure that benefits are maximised. This is particularly the case when protecting breeding/nesting birds from predation, where poor timing may reduce the benefits, and possibly require a shorter interval until next application.

12.3.9 There is some residual uncertainty around the adverse effects assessed as significant after taking account of existing and additional controls. The likelihood of adverse effects occurring to any species is possibly overstated, but this is consistent with the Committee's conservative approach to risk. If all the controls are complied with and there is continual development and improvements in application technology and bait quality by all users of the substances, as outlined in the recommendations for best practice in section 11.7 above, then it is expected that the risks will be lower than in this assessment.

12.3.10 The significant beneficial and adverse effects on the environment are ranked and compared in Tables 12.3 and 12.4 below in respect of ground-based and aerial application respectively.

Ranking and grouping of significant risks, costs and benefits to the biological and physical environment

Table 12.3: Ground-based application of formulated substances containing 1080

Benefits	Risks
Protection of vulnerable plant species from browsing by pest species and resulting biodiversity benefits (level of beneficial effect E – high)	Effects on native mammals (bats) following direct exposure of to pellets during direct aerial operations and coated baits (level of risk C – low)
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel (level of beneficial effect D – medium)	Effects on threatened species of native birds following direct exposure to pellets and coated baits during uncontained ground-based operations (level of risk C – low)
Protection of native ecosystem health and habitat values (level of beneficial effect D – medium)	
Capacity to create and maintain predator-free offshore islands (level of beneficial effect E – high) Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel) (level of beneficial effect F – extreme)	
Reduced competition for food supply and some habitat resources for native birds particularly threatened species (level of beneficial effect C – low) Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats (level of beneficial effect D – medium)	
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs) (level of beneficial effect C – low)	
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food (level of beneficial effect C – low)	

- 12.3.11 The Committee concludes that considerable beneficial effects on the biological and physical environment substantially outweigh the adverse effects, noting also that these adverse effects are associated with direct exposure to baits during uncontained ground-based 1080 operations.

Table 12.4: Aerial application of formulated substances containing 1080

Benefits	Risks
Protection of vulnerable plant species from browsing by pest species and resulting biodiversity benefits (level of beneficial effect F – extreme)	Effects on native mammals (bats) following direct exposure of to pellets during direct aerial operations and coated baits (level of risk D – medium)
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel (level of beneficial effect F – extreme)	Effects on threatened species of native birds following direct exposure to pellets and coated baits during aerial operations (level of risk C–D low-medium)
Protection of native ecosystem health and habitat values (level of beneficial effect F – extreme)	Effects on native herpetofauna (frogs and lizards) following direct exposure to pellets during aerial operations (level of risk C – low)
Capacity to create and maintain predator-free offshore islands (level of beneficial effect F – extreme)	
Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel) (level of beneficial effect F – extreme)	
Reduced competition for food supply and some habitat resources for native birds particularly threatened species (level of beneficial effect F – extreme)	
Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats (level of beneficial effect F – extreme)	
Protection of <i>Powelliphanta</i> land snails from predation (level of beneficial effect F – extreme)	
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs) (level of beneficial effect E – high)	
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food (level of beneficial effect E – high)	

- 12.3.12 The Committee concludes that considerable beneficial effects on the biological and physical environment substantially outweigh the adverse effects, noting also that these adverse effects are associated with direct exposure to baits during aerial 1080 operations.

12.4 Overall evaluation: human health and safety

Manufacture and handling of formulated substances containing 1080

- 12.4.1 There are no significant beneficial effects to human health and safety associated with the use of formulated substances containing 1080 and one significant adverse effect related to occupational exposure during manufacture and handling of these substances. This adverse effect is primarily associated with aerial use of 1080.
- 12.4.2 The Committee recognises that occupational exposure data indicated that workers involved in the manufacture and handling of formulated substances containing 1080 may be exposed to 1080. These exposures are likely to be associated with inadequate use of personal protective equipment (PPE) and/or failure to follow the Department of Labour Guidelines for the Safe Use of Sodium Fluoroacetate (1080). Exposure related to handling of the formulated substances containing 1080 is most likely to arise during the manufacture of treated carrot or the loading of treated carrot and pellet into aircraft hoppers.

Distribution of risks and benefits

- 12.4.3 The Committee notes that a relatively small number of workers are exposed to the occupational health risk resulting from the manufacturing and handling of 1080 and substances containing 1080. These workers are voluntarily involved in these operations, and are personally responsible for minimising their exposures by adherence to personal protective equipment requirements and hygiene measures. These individuals are not continuously exposed because the work is seasonal and often weather dependent during the normal operating period.
- 12.4.4 The health hazard applies only to the individual workers and is not unrestricted with respect to time nor does it spread in scope outside the immediate area of operation.

Uncertainty

- 12.4.5 The Committee notes that there is some uncertainty associated with the adverse health effect on exposed workers from exposure to 1080. Firstly there is uncertainty associated with extrapolation of adverse effects on test animal species (rats in particular) to the effects of intake levels in humans. This has been addressed by including safety factors in the analysis of the occupational exposure index.
- 12.4.6 The occupational exposure data indicate that the Department of Labour exposure index for 1080 in workers' urine may be exceeded in some workers' samples on some occasions. There is uncertainty about the circumstances that give rise to these exposures. In particular, it is unclear whether or not appropriate personal protective equipment and personal hygiene measures were in place when high urine values were found.

Conclusion

12.4.7 The Committee does not consider further controls are needed to address the occupational health risk because the exposures are only likely to arise when controls (such as requiring PPE) and the Department of Labour Guidelines are not complied with. On this basis, the Committee concludes that compliance with controls should ensure adequate protection for workers.

12.5 Overall evaluation: relationship of Māori to the environment

Ground-based application of formulated substances containing 1080

12.5.1 The Committee recognises that many of the issues outlined in other sections relating to the ground-based application of 1080 are of general interest and concern to iwi/Māori, particularly as they relate to effects on native species and other taonga.

12.5.2 Having addressed those general issues in other sections, the Committee concludes that there are no adverse or beneficial effects of specific concern to the relationship of Māori to the environment, arising from the ground-based application of formulated substances containing 1080.

Aerial application of formulated substances containing 1080

12.5.3 The Committee identifies three significant beneficial effects on the relationship of Māori to the environment associated with the aerial application of formulated substances containing 1080. These are:

- positive impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment (level of beneficial effect F – extreme);
- protection of taonga species and resources from browsing pest species supporting the ongoing roles and responsibilities of iwi/Māori as kaitiaki (level of beneficial effect F – extreme); and
- protection of iwi/Māori economic interests (level of beneficial effect F – extreme).

12.5.4 The Committee identifies three significant risks associated with the aerial application of formulated substances containing 1080. These are:

- negative impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment (level of adverse effect E – high);
- undermining of the roles and responsibilities of kaitiaki (level of adverse effect C – low); and
- negative impact on the physical and spiritual health and wellbeing of iwi/Māori caused by the compromising or contamination of waters, traditional healing practices and wild foods (level of adverse effect D – medium).

Distribution of risks and benefits

- 12.5.5 The benefits accrue to all New Zealanders due to the importance and value provided by the unique cultural history and context within which the natural environment and indigenous biodiversity rests.
- 12.5.6 The adverse effects accrue primarily to iwi/Māori in the short to medium term but will be minimised over time with the improvement of effective engagement at both strategic and operational levels of pest and conservation management, and with the development of alternative technologies.

Uncertainty

- 12.5.7 Over and above the uncertainty noted earlier relating to the existence of multiple factors affecting the natural environment, the Committee notes additional uncertainty can arise when considering non-biophysical factors such as mauri. For the benefits relating to the relationship of Māori to the environment to be fully realised and maximised, significant improvement is required with regard to the involvement of iwi/Māori throughout pest and conservation management regimes.
- 12.5.8 Some residual uncertainty relating to non-biophysical effects remains after taking account of existing and additional controls. The Committee considers that its recommendation relating to further research conducted in partnership with iwi/Māori could address this uncertainty over time in conjunction with the continued development and improvement of application technologies and alternatives.
- 12.5.9 The significant beneficial and adverse effects on the relationship of Māori to the environment are ranked and compared in Table 12.4 below.

Table 12.4: Ranking and grouping of significant risks, costs and benefits to the relationship of Māori to the environment

Benefits	Risks
Positive impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment (level of beneficial effect F – extreme)	Negative impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment (level of risk E – high)
Protection of taonga species and resources from browsing by pest species supporting the ongoing roles and responsibilities of iwi/Māori as kaitiaki (level of beneficial effect F – extreme)	Undermining the roles and responsibilities of kaitiaki (level of risk C – low)
Protection of iwi/Māori economic interests (level of beneficial effect F – extreme)	Negative impact on the physical and spiritual health and wellbeing of iwi/Māori caused by the compromising or contamination of traditional healing practices and wild foods (level of risk D – medium)

- 12.5.10 The Committee concludes that taking into account distributional considerations, uncertainty and levels of effect, the beneficial effects posed to the relationship of Māori to the environment by the use of formulated substances containing 1080 outweighs the adverse effects.

12.6 Overall evaluation: society and communities

Ground-based application of formulated substances containing 1080

- 12.6.1 The Committee concludes that none of the identified adverse or beneficial effects on society and communities is significant when formulated substances containing 1080 are used in ground-based applications.

Aerial application of formulated substances containing 1080

- 12.6.2 The Committee identifies three significant beneficial effects on society and communities associated with the aerial application of formulated substances containing 1080. These are:
- reduced concern about native ecosystem degradation (level of beneficial effect E – high);
 - enhanced enjoyment of recreational activities (that rely on the maintenance of a healthy forest habitat and native biodiversity) (level of beneficial effect E – high); and
 - reduced concern about bovine Tb risk (leading to reduced stress about farm productivity) (level of beneficial effect D – medium).
- 12.6.3 The Committee identifies three significant adverse effects on society and communities associated with the aerial use of formulated substances containing 1080. These are listed below:
- concern resulting from perceptions of ecosystem degradation (level of adverse effect E – high);
 - loss of opportunity to hunt due to reduced deer populations (includes loss of amenity and loss of food source) (level of adverse effect C – low);
 - concern for animal welfare (including welfare of non-target animals and target animals) (level of adverse effect C – low).

Distribution of risks and benefits

- 12.6.4 The benefits of reduced concern associated with perceptions of a reduction in native ecosystem degradation and enhanced enjoyment of recreational activities that depend on healthy ecosystems accrue to all New Zealanders. This includes those who actively enter native forest habitat for recreation and those who feel pride and satisfaction in knowing that healthy forests are being maintained and enhanced.

- 12.6.5 These benefits depend to some extent on the associated environmental benefit. Similarly, realisation of the overall long-term benefits depends on the ongoing availability of formulated substances containing 1080.
- 12.6.6 The immediate beneficial effect of reduced stress to farming communities accrues to farmers and their families. This benefit will extend to local communities and the wider public if the reduction in possums is maintained.
- 12.6.7 The adverse effects on society and communities associated with loss of opportunity to hunt accrue to the hunting community. Concern for animal welfare is broadly based and felt by all New Zealanders, but especially the hunting community who are concerned about effects on non-target animals. Concern about perceptions of ecosystem degradation is felt broadly by a range of New Zealanders.
- 12.6.8 These adverse effects will all have an impact over time, but will reduce over time if control is maintained and proposed mitigation measures are effective.

Uncertainty

- 12.6.9 There is little uncertainty about the benefits of reduced concern associated with perceptions of native ecosystem degradation.
- 12.6.10 There is some uncertainty about the beneficial effect of enhanced enjoyment of recreational activities that rely on the maintenance of a healthy forest habitat and native biodiversity because of the uncertainty about the realisation of the environmental beneficial effect that it depends on.
- 12.6.11 There is little uncertainty about the beneficial effect of reduced stress to farming communities from the removal or reduction in bovine Tb risk and associated threat to farm productivity.
- 12.6.12 The significant benefits and adverse effects on society and communities are ranked and compared in Table 12.5 below.

Table 12.5: Ranking and grouping of significant risks, costs and benefits to society and communities

Benefits	Risks
Reduced concern associated with perceptions of native ecosystem degradation (level of beneficial effect E – high)	Concern resulting from perceptions of ecosystem degradation (level of risk E – high)
Enhanced enjoyment of recreational activities that rely on the maintenance of a healthy forest habitat and native biodiversity (level of beneficial effect E – high)	Loss of opportunity to hunt due to reduced deer populations (level of risk C – low)
Reduced stress to farming communities from the removal or reduction in Tb risk and associated threat to farm productivity (level of beneficial effect D – medium)	Concern for animal welfare (level of risk C – low)

- 12.6.13 In comparing the beneficial and adverse effects on society and communities the Committee notes that the benefits from reduced concern about environmental degradation is balanced by the risk of concern resulting from perceptions from ecosystem degradation. Submitters expressed opposing views about this issue with equivalent arguments and similar concerns.
- 12.6.14 The remaining two beneficial effects are rated as ‘high’ and ‘medium’, while the two remaining adverse effects are both rated as ‘low’. The Committee concludes that the beneficial effects on society and community outweigh the adverse effects.

12.7 Overall evaluation: the market economy

Ground-based application of formulated substances containing 1080

- 12.7.1 The Committee concludes that none of the identified adverse or beneficial effects on the market economy is significant when formulated substances containing 1080 are used in ground-based application.

Aerial application of formulated substances containing 1080

- 12.7.2 The Committee identifies six significant beneficial effects on the market economy associated with the aerial use of formulated substances containing 1080. These are:
- reduced likelihood of losing access to/sales in export markets for beef, venison and dairy products (level of beneficial effect E – high);
 - reduced costs to farmers for vector control (level of beneficial effect D – medium);
 - removal or relaxation of restrictions on livestock movements (level of beneficial effect D – medium);
 - reduced competition for grazing from pests (rabbits) (level of beneficial effect C to D – low to medium);
 - reduced loss of livestock to bovine Tb (level of beneficial effect C – low); and
 - reduced costs to the agricultural sector and government associated with vector and disease control (level of beneficial effect C – low).
- 12.7.3 The Committee did not identify any significant adverse effects on the market economy.

Distribution of risks and benefits

- 12.7.4 The first benefit accrues to farmers and the national economy alike. The next three beneficial effects accrue directly to farmers and indirectly to farming communities through greater productivity. These benefits are expected to be realised in the short to medium term.

- 12.7.5 The fifth and sixth benefits accrue to the agricultural sector and government. While this last benefit has a low initial value, the Committee emphasises that if New Zealand achieves bovine Tb-free status, then in the longer term (10 years +) the benefits flowing from reduced costs will become much larger.

Uncertainty

- 12.7.6 The Committee notes that there is some uncertainty about the likelihood of formal restrictions on access to markets for agricultural products resulting from a deterioration in New Zealand's bovine Tb status. While the magnitude can be estimated, opinion varies considerably about the likelihood of such restrictions being imposed. Estimating the likelihood of a beneficial effect in the form of a reduced likelihood requires an additional causal link which increases the uncertainty. The Committee recognises that the likelihood of such an effect is difficult to estimate but considers that the magnitude of the effect is such that it requires particular consideration. The likelihood of consumer resistance/reduced demand in New Zealand's export markets if bovine Tb is not controlled is similarly of concern.
- 12.7.7 The Committee notes that there is little uncertainty about the realisation of any of the remaining significant beneficial effects, all of which are expected to increase over time if the reduction in possum numbers can be maintained.

Summary

- 12.7.8 The Committee did not identify any significant adverse effects on the market economy associated with the aerial use of formulated substances containing 1080.
- 12.7.9 Therefore, the Committee concludes that the benefits on the market economy of aerial use of formulated substances containing 1080 outweigh the adverse effects.

12.8 Overall evaluation: summary and conclusion

Ground-based application of formulated substances containing 1080

- 12.8.1 For ground-based application, the Committee notes that some of the adverse effects are deemed to be non-negligible, and therefore the decision is made based on clause 27 of the Methodology.
- 12.8.2 However, as shown above, the Committee concludes that for all areas of impact, the beneficial effects of aerial use of formulated substances containing 1080 outweigh the adverse effects.

Aerial application of formulated substances containing 1080

- 12.8.3 For aerial application, a number of the assessed adverse effects are non-negligible, and therefore the decision is also based on clause 27 of the Methodology.

- 12.8.4 Looking at each of the areas of impact, the Committee concludes that for effects on the natural and physical environment, human health, the relationship of Māori to the environment, society and communities and the market economy, the beneficial effects of the use of formulated substances containing 1080 clearly outweigh the adverse effects.
- 12.8.5 Thus, in summary, the Committee concludes that combining effects over all areas of impact the positive effects (benefits) of the use of sodium fluoroacetate (1080) and formulated substances containing 1080 outweigh the adverse effects (risks and costs).

13. Environmental user charges

- 13.1.1 The Committee considers that the application of controls to 1080 and formulated substances containing 1080 will provide the most effective means of managing risks associated with these substances throughout their lifecycle. Therefore, the imposition of environmental user charges instead of, or in combination with, controls is not required at this time in order to achieve effective risk management.

14. Decision

14.1.1 Pursuant to sections 63 and 29, the Committee has considered this application to reassess sodium fluoroacetate (1080) and formulated substances containing 1080.

The Committee determines that:

14.1.2 Sodium fluoroacetate (1080) and formulated substances containing 1080 have the following hazard classifications:

Substance description and approval number	Trade name products	HSNO hazard classifications
Sodium fluoroacetate (1080) HSNO Approval Number: HSR002771	–	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2B, 9.3A, 9.4A
Soluble concentrate containing 200 g sodium fluoroacetate/litre HSNO Approval Number: HSR002427	1080 Solution Stock Solution 1080	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Cereal based pellets containing 1.5–2.0 g sodium fluoroacetate/kg HSNO Approval Number: HSR002424	0.15% 1080 Pellets 0.2% 1080 Pellets	6.1B, 6.8A, 9.1D, 9.3A
Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg HSNO Approval Number: HSR002423	0.1% 1080 Feral Cat Bait	6.1C, 6.8A, 9.1D, 9.3B
Cereal based pellets containing 0.4–0.8 g sodium fluoroacetate/kg HSNO Approval Number: HSR002422	0.04% 1080 Pellets 0.06% 1080 Pellets 0.08% 1080 Pellets 0.08% 1080 Rodent Pellets	6.1C, 9.1D, 9.3B
Fish paste containing 10 g sodium fluoroacetate/kg HSNO Approval Number: HSR002425	1.0% 1080 Wasp Paste	6.1B, 6.8A, 6.9B, 9.1D, 9.3A, 9.4A
Apple-based paste containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: HSR002421	Pestoff Professional 1080 Possum Paste 0.15%,	6.1B, 6.8A, 9.1D, 9.3A
Peanut-based paste containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: [To be allocated]	Pestoff Exterminator Paste (0.15%)	6.1B, 6.8A, 9.1D, 9.3A
Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg HSNO Approval Number: HSR002420	Pestoff Professional 1080 Possum and Rabbit Paste 0.06% Pestoff Professional 1080 Possum Paste 0.08%	6.1C, 9.1D, 9.3B

Substance description and approval number	Trade name products	HSNO hazard classifications
Polymer gel containing 50 g sodium fluoroacetate/kg HSNO Approval Number: HSR002418	5% 1080 Gel	6.1A, 6.8A, 6.9B, 9.1A, 9.3A, 9.4A
Polymer gel containing 100 g sodium fluoroacetate/kg HSNO Approval Number: HSR002426	10% 1080 Gel	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.2D, 9.3A, 9.4A
Polymer gel block containing 1.5 g sodium fluoroacetate/kg HSNO Approval Number: HSR 002419	No Possums 1080 Gel Bait	6.1B, 6.8A, 9.1D, 9.3A

- 14.1.3 Based on consideration and analysis of the information provided on the possible effects of sodium fluoroacetate (1080) and formulated substances containing 1080, in accordance with the Act and the Methodology, and taking into account the application of default controls (as varied) and the additional controls, the Committee is satisfied, for the reasons set out in this decision, that the positive effects (benefits) of the substances outweigh the adverse effects (risks and costs) associated with the import or manufacture of the substances.
- 14.1.4 The application for importation and manufacture of the sodium fluoroacetate (1080) and formulated substances containing 1080 is thus approved, with the controls listed in Appendix A.
- 14.1.5 The Committee is satisfied that the default controls together with the variations thereto and the additional controls imposed, will be adequate to manage the adverse effects of the substances.
- 14.1.6 In accordance with clause 36(2)(b), the Committee records that, in reaching its decision, it has applied the balancing tests required under section 29 and clause 27 and has relied in particular on the following criteria in the Act and the Methodology:
- clause 8 – information to be relevant and appropriate;
 - clause 9 – equivalent of sections 5, 6 and 8;
 - clause 11 – characteristics of substance;
 - clause 12 – evaluation of assessment of risks;
 - clause 13 – evaluation of assessment of costs and benefits;
 - clause 14 – costs and benefits accruing to New Zealand;
 - clause 15 – regard to evidence in submissions;
 - clause 16 – take account of scientific basis for scientific evidence or uncertainty;
 - clause 21 – the decision accords with the requirements of the Act and regulations;

- clause 22 – the evaluation of risks, costs and benefits – relevant considerations;
- clause 24 – the use of recognised risk identification, assessment, evaluation and management techniques;
- clause 25 – the evaluation of risks and taking account of degree of uncertainty;
- clause 27 – risks and costs are outweighed by benefits;
- clause 29 – determine the materiality and significance of any uncertainty;
- clause 30 – take account of the need for caution where uncertainty is not resolved;
- clause 32 – establish range of uncertainty;
- clause 33 – the extent to which ‘risk characteristics’ exist;
- clause 34 – the aggregation and comparison of risks, costs and benefits; and
- clause 35 – the costs and benefits of varying the default controls and inviting the applicants to comment on cost-effective application of controls.

Neil Walter	Date
Chair	

The substances have been given the following unique identifiers for the ERMA New Zealand Hazardous Substances Register:

ERMA New Zealand Approval Code:

Substance description	Approval code
Sodium fluoroacetate (1080) [CAS No: 62-74-8]	HSR00
Soluble concentrate containing 200 g sodium fluoroacetate/litre	HSR00
Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg	HSR00
Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg	HSR00
Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg	HSR00
Fish paste containing 10 g sodium fluoroacetate/kg	HSR00
Apple-based paste containing 1.5 g sodium fluoroacetate/kg	HSR00
Peanut-based paste containing 1.5 g sodium fluoroacetate/kg	HSR00
Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg	HSR00
Polymer gel containing 50 g sodium fluoroacetate/kg	HSR00
Polymer gel containing 100 g sodium fluoroacetate/kg	HSR00
Polymer gel block containing 1.5 g sodium fluoroacetate/kg	HSR00

Appendix A: Controls for Sodium Fluoroacetate (1080) and Formulated Substances Containing 1080

List of tables

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Notes

1. The controls attached to sodium fluoroacetate (1080) and formulated substances containing 1080 are those prescribed by regulations made under the Act and which are assigned to these substances on the basis of their hazard classifications (the ‘default controls’), with the changes set out in the following tables. The shaded text in the following tables indicate changes made to the default controls and explain the rationale for the changes. These changes are also discussed in section 11 of this decision.
2. There are two tables in this Appendix:
 - Table A1 – outlines the controls which apply to sodium fluoroacetate (1080), which is the technical grade substance used for the manufacture of formulated substances containing 1080.
 - Table A2 – outlines the controls which apply to formulated substances containing 1080.
3. The Control Code given in the left hand column in the Tables relates to the coding system used in the ERMA New Zealand Controls Matrix. This links the hazard classification categories to the regulatory controls triggered by each category. It is available from the ERMA New Zealand website www.ermanz.govt.nz/resources and is also contained in the ERMA New Zealand User Guide to the HSNO Control Regulations.
4. The regulations referred to (as varied or amended) together with the additional controls imposed under this decision, form the controls applicable to the substance(s). The accompanying explanatory text is intended for ease of reference and guidance only and has no legal status. Reference should be made to the actual text of the cited regulations (or relevant variations or amendments) for the legal wording of the controls and for relevant legal definitions and exemptions.

Interpretation

In the following tables, unless the context otherwise requires—

- (a) words and phrases have the meanings given to them in the Act and regulations made under the Act; and
- (b) the following words and phrases have the following meanings:
 - aerial application** means application from an aircraft;
 - aircraft** has the meaning given to it by section 2 of the Civil Aviation Act 1990;

application, in relation to a formulated substance containing 1080, means dropping, spreading, laying as bait, or placing the substance on ground or vegetation, and **apply** has a corresponding meaning;

contained ground-based application means application of a formulated substance containing 1080—

- (a) in a bait station, or bait bag, or other container that is fixed to an object; or
- (b) so that it is contained in some other way, such as in a pipe or burrow;

ground-based application, means application from the ground, and includes contained ground-based application;

public drinking water supply includes drinking water supply reservoirs, treatment plants and storage facilities; and

- (c) references in the regulations or controls referred to in the tables below to the UN Model Regulations, the Land Transport Rule, the International Maritime Dangerous Goods Code, or any rules made under Part 3 of the Maritime Transport Act 1994 or Part 3 of the Civil Aviation Act 1990 shall be deemed to be references to the latest versions or editions thereof.

Table A1: Controls for sodium fluoroacetate (1080) (CAS No: 62-74-8)

Control Code	Regulation and Explanation
Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001	
T3 and E5	Regulation 5-6 – Requirements for keeping records of use
T8	Regulation 28 – Controls on vertebrate poisons
E2	Regulations 46-48 – Restrictions on use within application area
E3	Regulation 49 – Controls relating to protection of terrestrial invertebrates
E4	Regulations 50-51 – Controls relating to protection of terrestrial vertebrates
<p>All these controls relate to the use of a hazardous substance that is discharged or laid in the environment. An additional control has been imposed under section 77A (see Additional Control 1) which prohibits the use of sodium fluoroacetate (1080) for any purpose other than for research or development (not involving use in the outdoor environment) or as an ingredient or component in the manufacture of another substance or product. This additional control effectively means that sodium fluoroacetate (1080) is not permitted to enter the outdoor environment. Accordingly, the Committee deletes the above 'default' controls under section 77(4)(a) on the basis that the adverse effects identified for the substance are less than the adverse effects which would usually be associated with substances with the same hazard classifications.</p>	
T1	<p>Regulations 11-27 – Limiting exposure to toxic substances</p> <p>This control relates to limiting public exposure to toxic substances through the setting of tolerable exposure limits (TELs). A TEL represents the maximum allowable concentration of a substance in a particular environmental medium. TEL values are established by the Authority and are enforceable controls under the HSNO Act. TELs are derived from potential daily exposure (PDE) values, which in turn are derived from acceptable daily exposure (ADE)/reference dose (RfD) values.</p> <p>An ADE/RfD value must be set for a toxic substance if:</p> <ul style="list-style-type: none"> • it is likely to be present in an environmental medium (air, water, soil or a surface that the substance may be deposited onto) or food or other matter that might be ingested; and • it is a substance to which people are likely to be exposed to during their lifetime; and • exposure is likely to result in an appreciable toxic effect. <p>If an ADE/RfD value is set for a substance, a PDE value for each exposure route must also be set for the substance. The PDE is a measure of the relative likelihood of a person actually being exposed to the substance through a particular exposure route given daily living patterns.</p>

Control Code	Regulation and Explanation
	<p>The following ADE is set for sodium fluoroacetate (1080):</p> <p>ADE = 0.02 µg sodium fluoroacetate (1080)/kg bw/day.</p> <p>The following PDE values are set for sodium fluoroacetate (1080):</p> <p>PDE_{FOOD} = 0.006 µg sodium fluoroacetate (1080)/kg bw/day;</p> <p>PDE_{DRINKING WATER} = 0.010 µg sodium fluoroacetate (1080)/kg bw/day;</p> <p>PDE_{INHALATION} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day; and</p> <p>PDE_{DERMAL} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day.</p> <p>The Committee notes the ongoing public concern about the potential for contamination of water supplies during aerial application of formulated substances containing 1080. The TEL_{water} value set below is based on the Ministry of Health Provisional Maximum Acceptable value (PMAV) in drinking water (<i>Drinking-water Standards for New Zealand 2005 – Ministry of Health</i>). The PMAV represents the concentration of sodium fluoroacetate (1080) in water that, on the basis of present knowledge, is not considered to cause any significant risk to the health of the consumer over their lifetime of consumption of that water. The Committee considers that setting a TEL_{water} value based on the Ministry of Health's PMAV is appropriate at this time.</p> <p>The PMAV is set by the Ministry of Health as a minimum standard for protection of consumers for lifetime consumption of drinking water. The Committee notes the intention of the Ministry of Health to review the PMAV for sodium fluoroacetate (1080) and recommends that the TEL_{water} values set below be reviewed when the Ministry of Health has completed its review of the PMAV.</p> <p>The following TEL value is set for sodium fluoroacetate (1080):</p> <p>TEL_{water} = 3.5 µg sodium fluoroacetate (1080)/litre water.</p>
Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001: Toxic Property Controls	
T2	<p>Regulations 29-30 – Controlling exposure in places of work</p> <p>A workplace exposure standard (WES) is designed to protect persons in the workplace from the adverse effects of toxic substances. A WES is an airborne concentration of a substance (expressed as mg substance/m³ of air or ppm in air), which must not be exceeded in a workplace and applies to every place of work where the substance is being used.</p> <p>When setting a WES value, the Authority is required under regulation 30, to either adopt a WES proposed for the substance concerned by Department of Labour as part of its administration of the Health and Safety in Employment Act 1992 or arrive at the value by taking into account matters set out in regulation 30(2). In this case, as Department of Labour has set a WES value for sodium fluoroacetate (1080), the Committee therefore adopts the Department's WES value as follows:</p> <p>Sodium fluoroacetate (1080) (skin, bio) [CAS No: 62-74-8] – 0.05 mg/m³.</p> <p>The 'skin' notation indicates that there is potential for sodium fluoroacetate (1080) to be absorbed through the skin (as an additional route of exposure); and the 'bio' notation indicates that occupational exposure to sodium fluoroacetate (1080) can be estimated by biological monitoring of urine.</p>
T4 and E6	<p>Regulation 7 – Requirements for equipment used to handle hazardous substances</p> <p>Any equipment used to handle sodium fluoroacetate (1080) must retain and/or dispense the substance in the manner intended, ie without leakage, and must be accompanied by sufficient information so that this can be achieved.</p>
T5	<p>Regulation 8 – Requirements for protective clothing and equipment</p> <p>Protective clothing or equipment must be employed when sodium fluoroacetate (1080) is being handled. The protective clothing or equipment must be designed, constructed and operated to ensure that the person handling the substance does not come into contact with it and is not directly exposed to a concentration of the substance that is greater than the WES for that substance.</p> <p>The person in charge must ensure that people using the protective clothing or equipment have access to sufficient information specifying how the protective clothing or equipment may be used, and the requirements for maintaining the protective clothing or equipment.</p>
T6 and E7	<p>Regulation 9 – Approved handler requirements</p> <p>Where sodium fluoroacetate (1080) is held or used in any quantity, the substance must be under the personal control of an approved handler, or locked up. However, the substance may be handled by a person who is not an approved handler if:</p> <ul style="list-style-type: none"> • an approved handler is present at the facility where the substance is being handled; and • the approved handler has provided guidance to the person in respect of handling; and • the approved handler is available at all times to provide assistance if necessary.

Control Code	Regulation and Explanation
	<p>Regulation 9A – Exception to approved handler requirement for transportation of packaged class 6 substances</p> <p>(1) Regulation 9 is deemed to be complied with if—</p> <p>(a) in the case of sodium fluoroacetate (1080) being transported on land—</p> <p>(i) in the case of sodium fluoroacetate (1080) being transported by rail, the person who drives the rail vehicle that is transporting the substance is fully trained in accordance with an approved safety system under section 6D of the Transport Services Licensing Act 1989 or a safety system which is referred to in an approved safety case under the Railways Act 2005; and</p> <p>(ii) in every other case, the person who drives, loads, and unloads the vehicle that is transporting the substance—</p> <p>(A) for hire or reward, or in quantities which exceed those set out in Schedule 1 of the Land Transport Rule, has a current dangerous goods endorsement on his or her driver licence; or</p> <p>(B) in every other case, the Land Transport Rule is complied with; or</p> <p>(b) in the case of sodium fluoroacetate (1080) being transported by sea, one of the following is complied with:</p> <p>(i) Maritime Rules: Part 24A – Carriage of Cargoes – Dangerous Goods (MR024A); or</p> <p>(ii) International Maritime Dangerous Goods Code; or</p> <p>(c) in the case of sodium fluoroacetate (1080) being transported by air, Part 92 of the Civil Aviation Rules is complied with.</p> <p>(2) Subclause (1)(a)—</p> <p>(a) does not apply to a tank wagon or a transportable container to which the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 applies; but</p> <p>(b) despite paragraph (a), does apply to an intermediate bulk container that complies with the UN Model Regulations.</p> <p>(3) Subclause (1)(c)—</p> <p>(a) applies to pilots, aircrew, and airline ground personnel loading and handling sodium fluoroacetate (1080) within an aerodrome; but</p> <p>(b) does not apply to the storage and handling of sodium fluoroacetate (1080) in any place that is not within an aerodrome or within an aerodrome by non-airline ground personnel.</p>
	<p>Regulation 9 applies to sodium fluoroacetate (1080) with the addition of regulation 9A which provides for exceptions to the approved handler requirements in certain situations when transporting sodium fluoroacetate (1080). This control is varied under section 77A in order to reduce compliance costs and to avoid duplicating the requirements of other legislation.</p> <p>Sodium fluoroacetate (1080) is therefore required to be under the control of an approved handler unless the requirements set out in regulation 9A above are met. These requirements are considered to be a cost-effective way of ensuring the safe management of sodium fluoroacetate (1080) during the stated modes of transport.</p>
T7	<p>Regulation 10 – Restrictions on the carriage of hazardous substances on passenger service vehicles</p> <p>Carriage of sodium fluoroacetate (1080) in any quantity on passenger service vehicles is prohibited.</p>
E1	<p>Regulations 32-45 – Limiting exposure to ecotoxic substances</p> <p>This control relates to the setting of environmental exposure limits (EELs). An EEL establishes the maximum concentration of an ecotoxic substance legally allowable in a particular environmental medium (for example, soil or sediment or water), including deposition of a substance onto surfaces.</p> <p>Under the regulations, an EEL can be established by one of three means:</p> <ul style="list-style-type: none"> • applying the default EELs specified; • adopting an established EEL; • calculating an EEL from an assessment of available ecotoxicological data.
	<p>No environmental exposure limits (EELs) are set for sodium fluoroacetate (1080) at this time, either through applying the default EEL, adopting an established value, or calculating an EEL from an assessment of available ecotoxicological data. The Committee notes that EELs may be set at a later date when the policy for the setting of EELs under section 77B has been established.</p> <p>The default EELs specified under regulation 32 are accordingly deleted.</p>

Control Code	Regulation and Explanation
Hazardous Substances (Identification) Regulations 2001	
These Regulations prescribe requirements with regard to identification of hazardous substances in terms of:	
<ul style="list-style-type: none"> • information that must be “immediately available” with the substance (priority and secondary identifiers). This information is generally provided by way of the product label; • documentation that must be available in the workplace, generally provided by way of Safety Data Sheets; and • signage at a place where there is a large quantity of the substance. 	
11	<p data-bbox="389 510 751 533">General identification requirements</p> <p data-bbox="389 551 1337 645">These controls relate to the duties of suppliers and persons in charge of sodium fluoroacetate (1080) with respect to identification (essentially labelling) (Regulations 6 and 7), accessibility of the required information (Regulations 32 and 33) and presentation of the required information with respect to comprehensibility, clarity and durability (Regulations 34, 35, 36(1)–(7)).</p> <p data-bbox="389 663 884 685">Regulation 6 – Identification duties of suppliers</p> <p data-bbox="389 703 1350 819">Suppliers of sodium fluoroacetate (1080) must ensure it is labelled with all relevant priority identifier information (as required by Regulations 8–17) and secondary identifier information (as required by Regulations 18–30) before supplying it to any other person. This includes ensuring that the priority identifier information is available to any person handling the substance within two seconds (Regulation 32), and the secondary identifier information available within 10 seconds (Regulation 33).</p> <p data-bbox="389 837 1331 887">Suppliers must also ensure that no information is supplied with the substance (or its packaging) that suggests it belongs to a class or subclass that it does not in fact belong to.</p> <p data-bbox="389 904 970 927">Regulation 7 – Identification duties of persons in charge</p> <p data-bbox="389 945 1347 1088">Persons in charge of sodium fluoroacetate (1080) must ensure it is labelled with all relevant priority identifier information (as required by Regulations 8 to 17) and secondary identifier information (as required by Regulations 18 to 30) before supplying it to any other person. This includes ensuring that the priority identifier information is available to any person handling the substance within two seconds (Regulation 32), and the secondary identifier information is available within 10 seconds (Regulation 33).</p> <p data-bbox="389 1106 1260 1155">Persons in charge must also ensure that no information is supplied with the substance (or its packaging) that suggests it belongs to a class or subclass that it does not in fact belong to.</p> <p data-bbox="389 1173 928 1196">Regulations 32 and 33 – Accessibility of information</p> <p data-bbox="389 1214 1299 1263">All priority identifier Information (as required by Regulations 8 to 17) must be available within two seconds, for example, on the label.</p> <p data-bbox="389 1281 1337 1330">All secondary identifier Information (as required by Regulations 18 to 30) must be available within 10 seconds, for example, on the label.</p> <p data-bbox="389 1348 1279 1370">Regulations 34, 35, 36(1)–(7) – Comprehensibility, clarity and durability of information</p> <p data-bbox="389 1388 1343 1438">All required priority and secondary identifiers must be presented in a way that meets the performance standards in these Regulations. In summary:</p> <ul style="list-style-type: none"> • any information provided (either written or oral) must be readily understandable and in English; • any information provided in written or pictorial form must be able to be easily read or perceived by a person with average eyesight under normal lighting conditions; • any information provided in an audible form must be able to be easily heard by a person with average hearing; • any information provided must be in a durable format ie the information requirements with respect to clarity must be able to be met throughout the lifetime of the (packaged) substance under the normal conditions of storage, handling and use.
13	<p data-bbox="389 1671 986 1693">Regulation 9 – Priority identifiers for ecotoxic substances</p> <p data-bbox="389 1711 1327 1760">This requirement specifies that sodium fluoroacetate (1080) must be prominently identified as being ecotoxic.</p> <p data-bbox="389 1778 1337 1827">This information must be available to any person handling the substance within two seconds (Regulation 32) and can be provided by way of signal headings or commonly understood pictograms on the label.</p>
18	<p data-bbox="389 1850 1040 1872">Regulation 14 – Priority identifiers for certain toxic substances</p> <p data-bbox="389 1890 1327 1960">This requirement specifies that sodium fluoroacetate (1080) must be prominently identified as being toxic. In addition, information must be provided on the general degree and type of hazard of the substance, and the need to restrict access to the substance by children.</p>

Control Code	Regulation and Explanation
	This information must be available to any person handling the substance within two seconds (Regulation 32) and can be provided by way of signal headings or commonly understood pictograms on the label.
19	<p>Regulation 18 – Secondary identifiers for all hazardous substances</p> <p>This control relates to the level of detail required for sodium fluoroacetate (1080) on the product label. This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information is required:</p> <ul style="list-style-type: none"> • an indication (which may include its common name, chemical name, or registered trade name) that unequivocally identifies it; and • enough information to enable its New Zealand importer, supplier, or manufacturer to be contacted, either in person or by telephone; and • in the case of a substance which, when in a closed container, is likely to become more hazardous over time or develop additional hazardous properties, or become a hazardous substance of a different class or subclass, a description of each likely change and the date by which it is likely to occur.
111	<p>Regulation 20 – Secondary identifiers for ecotoxic substances</p> <p>This control relates to the additional label detail required for sodium fluoroacetate (1080). This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information must be provided:</p> <ul style="list-style-type: none"> • an indication of the circumstances in which it may harm living organisms; • an indication of the kind and extent of the harm it is likely to cause to living organisms; • an indication of the steps to be taken to prevent harm to living organisms; • an indication of its general type and degree of hazard (for example, very toxic to aquatic life and very ecotoxic to terrestrial invertebrates).
116	<p>Regulation 25 – Secondary identifiers for toxic substances</p> <p>This control relates to the additional label detail required for sodium fluoroacetate (1080). This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information must be provided:</p> <ul style="list-style-type: none"> • an indication of its general type and degree of toxic hazard (for example, acutely toxic); • an indication of the circumstances in which it may harm human beings; • an indication of the kinds of harm it may cause to human beings, and the likely extent of each kind of harm; • an indication of the steps to be taken to prevent harm to human beings; • the name and concentration of sodium fluoroacetate (1080).
117	<p>Regulation 26 – Use of generic names</p> <p>This control provides the option of using a generic name to identify groups of ingredients where such ingredients are required to be listed on the product label as specified by Regulations 19(f) and 25(e) and (f).</p> <p>The generic name must identify the key chemical entities and functional groups in the ingredients that contribute to their hazardous properties.</p> <p>Regulation 25(e) specifies a requirement to list on the product label, the name and concentration of sodium fluoroacetate (1080) that causes the substances to be classified as acutely toxic.</p>
118	<p>Regulation 27 – Use of concentration ranges</p> <p>This control provides the option of providing concentration ranges for those ingredients whose concentrations are required to be stated on the product label as specified by Regulations 19(f) and 25(e) and (f).</p> <p>Regulation 25(e) specifies a requirement to list on the product label, the name and concentration of sodium fluoroacetate (1080) that causes the substances to be classified as acutely toxic.</p>
119	<p>Regulation 29-31 – Alternative information in certain cases</p> <p>Regulation 29 – Substances in fixed bulk containers or bulk transport containers</p> <p>This Regulation relates to alternative ways of presenting the priority and secondary identifier information required by Regulations 8 to 25 when sodium fluoroacetate (1080) is contained in fixed bulk containers or bulk transport containers.</p>

Control Code	Regulation and Explanation
	<p>Regulation 29(1) specifies that for fixed bulk containers, it is sufficient compliance if there is available at all times to people near the container, information that identifies the type and general degree of hazard of the substance.</p> <p>Regulation 29(2) specifies that for bulk transport containers, it is sufficient compliance if the substance is labelled or marked in compliance with the requirements of the Land Transport Rule, Civil Aviation Act 1990 or Maritime Transport Act 1994.</p> <p>Regulation 30 – Substances in multiple packaging</p> <p>This Regulation relates to situations when sodium fluoroacetate (1080) is in multiple packaging and the outer packaging obscures some or all of the required substance information. In such cases, the outer packaging must:</p> <ul style="list-style-type: none"> • be clearly labelled with all relevant priority identifier information ie the hazardous properties of the substance must be identified; or • be labelled or marked in compliance with either the Land Transport Rule, Civil Aviation Act 1990 or the Maritime Safety Act 1994 as relevant; or • in the case of an ecotoxic substance, it must bear the EU pictogram “Dangerous to the Environment” (‘dead fish and tree’ on orange background); or • bear the relevant class or subclass label assigned by the UN Model Regulations. <p>Regulation 31 – Alternative information when substances are imported</p> <p>This Regulation relates to alternative information requirements for sodium fluoroacetate (1080) that is imported into New Zealand in a closed package or in a freight container and will be transported to its destination without being removed from that package or container. In these situations, it is sufficient compliance with the requirements of the HSNO Act if the package or container is labelled or marked in compliance with the requirements of the Land Transport Rule.</p>
120	<p>Regulation 36(8) – Durability of information for class 6.1 substances</p> <p>Any packaging in direct contact with sodium fluoroacetate (1080) must be permanently identified as having contained a toxic substance, unless the substance as packaged is restricted to a place of work.</p>
121	<p>Regulations 37-39, 47-50 – Documentation required in places of work</p> <p>These controls relate to the duties of suppliers and persons in charge of places of work with respect to provision of documentation (essentially Safety Data Sheets) (Regulations 37, 38 and 50); the general content requirements of the documentation (Regulation 39 and 47); the accessibility and presentation of the required documentation with respect to comprehensibility and clarity (Regulation 48).</p> <p>These controls are triggered when any quantity of sodium fluoroacetate (1080) is held in a place of work.</p> <p>Regulation 37 – Documentation duties of suppliers</p> <p>A supplier must provide documentation containing all relevant information required by Regulations 39 to 48 when selling or supplying to another person any quantity of sodium fluoroacetate (1080), if the substance is to be used in a place of work and the supplier has not previously provided the documentation to that person.</p> <p>Regulation 38 – Documentation duties of persons in charge of places of work</p> <p>The person in charge of any place of work where sodium fluoroacetate (1080) is present in quantities equal to or greater than those specified in Regulation 38 (and with reference to Schedule 2 of the Identification Regulations), must ensure that every person handling the substance has access to the documentation required for each hazardous substance concerned. The person in charge must also ensure that the documentation does not contain any information that suggests that the substance belongs to a class or subclass it does not in fact belong to.</p> <p>Regulation 39 – General content requirements for documentation</p> <p>The documentation provided with sodium fluoroacetate (1080) must include the following information:</p> <ul style="list-style-type: none"> • the unequivocal identity of the substance (for example, the CAS number, chemical name, common name, UN number, registered trade name(s)); • a description of the physical state, colour and odour of the substance; • if the substance’s physical state may alter over the expected range of workplace temperatures, the documentation must include a description of the temperatures at which the changes in physical state may occur and the nature of those changes; • in the case of a substance that, when in a closed container, is likely to become more hazardous over time or develop additional hazardous properties, or become a hazardous substance of a different class, the documentation must include a description of each likely change and the date by which it is likely to occur;

Control Code	Regulation and Explanation
	<ul style="list-style-type: none"> • contact details for the New Zealand supplier/manufacturer/importer; • all emergency management and disposal information required for the substance; • the date on which the documentation was prepared. <p>Regulation 47 – Information not included in approval</p> <p>This Regulation relates to the provision of specific documentation information (for example, as provided on an Safety Data Sheet). If information required by Regulations 39 to 46 was not included in the information used for the approval of the substance by the Authority, it is sufficient compliance with those Regulations if reference is made to that information requirement along with a comment indicating that such information is not applicable to that substance.</p> <p>Regulation 48 – Location and presentation requirements for documentation</p> <p>All required documentation must be available to a person handling sodium fluoroacetate (1080) in a place of work within 10 minutes. The documentation must be readily understandable by any fully-trained worker required to have access to it and must be easily read, under normal lighting conditions, at a distance of not less than 0.3m.</p> <p>Regulation 49 – Documentation requirements for vehicles</p> <p>This Regulation provides for the option of complying with documentation requirements as specified in the various Land, Sea and Air transport rules when sodium fluoroacetate (1080) is being transported.</p> <p>Regulation 50 – Documentation to be supplied on request</p> <p>Notwithstanding Regulation 37 above, a supplier must provide the required documentation to any person in charge of a place of work (where sodium fluoroacetate (1080) is present) if asked to do so by that person.</p>
123	<p>Regulation 41 – Specific documentation requirements for ecotoxic substances</p> <p>The documentation provided with sodium fluoroacetate (1080) must include the following information:</p> <ul style="list-style-type: none"> • its general degree and type of ecotoxic hazard (for example, highly ecotoxic to terrestrial invertebrates); • a full description of the circumstances in which it may harm living organisms and the extent of that harm; • a full description of the steps to be taken to prevent harm to living organisms; • a summary of the available acute and chronic (ecotox) data used to define the (ecotox) subclass or subclasses in which it is classified; • its bio-concentration factor or octanol-water partition coefficient; • its expected soil or water degradation rate; • any EELs set by the Authority.
128	<p>Regulation 46 – Specific documentation requirements for toxic substances</p> <p>The documentation provided with sodium fluoroacetate (1080) must include the following information:</p> <ul style="list-style-type: none"> • its general degree and type of toxic hazard; • a full description of the circumstances in which it may harm human beings; • the kinds of harm it may cause to human beings; • a full description of the steps to be taken to prevent harm to human beings; • if it will be a liquid during its use, the percentage of volatile substance in the liquid formulation, and the temperature at which the percentages were measured; • a summary of the available acute and chronic (toxicity) data used to define the (toxic) subclass or subclasses in which it is classified; • the symptoms or signs of injury or ill health associated with each likely route of exposure; • the dose, concentration, or conditions of exposure likely to cause injury or ill health; • any TELs or WESs set by the Authority.
129	<p>Regulations 51-52 – Duties of persons in charge of places with respect to signage</p> <p>These controls specify the requirements for signage, in terms of content, presentation and positioning at places where sodium fluoroacetate (1080) is held in quantities exceeding 50 kg.</p>

Control Code	Regulation and Explanation
	<p>Signs are required:</p> <ul style="list-style-type: none"> • at every entrance to the building and/or location (vehicular and pedestrian) where sodium fluoroacetate (1080) is present; • at each entrance to rooms or compartments where sodium fluoroacetate (1080) is present; • immediately adjacent to the area where sodium fluoroacetate (1080) is located in an outdoor area. <p>The information provided in the signage needs to be understandable over a distance of 10 metres and be sufficient to:</p> <ul style="list-style-type: none"> • advise that the location contains sodium fluoroacetate (1080); • describe the general type of hazard of the substance; • where the signage is immediately adjacent to the hazardous substance storage areas, describe the precautions needed to safely manage the substance.
I30	<p>Regulation 53 – Advertising corrosive and toxic substances</p> <p>Any advertisement for sodium fluoroacetate (1080) must include information that identifies the substance is toxic and indicates the need to restrict access by children. In addition, it must specify the general degree and type of hazard.</p>
Hazardous Substances (Packaging) Regulations 2001	
P1	<p>Regulations 5-6, 7(1), and 8</p> <p>General packaging requirements</p> <p>These controls relate to the ability of the packaging to retain its contents, allowable packaging markings with respect to design approvals, factors affecting choice of suitable packaging, and compatibility of the substance with any previous contents of the packaging.</p> <p>Regulation 5 – Ability to retain contents</p> <p>Packaging for sodium fluoroacetate (1080) must ensure that, when the package is closed, there is no visible release of the substance, and that it maintains its ability to retain its contents in temperatures from –10°C to +50°C. The packaging must also maintain its ability to retain its remaining contents if part of the contents is removed from the package and the packaging is then re-closed. The packaging in direct contact with the substance must not be significantly affected or weakened by contact with the substance such that the foregoing requirements cannot be met.</p> <p>Regulation 6 – Packaging markings</p> <p>Packages containing sodium fluoroacetate (1080) must not be marked in accordance with the UN Model Regulations unless:</p> <ul style="list-style-type: none"> • the markings comply with the relevant provisions of that document; and • the packaging complies with the tests set out in Schedule 1, 2 or 3 (Packaging Regulations) respectively; and • the design of the packaging has been test certified as complying with those tests. <p>Regulation 7(1) – Requirements when packing hazardous substance</p> <p>When packing sodium fluoroacetate (1080), account must be taken of its physical state and properties, and packaging must be selected that complies with the requirements of Regulations 5 and 9 to 21.</p> <p>Regulation 8 – Compatibility</p> <p>Sodium fluoroacetate (1080) must not be packed in packaging that has been previously packed with substances with which it is incompatible unless all traces of the previous substance have been removed.</p> <p>Regulations 9A and 9B – Large packaging</p> <p>Large packaging may be used to contain sodium fluoroacetate (1080) in New Zealand if it has been constructed, marked and tested as a large package as provided in the UN Model Regulations.</p> <p>“Large Packaging” does not include:</p> <ul style="list-style-type: none"> • a tank, tank wagon or transportable container (as defined in the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004; or • a stationary container system, a stationary tank or a tank (as defined in the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.

Control Code	Regulation and Explanation
P3, P13 and P15	<p>Regulation 19 and 21 – Packaging requirements for toxic substances</p> <p>Sodium fluoroacetate (1080) must be packaged according to Schedule 1 of the Packaging Regulations.</p> <p>Substances that are offered for sale in a package of less than 2.5 kg (ie toxic substances liable to be in homes) must be in child resistant packaging. However, if the substance is for use in a place of work to which children do not have access, as is most likely to be the case with sodium fluoroacetate (1080), this requirement is not mandatory.</p>
PG1	<p>Schedule 1 – Tests of packaging of hazardous substances required</p> <p>This schedule describes the (minimum) packaging requirements that must be complied with for sodium fluoroacetate (1080) when packaged in any quantity.</p> <p>The tests in Schedule 1 correlate to the packaging requirements of UN Packing Group I (UN PGI).</p>
Hazardous Substances (Disposal) Regulations 2001	
D4 and D5	<p>Regulations 8 and 9 – Disposal requirements for toxic and ecotoxic substances</p> <p>Sodium fluoroacetate (1080) must be disposed of by:</p> <ul style="list-style-type: none"> • treating the substance so that it is no longer a hazardous substance, including depositing the substance in a landfill, incinerator or sewage facility. However, this does not include dilution of the substance with any other substance prior to discharge to the environment; or • discharging the substance to the environment provided that after reasonable mixing, the concentration of the substance in any part of the environment outside the mixing zone does not exceed any TEL (tolerable exposure limit) or EEL (environmental exposure limit) set by the Authority for that substance; or • exporting the substance from New Zealand as a hazardous waste.
D6	<p>Regulation 10 – Disposal requirements for packages</p> <p>This control gives the disposal requirements for packages that contained sodium fluoroacetate (1080) and are no longer to be used for that purpose. Such packages must be either decontaminated/treated or rendered incapable of containing any substance (hazardous or otherwise) and then disposed of in a manner that is consistent with the disposal requirements for the substance. In addition, the manner of disposal must take into account the material that the package is manufactured from.</p>
D7	<p>Regulations 11-12 – Disposal information requirements</p> <p>These controls relate to the provision of information concerning disposal (essentially on the label) that must be provided when selling or supplying any quantity of sodium fluoroacetate (1080).</p> <p>Information must be provided on appropriate methods of disposal and information may be supplied warning of methods of disposal that should be avoided ie that would not comply with the Disposal Regulations. Such information must be accessible to a person handling the substance within 10 seconds and must comply with the requirements for comprehensibility, clarity and durability as described in Regulations 34 to 36 of the Identification Regulations (Control Code I1).</p>
D8	<p>Regulations 13-14 – Disposal documentation requirements</p> <p>These controls relate to the provision of documentation concerning disposal (essentially in a Safety Data Sheet) that must be provided when selling or supplying any quantity of sodium fluoroacetate (1080).</p> <p>The documentation must describe one or more methods of disposal (that comply with the Disposal Regulations) and describe any precautions that must be taken. Such documentation must be accessible to a person handling the substance at a place of work within 10 minutes and must comply with the requirements for comprehensibility and clarity as described in Regulations 48(2), (3) and (4) of the Identification Regulations (Control Code I21).</p>
Hazardous Substances (Emergency Management) Regulations 2001	
EM1	<p>Regulations 6-7, 9-11 – Level 1 emergency management information: General requirements</p> <p>These controls relate to the provision of emergency management information (essentially on the label) that must be provided with any quantity of sodium fluoroacetate (1080).</p> <p>Regulation 6 describes the duties of suppliers, Regulation 7 describes the duties of persons in charge of places, Regulation 9 describes the requirement for the availability of the information (10 seconds) and Regulation 10 gives the requirements relating to the presentation of the information with respect to comprehensibility, clarity and durability. These requirements correspond with those relating to secondary identifiers required by the Identification Regulations (Control Code I1, Regulations 6, 7, 32–35, 36(1)–(7)).</p>

Control Code	Regulation and Explanation
	Regulation 11 provides for the option of complying with the information requirements specified in the various land, sea and air transport rules when the substance is being transported.
EM6	<p>Regulation 8(e) – Information requirements for toxic substances</p> <p>The following information must be provided when sodium fluoroacetate (1080) is present in any quantity:</p> <ul style="list-style-type: none"> • a description of the first aid to be given; • a 24-hour emergency service telephone number.
EM7	<p>Regulation 8(f) – Information requirements for ecotoxic substances</p> <p>The following information must be provided with sodium fluoroacetate (1080) when present in the quantities equal to or greater than 0.1 kg:</p> <ul style="list-style-type: none"> • a description of the parts of the environment likely to be immediately affected by it; • a description of its typical effects on those parts of the environment; • a statement of any immediate actions that may be taken to prevent the substance from entering or affecting those parts of the environment.
EM8	<p>Regulations 12-16, 18-20 – Level 2 emergency management documentation requirements</p> <p>These controls relate to the duties of suppliers and persons in charge of places of work with respect to the provision of emergency management documentation (essentially Safety Data Sheets).</p> <p>This documentation must be provided where sodium fluoroacetate (1080) is sold or supplied, or held in a workplace, in any quantity.</p> <p>Regulations 12 and 13 describe the duties of suppliers, regulation 14 describes the duties of persons in charge of places of work, regulation 15 provides for the option of complying with documentation requirements of the transport rules when the substance is being transported, and regulation 16 specifies requirements for general contents of the documentation.</p> <p>Regulation 18 prescribes location and presentation requirements for the documentation, ie it must be available within 10 minutes, be readily understandable, comprehensible and clear. These requirements correspond with those relating to documentation required by the Identification Regulations (Control Code I21).</p>
EM11	<p>Regulations 25-34 – Level 3 emergency management requirements – emergency response plans</p> <p>These Regulations relate to the requirement for an emergency response plan to be available at any place (excluding aircraft or ships) where sodium fluoroacetate (1080) is held (or is reasonably likely to be held on occasion) in quantities greater than 100 kg.</p> <p>The emergency response plan must describe all of the likely emergencies that may arise from the breach or failure of controls. The type of information that is required to be included in the plan is specified in Regulations 29 to 30. Requirements relating to the availability of equipment, materials and people are provided in Regulation 31, requirements regarding the availability of the plan are provided in Regulation 32 and requirements for testing the plan are described in Regulation 33.</p>
EM12	<p>Regulations 35-41 – Level 3 emergency management requirements – secondary containment – deleted</p> <p>These regulations are deleted under section 77(4)(a). The regulations require secondary containment systems for pooling substances and do not apply to sodium fluoroacetate (1080) given that it is a solid. Having regard to the requirements of section 77(4)(a), the Committee considers that because it is a solid, the adverse effects of sodium fluoroacetate (1080) will thus be less than the adverse effects of other (liquid) substances with the same hazard classifications and therefore the control is deleted.</p>
EM13	<p>Regulation 42 – Level 3 emergency management requirements – signage</p> <p>This control relates to the provision of emergency management information on signage at places where sodium fluoroacetate (1080) is held in quantities equal to or greater than 50 kg.</p> <p>The signage must advise of the action to be taken in an emergency and must meet the requirements for comprehensibility and clarity as defined in Regulations 34 and 35 of the Identification Regulations.</p>
Hazardous Substances (Personnel Qualification) Regulations 2001	
AH1	<p>Regulations 4-6 – Approved Handler requirements</p> <p>Sodium fluoroacetate (1080) is required to be under the control of an approved handler during specified parts of the lifecycle. An approved handler is a person who holds a current test certificate</p>

Control Code	Regulation and Explanation
	<p>certifying that they have met the competency requirements specified by the Personnel Qualification Regulations in relation to handling specific hazardous substances.</p> <p>Regulation 4 describes the test certification requirements, Regulation 5 describes the qualification (competency and skill) requirements and regulation 6 describes situations where transitional qualifications for approved handlers apply.</p> <p>Also see Control Codes T6 and E7.</p>
Hazardous Substances (Tracking) Regulations 2001	
TR1	<p>Regulations 4(1), 5-6 – General tracking requirements</p> <p>Under regulation 4(1), sodium fluoroacetate (1080) is subject to tracking requirements, ie the location and movement of the substance must be recorded at each stage of its lifecycle until its final disposal. (The hazard classifications of the substances requiring tracking are listed in Schedule 1 of the Tracking Regulations).</p> <p>The person in charge of the place where the tracked substance is kept is responsible for ensuring that the necessary information is included in the record. This information to be provided is specified in Schedule 2 of the Tracking Regulations, and includes information on the identification of the approved handler, and on the identification, quantity, location and disposal of the substance. The record must meet the location and presentation requirements specified in Part 2 of the Identification Regulations, ie it must be accessible within 10 minutes and meet the performance standards for comprehensibility and clarity (Regulation 5(1) and (2)).</p> <p>If a tracked substance is transferred to another place, the person in charge must ensure that the record is retained for a period of 12 months. If the substance has undergone treatment that results in it no longer being a tracked substance, or if it has been intentionally or unintentionally disposed of, the record must be kept for 3 years. However these requirements do not apply to places that are vehicles (Regulations 5(3) and (4)).</p> <p>Regulation 6 prescribes requirements relating to the transfer of tracked substances from one place to another. Specifically, the person in charge may only transfer the tracked substance to another place if they have received confirmation that:</p> <ul style="list-style-type: none"> • an approved handler is present at the place receiving the substance; • the place receiving the substance meets any location test certification requirements; • any place where the substance is to be held during transit complies with the relevant requirements of the Hazardous Substances (Emergency Management) Regulations and Hazardous Substances (Classes 1 to 5 Controls) Regulations.
Additional Controls on sodium fluoroacetate (1080) imposed under section 77A	
Additional Control 1	<p>Prohibition on the use of sodium fluoroacetate (1080)</p> <p>(1) No person may use sodium fluoroacetate (1080) for any purpose other than –</p> <ol style="list-style-type: none"> (a) for research and development; or (b) as an ingredient or component in the manufacture of another substance or product. <p>(2) For the purposes of this control, "research and development", means the systematic investigation or experimentation activities that involve sodium fluoroacetate (1080) but does not include investigation or experimentation in which the substance is discharged, laid, or applied in or to the outdoor environment.</p>
<p>This additional control is added under section 77A to prohibit the use of sodium fluoroacetate (1080) as a vertebrate poison. While it is highly unlikely that sodium fluoroacetate (1080) would be used as a vertebrate poison, it is still necessary to ensure that this use is specifically prohibited, as the risks of its use as a vertebrate poison have not been assessed. The Committee is satisfied that this additional control is more effective in terms of its effect on the management, use and risks of sodium fluoroacetate (1080) than the following 'default' controls for which this control is substituted (see above). The following controls are therefore deleted:</p> <ul style="list-style-type: none"> • T3 and E5 – requirements for keeping records of use • T8 – controls on vertebrate poisons • E2 – restrictions on use within application area • E3 – controls relating to protection of terrestrial invertebrates • E4 – controls relating to protection of terrestrial vertebrates. 	

Table A2: Controls for formulated substances containing 1080

Note: Except as specifically provided for in the following Table, references to “formulated substances containing 1080” should be read as references to all such substances as listed in section 14.1.2 of this decision.

Control Code	Regulation and Explanation
Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001	
T1	<p>Regulations 11-27 – Limiting exposure to toxic substances</p> <p>This control relates to limiting public exposure to toxic substances through the setting of tolerable exposure limits (TELs). A TEL represents the maximum allowable concentration of a substance legally allowable in a particular environmental medium. TEL values are established by the Authority and are enforceable controls under the HSNO Act. TELs are derived from potential daily exposure (PDE) values, which in turn are derived from acceptable daily exposure (ADE)/reference dose (RfD) values.</p> <p>An ADE/RfD value must be set for a toxic substance if:</p> <ul style="list-style-type: none"> it is likely to be present in an environmental medium (air, water, soil or a surface that the substance may be deposited onto) or food or other matter that might be ingested; and it is a substance to which people are likely to be exposed to during their lifetime; and exposure is likely to result in an appreciable toxic effect. <p>If an ADE/RfD value is set for a substance, a PDE for each exposure route must also be set for the substance. The PDE is a measure of the relative likelihood of a person actually being exposed to the substance through a particular exposure route given daily living patterns.</p> <p>The following ADE is set for formulated substances containing 1080:</p> <p>ADE = 0.02 µg sodium fluoroacetate (1080)/kg bw/day.</p> <p>The following PDE values are set for formulated substances containing 1080:</p> <p>PDE_{FOOD} = 0.006 µg sodium fluoroacetate (1080)/kg bw/day;</p> <p>PDE_{DRINKING WATER} = 0.010 µg sodium fluoroacetate (1080)/kg bw/day;</p> <p>PDE_{INHALATION} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day; and</p> <p>PDE_{DERMAL} = 0.002 µg sodium fluoroacetate (1080)/kg bw/day.</p> <p>The Committee notes the ongoing public concern about the potential for contamination of water supplies during aerial application of formulated substances containing 1080. The TEL_{water} value set below is based on the Ministry of Health Provisional Maximum Acceptable value (PMAV) in drinking water (<i>Drinking-water Standards for New Zealand 2005</i>: Ministry of Health). The PMAV represents the concentration of sodium fluoroacetate (1080) in water that, on the basis of present knowledge, is not considered to cause any significant risk to the health of the consumer over their lifetime of consumption of that water. The Committee considers that setting a TEL_{water} value based on the Ministry of Health's PMAV is appropriate at this time.</p> <p>The PMAV is set by the Ministry of Health as a minimum standard for protection of consumers for lifetime consumption of drinking water. The Committee notes the intention of the Ministry of Health to review the PMAV for sodium fluoroacetate (1080) and recommends that the TEL_{water} values set below be reviewed when the Ministry of Health has completed its review of the PMAV.</p> <p>The following TEL value is set for sodium fluoroacetate (1080):</p> <p>TEL_{water} = 3.5 µg sodium fluoroacetate (1080)/litre water.</p>
T2	<p>Regulations 29-30 – Controlling exposure in places of work</p> <p>A workplace exposure standard (WES) is designed to protect persons in the workplace from the adverse effects of toxic substances. A WES is an airborne concentration of a substance (expressed as mg substance/m³ of air or ppm in air), which must not be exceeded in a workplace and applies to every place of work where the substance is being used.</p> <p>When setting a WES value, the Authority is required under regulation 30, to either adopt a WES proposed for the substance concerned by Department of Labour as part of its administration of the Health and Safety in Employment Act 1992 or arrive at the value by taking into account matters set out in regulation 30(2). In this case, as Department of Labour has set a WES value for sodium fluoroacetate (1080), the Committee therefore adopts the Department's WES value as follows:</p> <p>Sodium fluoroacetate (1080) (skin, bio) [CAS No: 62-74-8] – 0.05 mg/m³.</p>

Control Code	Regulation and Explanation
<p>The 'skin' notation indicates that there is potential for 1080 to be absorbed through the skin (as an additional route of exposure); and the 'bio' notation indicates that occupational exposure to 1080 can be estimated by biological monitoring of urine.</p>	
T3 and E5	<p>Regulations 5-6 – Requirements for keeping records of use</p> <p>A person using any formulated substance containing 1080 for the purposes of causing biocidal action must keep written records of each use if the application is in an area where members of the public may be present, or where the substance is likely to enter air or water and leave the place.</p> <p>The information to be provided in the record is described in Regulation 6(1):</p> <ul style="list-style-type: none"> • the name of the substance; • the date and time of each application or discharge of the substance; • the amount of the substance applied or discharged; • the location where the substance was applied or discharged; • if the substance is applied to or discharged in the air, a description of the wind speed and direction when the substance was applied or discharged; and • the name of the substance and the user's address. <p>The record must be kept for a minimum of three years following the use and must be made available to an enforcement officer on request.</p>
T4 and E6	<p>Regulation 7 – Requirements for equipment used to handle hazardous substances</p> <p>Any equipment used to handle any formulated substance containing 1080 must retain and/or dispense the substance in the manner intended, ie without leakage, and must be accompanied by sufficient information so that this can be achieved.</p>
T5	<p>Regulation 8 – Requirements for protective clothing and equipment</p> <p>Protective clothing or equipment must be employed when any formulated substance containing 1080 is being handled. The protective clothing or equipment must be designed, constructed and operated to ensure that the person handling the substance does not come into contact with it and is not directly exposed to a concentration of the substance that is greater than the WES for that substance.</p> <p>The person in charge must ensure that people using the protective clothing or equipment have access to sufficient information specifying how the protective clothing or equipment may be used, and the requirements for maintaining the protective clothing or equipment.</p>
T6 and E7	<p>Regulation 9 – Approved handler requirements</p> <p>Where any formulated substance containing 1080 is held or used in any quantity, the substance must be under the personal control of an approved handler, or locked up. However, the substance may be handled by a person who is not an approved handler if:</p> <ul style="list-style-type: none"> • an approved handler is present at the place where the substance is being handled; and • the approved handler has provided guidance to the person in respect of handling; and • the approved handler is available at all times to provide assistance if necessary. <p>Regulation 9A – Exception to approved handler requirement for transportation of packaged class 6 substances</p> <p>(1) Regulation 9 is deemed to be complied with if—</p> <p>(a) in the case of sodium fluoroacetate (1080) being transported on land—</p> <ul style="list-style-type: none"> (i) in the case of sodium fluoroacetate (1080) being transported by rail, the person who drives the rail vehicle that is transporting the substance is fully trained in accordance with an approved safety system under section 6D of the Transport Services Licensing Act 1989 or a safety system which is referred to in an approved safety case under the Railways Act 2005; and (ii) in every other case, the person who drives, loads, and unloads the vehicle that is transporting the substance— <ul style="list-style-type: none"> (A) for hire or reward, or in quantities which exceed those set out in Schedule 1 of the Land Transport Rule, has a current dangerous goods endorsement on his or her driver licence; or (B) in every other case, the Land Transport Rule is complied with; or <p>(b) in the case of sodium fluoroacetate (1080) being transported by sea, one of the following is complied with:</p> <ul style="list-style-type: none"> (i) Maritime Rules: Part 24A – Carriage of Cargoes – Dangerous Goods (MR024A); or (ii) International Maritime Dangerous Goods Code; or

Control Code	Regulation and Explanation
	<p>(c) in the case of sodium fluoroacetate (1080) being transported by air, Part 92 of the Civil Aviation Rules is complied with.</p> <p>(2) Subclause (1)(a)—</p> <p>(a) does not apply to a tank wagon or a transportable container to which the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 applies; but</p> <p>(b) despite paragraph (a), does apply to an intermediate bulk container that complies with the UN Model Regulations.</p> <p>(3) Subclause (1)(c)—</p> <p>(a) applies to pilots, aircrew, and airline ground personnel loading and handling sodium fluoroacetate (1080) within an aerodrome; but</p> <p>(b) does not apply to the storage and handling of sodium fluoroacetate (1080) in any place that is not within an aerodrome or within an aerodrome by non-airline ground personnel.</p>
	<p>Regulation 9 applies to formulated substances containing 1080 with the addition of regulation 9A which provides for exceptions to the approved handler requirements in certain situations when transporting formulated substances containing 1080. This additional control is added under section 77A in order to reduce compliance costs and to avoid duplicating the requirements of other legislation.</p> <p>Formulated substances containing 1080 are therefore required to be under the control of an approved handler unless the requirements set out in regulation 9A below are met. These additional requirements are considered to be a cost effective way of ensuring the safe management of formulated substances containing 1080 during the stated modes of transport.</p>
T7	<p>Regulation 10 – Restrictions on the carriage of hazardous substances on passenger service vehicles</p> <p>In order to limit the potential for public exposure to hazardous substances, the following requirements are prescribed for the carriage of formulated substances containing 1080 on passenger service vehicles:</p> <p>Carriage of any quantity of the following formulated substances containing 1080 is prohibited:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg. <p>The maximum quantity per package of the following formulated substances containing 1080 permitted to be carried on passenger service vehicles is 0.5 kg:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>The maximum quantity per package of the following formulated substances containing 1080 permitted to be carried on passenger service vehicles is 3.0 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg.
T8	<p>Regulation 28 – Controls on vertebrate poisons – varied (in part)</p> <p>This Regulation applies to formulated substances containing 1080 that are (lawfully) laid or applied outdoors for terrestrial vertebrate pest control. Signage requirements are imposed on the person in charge of laying or applying the bait which are designed to limit the likelihood of the substances from coming into contact with members of the general public and non-target species in places of public access.</p> <p>The requirement for the substance to be under the control of an approved handler or secured (Control Code T6, Regulation 9) does not apply after the substance has been applied or laid.</p> <p>Regulation 28 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001</p> <p>For formulated substances containing 1080, subclauses (2), (3)(b) and (d), (4) and (5) of regulation 28 are varied under section 77A as follows:</p> <p>(2) A person in charge of the substance must ensure that signs are erected at every normal point of entry to the place where the substance is to be applied or laid before the substance is applied or laid.</p> <p>(3) The signs must—...</p>

Control Code	Regulation and Explanation
	<ul style="list-style-type: none"> (b) identify the substance and state that it is toxic to human beings and ecotoxic to other vertebrates and state that it might be present in carcasses; and... (d) comply with regulations 34 and 35 of the Hazardous Substances (Identification) Regulations 2001, except that regulation 35 applies as follows: <ul style="list-style-type: none"> (i) in relation to the information required to be included on the signs by virtue of subclauses (3)(a) and (c) of this regulation 28, as if the distances referred to in regulation 35(3)(c) of the Hazardous Substances (Identification) Regulations 2001 were a distance of not less than 2 metres; and (ii) in relation to the information required to be included on the signs by virtue of subclause (3)(b) of this regulation 28, as if the distances referred to in regulation 35(3)(c) of the Hazardous Substances (Identification) Regulations 2001 were a distance of not less than 10 metres. (4) The signs must remain in place for a minimum of six months or until the earlier of— <ul style="list-style-type: none"> (a) the date when the substance (or any carcass) is no longer toxic; or (b) the date of retrieval of the substance from the place concerned. (5) Signs must be removed at the later of— <ul style="list-style-type: none"> (a) the date when they are no longer required to remain under subclause (4); or (b) in the case of signs that include information to which a legal obligation applies that requires the signs to remain in place for a longer period of time, the expiry of that longer period of time.
	<p>Regulation 28(2) requires that signs be erected at every normal point of entry at least three days before a substance is applied or laid. At the time of transfer (and approval) of relevant formulated substances containing 1080 into the HSNO regime, the Authority's Transfer of Substances Standing Committee removed the requirement for signs to be in place "at least three days" before a substance is applied or laid. This was in response to submissions received on the three-day requirement which indicated that it was an impractical requirement which would not reduce risks to the public. The Transfer of Substances Standing Committee also noted that the Medical Officers of Health and the Department of Conservation are able to set additional conditions on the use of formulated substances containing 1080 through the requirement for permissions under section 95A of the Act. This was considered to be a more effective way to manage the signage requirement than requiring signs to be erected "at least three days" before a substance is applied or laid. The Committee in this application, is satisfied that regulation 28(2) set out above should be varied under section 77A, as the varied control will be more effective in terms of its effect on the management, use and risks of formulated substances containing 1080.</p> <p>Regulation 28(3)(d) requires that signs must comply with Part 3 of the Hazardous Substances (Identification) Regulations 2001. As the regulation is written, this means that all information displayed on a sign, including identification of the person applying the substance, their contact details and the date on which the substance is to be applied must be visible from 10 metres.</p> <p>In the Committee's view, the 10 metre requirement is intended to address other matters such as stating that hazardous substances are present, their general type of hazard and their general type of classification. If required to be adhered to in the case of use of formulated substances containing 1080 for information relating to date of application and contact details, signs will be considerably larger than is desirable and will lose their visibility and clarity with respect to the priority identification information and will not effectively manage risks to the public. For this reason, the visibility distance for information required in relation to formulated substances containing 1080 by regulation 28(3)(a) and (c) of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001, is varied under section 77A to a distance of not less than two metres.</p> <p>However, in respect of Regulation 28(3)(b), the Committee is of the opinion that the 10 metre requirement should apply to one other matter not currently required on signs, namely the hazards posed by poisoned carcasses to dogs. The Committee notes that ACVM and DoC currently require signs to indicate that both bait and carcasses are poisonous to dogs but considers that it is appropriate that this risk should also be managed by way of a control under the Act.</p> <p>The Committee is therefore satisfied that regulation 28(3)(b) and (d) should be varied under section 77A as set out above and that these variations are more effective in terms of its effect on the management, use and risks of the substances as they will help to limit the likelihood of the substances coming into contact with members of the public and non-target species in places of public access.</p> <p>Regulations 28(4) and (5) relate to the period of time during which signs must remain in place. For formulated substances containing 1080, the Committee varies these requirements under section 77A to provide that signs must remain for at least a minimum period of six months or until the earlier of retrieval of the bait or it is demonstrated that the bait has ceased to be toxic. This latter requirement will also relate to bait in carcasses.</p> <p>In addition, the Committee re-imposes an additional mandatory requirement under section 77A for signs to be removed after completion of an operation. This requirement was imposed by the Transfer of Substances Standing Committee on transfer of the substances into the HSNO regime based on the premise that signs should only remain in place for so long as the hazard remains present in the environment. The Committee is satisfied that these variations/additions are more effective in terms of their effect on the management, use and risks of the substances than the existing regulations.</p>

Control Code	Regulation and Explanation
E1	<p data-bbox="383 324 1037 347">Regulations 32-45 – Limiting exposure to ecotoxic substances</p> <p data-bbox="383 358 1372 459">This control relates to the setting of environmental exposure limits (EELs). An EEL establishes the maximum concentration of an ecotoxic substance legally allowable in a particular (non-target) environmental medium (for example, soil or sediment or water), including deposition of a substance onto surfaces (for example, as in spray drift deposition).</p> <p data-bbox="383 470 1085 492">Under the regulations, an EEL can be established by one of three means:</p> <ul data-bbox="383 504 1149 593" style="list-style-type: none"> • applying the default EELs specified; • adopting an established EEL; • calculating an EEL from an assessment of available ecotoxicological data. <p data-bbox="199 604 1372 683">No environmental exposure limits (EELs) are set for 1080 at this time, either through applying the default EEL, adopting an established value, or calculating an EEL from an assessment of available ecotoxicological data. The Committee notes that EELs may be set at a later date when the policy for the setting of EELs under section 77B has been established.</p> <p data-bbox="199 694 877 716">The default EELs specified under regulation 32 are accordingly deleted.</p>
E2	<p data-bbox="383 739 1037 761">Regulations 46-48 – Restrictions on use within application area</p> <p data-bbox="383 772 1372 952">These Regulations relate to controls on application areas. An application (target) area is an area that the person using the substance either has control over or is otherwise authorised to apply the substance to. For ecotoxic substances that are intentionally released into the environment (for example, pesticides), any EEL controls will not apply within the application (target) area provided that the substance is applied at a rate that does not exceed the allowed application rate. In addition, any approved handler controls (Code T6/E7, Regulation 9) do not apply once the substance has been applied or laid.</p> <p data-bbox="383 963 1372 1108">In recognition of the need to limit adverse effects within the target area, Regulations have been prescribed to restrict the use of the substance within the target area. These include a requirement to set an application rate for any substance designed for biocidal action for which an EEL has been set. The application rate must not be greater than the application rate specified in the application for approval, or not greater than a rate calculated in a similar manner to that used to calculate EELs (with the proviso that the product of the uncertainty factors must not exceed 100).</p> <p data-bbox="383 1120 1372 1220">Regulation 48 (as amended in the Hazardous Substances (Sodium Fluoroacetate) Transfer Notice 2005 (<i>New Zealand Gazette</i> Issue No 92, 17 June 2005) states that the Authority may set an application rate for a substance that is designed for biocidal action if an EEL has been set for the substance. This change gives the Authority discretion on whether or not to set an application rate.</p> <p data-bbox="383 1232 1372 1310">No application rate is set for the ground-based application of formulated substances containing 1080. The following control, however, is set for aerial application of three of the formulated substances containing 1080:</p> <p data-bbox="383 1321 782 1355">Application rates for aerial application</p> <p data-bbox="383 1366 1372 1422">For aerial application of formulated substances containing 1080, an application rate not exceeding 30g sodium fluoroacetate(1080)/ha is set.</p> <p data-bbox="383 1433 1149 1456">This application rate applies to the following substances when aerially applied:</p> <ul data-bbox="502 1467 1197 1579" style="list-style-type: none"> • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Soluble concentrate containing 200 g sodium fluoroacetate/litre.
	<p data-bbox="199 1590 1372 1758">The Committee notes that application rates per hectare have come down significantly over the past few decades and that the current practice for possum and rabbit control are for application rates of 2.4–7.5 g 1080/ha and 2–8 g 1080/ha respectively (additional information supplied by the applicants, 22 December 2006). The Committee accepts DoC's view provided at the hearings that it is appropriate to leave the rate at its current level so as to allow a sufficient degree of operational flexibility particularly when considering simultaneous multi-species pest control (for example, rats, possums and wallabies). Further, DoC advised the Committee that on occasions when pest numbers are high, double-sowing is necessary.</p> <p data-bbox="199 1769 1372 1825">The Committee therefore sets an application rate not exceeding 30g sodium fluoroacetate(1080)/ha for the following substances when aerially applied:</p> <ul data-bbox="327 1836 1021 1937" style="list-style-type: none"> • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Soluble concentrate containing 200 g sodium fluoroacetate/litre.

Control Code	Regulation and Explanation												
E3	<p>Regulation 49 – Controls relating to protection of terrestrial invertebrates – deleted</p> <p>This control is deleted under section 77(4)(a). The control is only triggered for the following formulated substances containing 1080:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Fish paste containing 10 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg. <p>However, while these substances all have a 9.4A classification, none of them is attractive to bees as they contain no sweeteners. Therefore, regulation 49(1)(a) does not apply as the substances are not in a form to which bees are “likely to be exposed”. As a result, the Committee is satisfied, having regard to section 77(4)(a), that the adverse effects identified for these substances are less than the adverse effects which would usually be associated with substances given the same hazard classification and that the control can be deleted.</p>												
E4	<p>Regulation 50 – Controls relating to protection of terrestrial vertebrates – deleted</p> <p>Regulation 50 is deleted under section 77(4)(b). The formulated substance <i>soluble concentrate containing 200 g sodium fluoroacetate/litre</i>, when mixed with oats, potentially falls within the ambit of this regulation (“coated on seed”). However, the regulation is concerned with setting an EEL for the substance so that if ingested, it would not be likely to cause adverse effects in terrestrial vertebrates. Given that the substance is to be specifically used to control possums and other vertebrates, it would not be appropriate to set an EEL under this regulation. The Committee is satisfied that the benefits of using <i>soluble concentrate containing 200 g sodium fluoroacetate/litre</i>, when mixed with oats justify deleting the regulation under section 77(4)(b) and that the deletion does not, in the Committee’s opinion, significantly increase the adverse effects of using the substance, particularly given the imposition, under this approval, of other controls on its use.</p>												
E4	<p>Regulation 51 – Controls relating to the use of ecotoxic substances as bait</p> <p>Where substances are used outdoors as bait and are known to inhibit growth or reproduction or cause death in one or more vertebrate species, this regulation requires that the Authority must specify one or more of the following matters for the substance:</p> <ul style="list-style-type: none"> • colour; • methods of release; • repellents or attractants to be used with the substance; • bait size; • degree of palatability. <p>In accordance with this regulation, the Committee sets the following methods of release, bait size and colours for the stated formulated substances containing 1080:</p> <p>Methods of release, bait size and colour</p> <p>The following Table specifies for each formulated substance containing 1080 listed in column 1—</p> <p>(a) the method or methods of release and (where applicable) bait size specified in column 2 for the substance; and</p> <p>(b) a colour specified in column 3 for the substance.</p> <table border="1"> <thead> <tr> <th>Column 1</th> <th>Column 2</th> <th>Column 3</th> </tr> <tr> <th>Substance</th> <th>Method(s) of release and (where applicable) bait size</th> <th>Colour</th> </tr> </thead> <tbody> <tr> <td>Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg</td> <td>Aerial application or ground-based application</td> <td>Blue or green</td> </tr> <tr> <td>Soluble concentrate containing 200 g sodium fluoroacetate/litre</td> <td>This substance may only be used when mixed with the following food baits and released by the following methods: <u>When mixed with prepared (cut) apple:</u></td> <td>Blue or green</td> </tr> </tbody> </table>	Column 1	Column 2	Column 3	Substance	Method(s) of release and (where applicable) bait size	Colour	Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg	Aerial application or ground-based application	Blue or green	Soluble concentrate containing 200 g sodium fluoroacetate/litre	This substance may only be used when mixed with the following food baits and released by the following methods: <u>When mixed with prepared (cut) apple:</u>	Blue or green
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Substance	Method(s) of release and (where applicable) bait size	Colour											
Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg	Aerial application or ground-based application	Blue or green											
Soluble concentrate containing 200 g sodium fluoroacetate/litre	This substance may only be used when mixed with the following food baits and released by the following methods: <u>When mixed with prepared (cut) apple:</u>	Blue or green											

Control Code	Regulation and Explanation		
		<ul style="list-style-type: none"> to a maximum concentration of 2.0 g sodium fluoroacetate (1080) per kg apple <p>Contained ground-based application</p> <p><u>When mixed with prepared (cut) carrot (except when used for rabbit control through ground-based application):</u></p> <ul style="list-style-type: none"> to a maximum concentration of 2.0 g sodium fluoroacetate (1080) per kg carrot; bait must be screened so that bait has a mean weight of 6 g or larger; and chaff (pieces <0.5 g) must be less than 1.5% of the total weight of carrot <p>Aerial application or ground-based application</p> <p><u>When mixed with oats :</u></p> <ul style="list-style-type: none"> to a maximum concentration of 0.6 g sodium fluoroacetate (1080) per kg oats <p>Aerial application or ground-based application</p>	
	Peanut-based Paste containing 1.5 g sodium fluoroacetate/kg	Contained ground-based application	Blue or green
	Apple-based Paste containing 1.5 g sodium fluoroacetate/kg	Ground-based application	Blue or green
	Apple-based paste containing 0.6 – 0.8 g sodium fluoroacetate/kg Polymer gel containing 50 g sodium fluoroacetate/kg Polymer gel containing 100 g sodium fluoroacetate/kg Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg	Ground-based application	Blue or green
	Fish paste containing 10 g sodium fluoroacetate/kg	Contained ground-based application	Blue or green
	Polymer gel block containing 1.5 g sodium fluoroacetate/kg		

The restrictions set out in the Table are imposed on formulated substances containing 1080 under Regulation 51, for the following reasons:

Colour

For all formulated substances containing 1080, baits must be coloured either blue or green. The previous requirement under the Pesticides Act (and related regulations) that baits had to be dyed green was based on the effectiveness of the colour in reducing the visual attractiveness of the baits to birds. More recent research with New Zealand native birds indicated that blue may also be an effective visual deterrent for North Island robins and weka. There have also been problems with attaining a green colour in certain bait formulations. Specification of the bait colour as either blue or green provides a visual deterrent to birds which allows some flexibility in bait colour depending on the characteristics of the bait and the specific circumstances of any particular operation.

Control Code	Regulation and Explanation
	<p><u>Method(s) of release</u></p> <p>The formulated substance <i>peanut-based paste containing 1.5 g sodium fluoroacetate/kg</i> is restricted to use in contained ground-based application.</p> <p>The previous approval for <i>paste containing 1.5 g sodium fluoroacetate/kg</i> covered both peanut-based pastes and fruit (apple)-based paste approved for use in ground-based application.</p> <p>Testing has shown that peanut is more attractive to native bats than some of the other types of bait and current practice is that peanut-based paste is used only in bait stations. The attractiveness of the peanut-based paste to other non-target species has not been studied. Having regard to this uncertainty over attractiveness of the peanut-based paste to non-target species, and the differing risk profiles of the peanut and apple-based pastes, the Committee has decided that they should be separately approved under this decision with a control added to restrict the peanut-based paste to use in contained ground-based application. This effectively restricts its use to bait stations, which accords with current practice. The Committee is of the opinion that this will be a more effective way of managing the risks posed by the peanut-based substance. It is also consistent with the approach taken by virtue of Additional Control 10 which requires formulation changes to be notified to the Authority and could lead to changes to controls on approved substances if information provided shows changes to the risk profile.</p> <p>Two other formulated substances containing 1080 are also restricted to contained ground-based application, consistent with current practice, to minimise the exposure of non-target species to the baits:</p> <ul style="list-style-type: none"> • Fish paste containing 10 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Further, the Committee has decided that when <i>soluble concentrate containing 200g/L sodium fluoroacetate</i> is mixed with cut apple to a maximum toxic loading of 2.0 g sodium fluoroacetate per kg of prepared apple, it must only be used in contained bait stations because cut apple is attractive to a range of non-target species if not contained.</p> <p><u>Bait size</u></p> <p>When <i>soluble concentrate containing 200g/L sodium fluoroacetate</i> is mixed with prepared (cut) carrots to a maximum toxic loading of 2.0 g sodium fluoroacetate (1080) per kg of carrot, it must be manufactured to the following specifications:</p> <ul style="list-style-type: none"> • bait must be screened so that bait has a mean weight of 6 g or larger; and • chaff (pieces <0.5 g) must be less than 1.5% of the total weight of carrot. <p>This applies whichever of the two approved methods of release are used. The rationale for this is that small pieces of bait contain a higher toxic loading than larger pieces and present a higher risk to non-target species. This is due to their small size (they are more readily ingested and have a high toxic loading) and the fact that a greater number of baits per hectare increases the likelihood of exposure. The requirements do not, however, apply when the carrot bait is being used for rabbit control through ground-based application.</p>

Hazardous Substances (Identification) Regulations 2001

The Identification Regulations prescribe requirements with regard to identification of hazardous substances in terms of:

- information that must be “immediately available” with the substance (priority and secondary identifiers). This information is generally provided by way of the product label;
- documentation that must be available in the workplace, generally provided by way of Safety Data Sheets; and
- signage at a place where there is a large quantity of the substance.

11

General identification requirements

These controls relate to the duties of suppliers and persons in charge of formulated substances containing 1080 with respect to identification (essentially labelling) (Regulations 6 and 7), accessibility of the required information (Regulations 32 and 33) and presentation of the required information with respect to comprehensibility, clarity and durability (Regulations 34, 35, 36(1)–(7)).

Regulation 6 – Identification duties of suppliers

Suppliers of any substance containing 1080 must ensure it is labelled with all relevant priority identifier information (as required by Regulations 8–17) and secondary identifier information (as required by Regulations 18–30) before supplying it to any other person. This includes ensuring that the priority identifier information is available to any person handling the substance within **two seconds** (Regulation 32), and the secondary identifier information available within **10 seconds** (Regulation 33).

Suppliers must also ensure that no information is supplied with the substance (or its packaging) that suggests it belongs to a class or subclass that it does not in fact belong to.

Control Code	Regulation and Explanation
	<p>Regulation 7 – Identification duties of persons in charge</p> <p>Persons in charge of any formulated substance containing 1080 must ensure it is labelled with all relevant priority identifier information (as required by Regulations 8 to 17) and secondary identifier information (as required by Regulations 18 to 30) before supplying it to any other person. This includes ensuring that the priority identifier information is available to any person handling the substance within two seconds (Regulation 32), and the secondary identifier information is available within 10 seconds (Regulation 33).</p> <p>Persons in charge must also ensure that no information is supplied with the substance (or its packaging) that suggests it belongs to a class or subclass that it does not in fact belong to.</p> <p>Regulations 32 and 33 – Accessibility of information</p> <p>All priority identifier Information (as required by Regulations 8 to 17) must be available within two seconds, for example, on the label.</p> <p>All secondary identifier Information (as required by Regulations 18 to 30) must be available within 10 seconds, for example, on the label.</p> <p>Regulations 34, 35, 36(1)-(7) – Comprehensibility, clarity and durability of information</p> <p>All required priority and secondary identifiers must be presented in a way that meets the performance standards in these Regulations. In summary:</p> <ul style="list-style-type: none"> • any information provided (either written or oral) must be readily understandable and in English; • any information provided in written or pictorial form must be able to be easily read or perceived by a person with average eyesight under normal lighting conditions; • any information provided in an audible form must be able to be easily heard by a person with average hearing; • any information provided must be in a durable format ie the information requirements with respect to clarity must be able to be met throughout the lifetime of the (packaged) substance under the normal conditions of storage, handling and use.
13	<p>Regulation 9 – Priority identifiers for ecotoxic substances</p> <p>This requirement specifies that formulated substances containing 1080 must be prominently identified as being ecotoxic.</p> <p>This information must be available to any person handling the substance within two seconds (Regulation 32) and can be provided by way of signal headings or commonly understood pictograms on the label.</p>
18	<p>Regulation 14 – Priority identifiers for certain toxic substances</p> <p>This requirement specifies that formulated substances containing 1080 must be prominently identified as being toxic. In addition, information must be provided on the general degree and type of hazard of the substance, and the need to restrict access to the substance by children.</p> <p>This information must be available to any person handling the substance within two seconds (Regulation 32) and can be provided by way of signal headings or commonly understood pictograms on the label.</p>
19	<p>Regulation 18 – Secondary identifiers for all hazardous substances</p> <p>This control relates to the level of detail required for formulated substances containing 1080 on the product label. This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information is required:</p> <ul style="list-style-type: none"> • an indication (which may include its common name, chemical name, or registered trade name) that unequivocally identifies it; and • enough information to enable its New Zealand importer, supplier, or manufacturer to be contacted, either in person or by telephone; and • in the case of a substance which, when in a closed container, is likely to become more hazardous over time or develop additional hazardous properties, or become a hazardous substance of a different class or subclass, a description of each likely change and the date by which it is likely to occur.
111	<p>Regulation 20 – Secondary identifiers for ecotoxic substances</p> <p>This control relates to the additional label detail required for formulated substances containing 1080 substances. This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information must be provided:</p> <ul style="list-style-type: none"> • an indication of the circumstances in which it may harm living organisms;

Control Code	Regulation and Explanation
	<ul style="list-style-type: none"> • an indication of the kind and extent of the harm it is likely to cause to living organisms; • an indication of the steps to be taken to prevent harm to living organisms; • an indication of its general type and degree of hazard (for example, very toxic to aquatic life for a substance triggering a 9.1A classification and ecotoxic to terrestrial invertebrates for a substance triggering a 9.3B classification).
116	<p>Regulation 25 – Secondary identifiers for toxic substances</p> <p>This control relates to the additional label detail required for formulated substances containing 1080. This information must be accessible within 10 seconds (Regulation 33) and could be provided on secondary panels on the product label. The following information must be provided:</p> <ul style="list-style-type: none"> • an indication of its general type and degree of toxic hazard (for example, acutely toxic); • an indication of the circumstances in which it may harm human beings; • an indication of the kinds of harm it may cause to human beings, and the likely extent of each kind of harm; • an indication of the steps to be taken to prevent harm to human beings; • the name and concentration of sodium fluoroacetate (1080).
117	<p>Regulation 26 – Use of generic names</p> <p>This control provides the option of using a generic name to identify groups of ingredients where such ingredients are required to be listed on the product label as specified by Regulations 19(f) and 25(e) and (f).</p> <p>The generic name must identify the key chemical entities and functional groups in the ingredients that contribute to their hazardous properties.</p> <p>Regulations 25(e) specifies a requirement to list on the product label, the name and concentration of sodium fluoroacetate (1080).</p>
118	<p>Regulation 27 – Use of concentration ranges</p> <p>This control provides the option of providing concentration ranges for those ingredients whose concentrations are required to be stated on the product label as specified by Regulations 19(f) and 25(e) and (f).</p> <p>Regulations 25(e) specifies a requirement to list on the product label, the name and concentration of sodium fluoroacetate (1080).</p>
119	<p>Regulations 29-31 – Alternative information in certain cases</p> <p>Regulation 29 – Substances in fixed bulk containers or bulk transport containers</p> <p>This Regulation relates to alternative ways of presenting the priority and secondary identifier information required by Regulations 8 to 25 when formulated substances containing 1080 are contained in fixed bulk containers or bulk transport containers.</p> <p>Regulation 29(1) specifies that for fixed bulk containers, it is sufficient compliance if there is available at all times to people near the container, information that identifies the type and general degree of hazard of the substance.</p> <p>Regulation 29(2) specifies that for bulk transport containers, it is sufficient compliance if the substance is labelled or marked in compliance with the requirements of the Land Transport Rule, Civil Aviation Act 1990 or Maritime Transport Act 1994.</p> <p>Regulation 30 – Substances in multiple packaging</p> <p>This Regulation relates to situations when formulated substances containing 1080 are in multiple packaging and the outer packaging obscures some or all of the required substance information. In such cases, the outer packaging must:</p> <ul style="list-style-type: none"> • be clearly labelled with all relevant priority identifier information ie the hazardous properties of the substance must be identified; or • be labelled or marked in compliance with either the Land Transport Rule, Civil Aviation Act 1990 or the Maritime Safety Act 1994 as relevant; or • in the case of an ecotoxic substance, it must bear the EU pictogram “Dangerous to the Environment” (‘dead fish and tree’ on orange background); or • bear the relevant class or subclass label assigned by the UN Model Regulations.

Control Code	Regulation and Explanation
	<p>Regulation 31 – Alternative information when substances are imported</p> <p>This Regulation relates to alternative information requirements for formulated substances containing 1080 that are imported into New Zealand in a closed package or in a freight container and will be transported to its destination without being removed from that package or container. In these situations, it is sufficient compliance with the requirements of the Act if the package or container is labelled or marked in compliance with the requirements of the Land Transport Rule.</p>
I20	<p>Regulation 36(8) – Durability of information for class 6.1 substances</p> <p>Any packaging in direct contact with formulated substances containing 1080 must be permanently identified as having contained a toxic substance, unless the substance as packaged is restricted to a place of work.</p>
I21	<p>Regulations 37-39, 47-50 – Documentation required in places of work</p> <p>These controls relate to the duties of suppliers and persons in charge of places of work with respect to provision of documentation (essentially Safety Data Sheets) (Regulations 37, 38 and 50); the general content requirements of the documentation (Regulation 39 and 47); the accessibility and presentation of the required documentation with respect to comprehensibility and clarity (Regulation 48).</p> <p>These controls are triggered when the following quantities of formulated substances containing 1080 are held in a place of work:</p> <p>Any quantity:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities equal to or greater 0.5 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg. <p>Regulation 37 – Documentation duties of suppliers</p> <p>A supplier must provide documentation containing all relevant information required by Regulations 39 to 48 when selling or supplying to another person a quantity formulated substances containing 1080 (as indicated below), if the substance is to be used in a place of work and the supplier has not previously provided the documentation to that person.</p> <p>The requirements are triggered for the following quantities of formulated substances containing 1080:</p> <p>Any quantity:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities equal to or greater 0.5 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg. <p>Regulation 38 – Documentation duties of persons in charge of places of work</p> <p>The person in charge of any place of work where any substance containing 1080 is present in quantities equal to or greater than those specified in Regulation 38 (and with reference to Schedule 2 of the</p>

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	<p>Identification Regulations), must ensure that every person handling the substance has access to the documentation required for each hazardous substance concerned. The person in charge must also ensure that the documentation does not contain any information that suggests that the substance belongs to a class or subclass it does not in fact belong to.</p> <p>Regulation 39 – General content requirements for documentation</p> <p>The documentation provided with formulated substances containing 1080 must include the following information:</p> <ul style="list-style-type: none"> • the unequivocal identity of the substance (for example, the CAS number, chemical name, common name, UN number, registered trade name(s)); • a description of the physical state, colour and odour of the substance; • if the substance's physical state may alter over the expected range of workplace temperatures, the documentation must include a description of the temperatures at which the changes in physical state may occur and the nature of those changes; • in the case of a substance that, when in a closed container, is likely to become more hazardous over time or develop additional hazardous properties, or become a hazardous substance of a different class, the documentation must include a description of each likely change and the date by which it is likely to occur; • contact details for the New Zealand supplier/manufacturer/importer; • all emergency management and disposal information required for the substance; • the date on which the documentation was prepared. <p>Regulation 47 – Information not included in approval</p> <p>This Regulation relates to the provision of specific documentation information (for example, as provided on a Safety Data Sheet). If information required by Regulations 39 to 46 was not included in the information used for the approval of the substance by the Authority, it is sufficient compliance with those Regulations if reference is made to that information requirement along with a comment indicating that such information is not applicable to that substance.</p> <p>Regulation 48 – Location and presentation requirements for documentation</p> <p>All required documentation must be available to a person handling the substance in a place of work within 10 minutes. The documentation must be readily understandable by any fully-trained worker required to have access to it and must be easily read, under normal lighting conditions, at a distance of not less than 0.3 m.</p> <p>Regulation 49 – Documentation requirements for vehicles</p> <p>This Regulation provides for the option of complying with documentation requirements as specified in the various Land, Sea and Air transport rules when the substance is being transported.</p> <p>Regulation 50 – Documentation to be supplied on request</p> <p>Notwithstanding Regulation 37 above, a supplier must provide the required documentation to any person in charge of a place of work (where formulated substances containing 1080 are present) if asked to do so by that person.</p>
123	<p>Regulation 41 – Specific documentation requirements for ecotoxic substances</p> <p>The documentation provided with any formulated substance containing 1080 must include the following information:</p> <ul style="list-style-type: none"> • its general degree and type of ecotoxic hazard (for example, highly ecotoxic to terrestrial invertebrates for substances triggering a 9.3A classification); • a full description of the circumstances in which it may harm living organisms and the extent of that harm; • a full description of the steps to be taken to prevent harm to living organisms; • a summary of the available acute and chronic (ecotox) data used to define the (ecotox) subclass or subclasses in which it is classified; • its bio-concentration factor or octanol-water partition coefficient; • its expected soil or water degradation rate; • any EELs set by the Authority.
128	<p>Regulation 46 – Specific documentation requirements for toxic substances</p> <p>The documentation provided with any formulated substance containing 1080 must include the following information:</p>

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	<ul style="list-style-type: none"> • its general degree and type of toxic hazard; • a full description of the circumstances in which it may harm human beings; • the kinds of harm it may cause to human beings; • a full description of the steps to be taken to prevent harm to human beings; • if it will be a liquid during its use, the percentage of volatile substance in the liquid formulation, and the temperature at which the percentages were measured; • a summary of the available acute and chronic (toxicity) data used to define the (toxic) subclass or subclasses in which it is classified; • the symptoms or signs of injury or ill health associated with each likely route of exposure; • the dose, concentration, or conditions of exposure likely to cause injury or ill health; • any TELs or WESs set by the Authority.
I29	<p>Regulations 51-52 – Duties of persons in charge of places with respect to signage</p> <p>These controls specify the requirements for signage, in terms of content, presentation and positioning at places where formulated substances containing 1080 are held in quantities exceeding the amounts specified below.</p> <p>Quantities exceeding 50 kg:</p> <ul style="list-style-type: none"> • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg. <p>Quantities exceeding 50 litres:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre <p>Quantities exceeding 250 kg:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities exceeding 1000 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg. <p>Signs are required:</p> <ul style="list-style-type: none"> • at every entrance to the building and/or location (vehicular and pedestrian) where the substances are present; • at each entrance to rooms or compartments where the substances are present; • immediately adjacent to the area where the substances are located in an outdoor area. <p>The information provided in the signage needs to be understandable over a distance of 10 metres and be sufficient to:</p> <ul style="list-style-type: none"> • advise that the location contains the relevant substances; • describe the general type of hazard of each substance; • where the signage is immediately adjacent to the hazardous substance storage areas, describe the precautions needed to safely manage the substance.
I30	<p>Regulation 53 – Advertising corrosive and toxic substances</p> <p>Any advertisement for formulated substances containing 1080 must include information that identifies the substances as toxic and indicates the need to restrict access by children. In addition, it must specify the general degree and type of hazard.</p>
Hazardous Substances (Packaging) Regulations 2001	
P1	<p>Regulations 5-6, 7(1), and 8</p> <p>General packaging requirements</p> <p>These controls relate to the ability of the packaging to retain its contents, allowable packaging markings with respect to design approvals, factors affecting choice of suitable packaging, and compatibility of the substance with any previous contents of the packaging.</p>

Control Code	Regulation and Explanation
	<p>Regulation 5 – Ability to retain contents</p> <p>Packaging for formulated substances containing 1080 must ensure that, when the package is closed, there is no visible release of the substance, and that it maintains its ability to retain its contents in temperatures from –10°C to +50°C. The packaging must also maintain its ability to retain its remaining contents if part of the contents is removed from the package and the packaging is then re-closed. The packaging in direct contact with the substance must not be significantly affected or weakened by contact with the substance such that the foregoing requirements cannot be met.</p> <p>Regulation 6 – Packaging markings</p> <p>Packages containing formulated substances containing 1080 must not be marked in accordance with the UN Model Regulations unless:</p> <ul style="list-style-type: none"> • the markings comply with the relevant provisions of that document; and • the packaging complies with the tests set out in Schedule 1, 2 or 3 (Packaging Regulations) respectively; and • the design of the packaging has been test certified as complying with those tests. <p>Regulation 7(1) – Requirements when packing hazardous substance</p> <p>When packing any formulated substance containing 1080, account must be taken of its physical state and properties, and packaging must be selected that complies with the requirements of Regulations 5 and 9 to 21.</p> <p>Regulation 8 – Compatibility</p> <p>Formulated substances containing 1080 must not be packed in packaging that has been previously packed with substances with which it is incompatible unless all traces of the previous substance have been removed.</p> <p>Regulations 9A and 9B – Large packaging</p> <p>Large packaging may be used to contain formulated substances containing 1080 in New Zealand if it has been constructed, marked and tested as a large package as provided in the UN Model Regulations.</p> <p>“Large Packaging” does not include:</p> <ul style="list-style-type: none"> • a tank, tank wagon or transportable container (as defined in the Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004; or • a stationary container system, a stationary tank or a tank (as defined in the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.
P3	<p>Regulation 9 – Packaging requirements for substances packed in limited quantities</p> <p>When any formulated substance containing 1080 is packaged in limited quantities, there is provision for it to be packaged to a lesser performance standard than normally required (as specified in Schedule 4 of the Packaging Regulations).</p> <p>The quantities of formulated substances containing 1080 to which this provision applies are as follows:</p> <p>Quantities of 0.5 kg or less:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities of 3 kg or less</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg.
P3, P13 and P15	<p>Regulations 9, 19 and 21 – Packaging requirements for toxic substances</p> <p>The packaging requirements for formulated substances containing 1080 set out in the Schedules to the Regulations are varied as set out below.</p>
PG2	<p>Schedule 2 – Tests of packaging of hazardous substances required to be tested in accordance with this schedule</p> <p>The minimum packaging requirements that must be complied with are varied by substituting Schedule 2 for Schedule 1 for the following formulated substances containing 1080 when packaged in quantities of more than 0.5 kg:</p>

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	<ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg. <p>The tests in Schedule 2 correlate to the packaging requirements of UN Packing Group II (UN PGII).</p>
PG3	<p>Schedule 3 – Tests of packaging of hazardous substances required to be tested in accordance with this schedule</p> <p>The minimum packaging requirements that must be complied with are varied by substituting Schedule 3 for Schedule 2 for the following formulated substance containing 1080 when packaged in quantities of more than 3.0 kg:</p> <ul style="list-style-type: none"> • Fish paste containing 10 g sodium fluoroacetate/kg. <p>The tests in Schedule 3 correlate to the packaging requirements of UN Packing Group III (UN PGIII).</p>
PS4	<p>Schedule 4 – Tests of packaging of hazardous substances required to be tested in accordance with this schedule</p> <p>The minimum packaging requirements that must be complied with are varied by substituting Schedule 4 for Schedule 3 for the following formulated substances containing 1080 when packaged in any quantities:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg.
<p>Regulation 19</p> <p>The requirement for packaging for these substances is varied under section 77(4)(b) to substitute references to the above Schedules. The requirement for these substances to be packaged according to the Schedules in the regulations is based on the 6.1 acute oral toxicity classification of these substances. However, under the UN requirements for transport, the substances would be required to be packaged according to UNRTDG Packaging Groups based on assessment of rat toxicity data, which is less than the dog toxicity data used to classify 1080. These variations in the packaging requirements for these substances are made to align with national standards for the transport of dangerous goods.</p> <p>Having regard to the requirements of section 77(4)(b), the Committee considers that the benefits of these formulated substances containing 1080 are such that the controls should be varied to retain the benefits and that the variations will not significantly increase the adverse effects of the substances. Therefore the packaging requirements can be changed as indicated above. Further, the Committee notes that the requirements of the Identification Regulations will ensure that people handling the substances or attending an incident involving the packaged substances will be made adequately aware of the risks posed by the substances.</p>	
<p>Hazardous Substances (Disposal) Regulations 2001</p>	
D4 and D5	<p>Regulations 8-9 – Disposal requirements for toxic and ecotoxic substances</p> <p>Formulated substances containing 1080 must be disposed of by:</p> <ul style="list-style-type: none"> • treating the substance so that it is no longer a hazardous substance, including depositing the substance in a landfill, incinerator or sewage facility. However, this does not include dilution of the substance with any other substance prior to discharge to the environment; or • discharging the substance to the environment provided that after reasonable mixing, the concentration of the substance in any part of the environment outside the mixing zone does not exceed any TEL (tolerable exposure limit) or EEL (environmental exposure limit) set by the Authority for that substance; or • exporting the substance from New Zealand as a hazardous waste.
D6	<p>Regulation 10 – Disposal requirements for packages</p> <p>This control gives the disposal requirements for packages that contained formulated substances containing 1080 and are no longer to be used for that purpose. Such packages must be either decontaminated/treated or rendered incapable of containing any substance (hazardous or otherwise) and then disposed of in a manner that is consistent with the disposal requirements for the substance. In addition, the manner of disposal must take into account the material that the package is manufactured from.</p>

Control Code	Regulation and Explanation
D7	<p>Regulation 11-12 – Disposal information requirements</p> <p>These controls relate to the provision of information concerning disposal (essentially on the label) that must be provided when selling or supplying any quantity of a substance containing 1080.</p> <p>Information must be provided on appropriate methods of disposal and information may be supplied warning of methods of disposal that should be avoided, ie that would not comply with the Disposal Regulations. Such information must be accessible to a person handling the substance within 10 seconds and must comply with the requirements for comprehensibility, clarity and durability as described in Regulations 34 to 36 of the Identification Regulations (Control Code I1).</p>
D8	<p>Regulation 13-14 – Disposal documentation requirements</p> <p>These controls relate to the provision of documentation concerning disposal (essentially in an Safety Data Sheet) that must be provided when selling or supplying any quantity of the following formulated substances containing 1080:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>These controls relate to the provision of documentation concerning disposal (essentially in a Safety Data Sheet) that must be provided when selling or supplying the following formulated substances containing 1080 in quantities that exceed 0.5 kg:</p> <ul style="list-style-type: none"> • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg. <p>The documentation must describe one or more methods of disposal (that comply with the Disposal Regulations) and describe any precautions that must be taken. Such documentation must be accessible to a person handling the substance at a place of work within 10 minutes and must comply with the requirements for comprehensibility and clarity as described in Regulations 48(2), (3) and (4) of the Identification Regulations (Control Code I21).</p>
Hazardous Substances (Emergency Management) Regulations 2001	
EM1	<p>Regulations 6,7, 9-11 – Level 1 emergency management information: General requirements</p> <p>These controls relate to the provision of emergency management information (essentially on the label) that must be provided with any quantity of a formulated substance containing 1080.</p> <p>Regulation 6 describes the duties of suppliers, Regulation 7 describes the duties of persons in charge of places, Regulation 9 describes the requirement for the availability of the information (10 seconds) and Regulation 10 gives the requirements relating to the presentation of the information with respect to comprehensibility, clarity and durability. These requirements correspond with those relating to secondary identifiers required by the Identification Regulations (Control Code I1, Regulations 6, 7, 32–35, 36(1)–(7)).</p> <p>Regulation 11 provides for the option of complying with the information requirements specified in the various land, sea and air transport rules when the substance is being transported.</p>
EM6	<p>Regulation 8(e) – Information requirements for toxic substances</p> <p>The following information must be provided when any formulated substance containing 1080 is present in any quantity:</p> <ul style="list-style-type: none"> • a description of the first aid to be given; • a 24-hour emergency service telephone number.
EM7	<p>Regulation 8(f) – Information requirements for ecotoxic substances</p> <p>The following information must be provided with the formulated substances containing 1080 when present in the quantities specified below:</p> <ul style="list-style-type: none"> • a description of the parts of the environment likely to be immediately affected by it; • a description of its typical effects on those parts of the environment;

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	<ul style="list-style-type: none"> • a statement of any immediate actions that may be taken to prevent the substance from entering or affecting those parts of the environment. <p>Quantities equal to or greater than 0.1 litre:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre. <p>Quantities equal to or greater than 0.1 kg:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities equal to or greater than 0.2 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg.
EM8	<p>Regulations 12-16, 18-20 – Level 2 emergency management documentation requirements</p> <p>These controls relate to the duties of suppliers and persons in charge of places of work with respect to the provision of emergency management documentation (essentially Safety Data Sheets).</p> <p>This documentation must be provided where the following formulated substances containing 1080 are sold or supplied, or held in a workplace, in any quantity:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>This documentation must be provided where the following formulated substances containing 1080 are sold or supplied, or held in a workplace, in quantities equal to or greater than 0.5 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg. <p>Regulations 12 and 13 describe the duties of suppliers, regulation 14 describes the duties of persons in charge of places of work, regulation 15 provides for the option of complying with documentation requirements of the transport rules when the substance is being transported, and regulation 16 specifies requirements for general contents of the documentation.</p> <p>Regulation 18 prescribes location and presentation requirements for the documentation, ie it must be available within 10 minutes, be readily understandable, comprehensible and clear. These requirements correspond with those relating to documentation required by the Identification Regulations (Control Code I21).</p>
EM11	<p>Regulations 25-34 – Level 3 emergency management requirements – emergency response plans</p> <p>These Regulations relate to the requirement for an emergency response plan to be available at any place (excluding aircraft or ships) where formulated substances containing 1080 are held (or are reasonably likely to be held on occasion) in quantities greater than those specified below.</p> <p>Quantities greater than 100 litres:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre. <p>Quantities greater than 100 kg:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg;

Control Code	Regulation and Explanation
	<ul style="list-style-type: none"> • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg; • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>The emergency response plan must describe all of the likely emergencies that may arise from the breach or failure of controls. The type of information that is required to be included in the plan is specified in Regulations 29 to 30. Requirements relating to the availability of equipment, materials and people are provided in Regulation 31, requirements regarding the availability of the plan are provided in Regulation 32 and requirements for testing the plan are described in Regulation 33.</p>
EM12	<p>Regulations 35-41 – Level 3 emergency management requirements – secondary containment – deleted (in part)</p> <p>These regulations relate to the requirement for a secondary containment system to be installed at any fixed location where the following formulated substance containing 1080 is held in quantities equal to or greater than 100 litres:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre. <p>Regulation 36 prescribes requirements for secondary containment systems for pooling substances. Regulation 37 prescribes requirements for places where hazardous substances are held above ground in containers each holding up to 60 litres or less. Regulation 38 prescribes requirements for places where hazardous substances are held above ground in containers each holding between 60 litres and 450 litres. Regulation 39 prescribes requirements for places where hazardous substances are held above ground in containers each holding more than 450 litres. Regulation 40 prescribes requirements for places where hazardous substances are held underground. Regulation 41 prescribes requirements for secondary containment systems that contain substances of specific hazard classifications, e.g. there is a requirement to prevent substances from coming into contact with incompatible materials, and a requirement to exclude energy sources when class 1, 2, 3, 4 or 5 substances are contained.</p>
<p>These regulations are deleted under section 77(4)(a) for the other formulated substances containing 1080 as they are used in solid form. Having regard to the requirements of section 77(4)(a), the Committee considers that because they are solids, the adverse effects of the other formulated substances containing 1080 will thus be less than the adverse effects of other (liquid) substances with the same hazard classifications. Therefore the control is deleted for all formulated substances containing 1080 except for <i>soluble concentrate containing 200 g sodium fluoroacetate/litre</i> where it is held in quantities equal to or greater than 100 litres.</p>	
EM13	<p>Regulation 42 – Level 3 emergency management requirements – signage</p> <p>This control relates to the provision of emergency management information on signage at places where formulated substances containing 1080 are held at the quantities detailed below:</p> <p>Quantities equal to or greater than 50 litres:</p> <ul style="list-style-type: none"> • Soluble concentrate containing 200 g sodium fluoroacetate/litre. <p>Quantities equal to or greater than 50 kg:</p> <ul style="list-style-type: none"> • Polymer gel containing 50 g sodium fluoroacetate/kg; • Polymer gel containing 100 g sodium fluoroacetate/kg. <hr/> <p>Quantities equal to or greater than 250 kg:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Fish paste containing 10 g sodium fluoroacetate/kg; • Apple-based paste containing 1.5 g sodium fluoroacetate/kg; • Peanut-based paste containing 1.5 g sodium fluoroacetate/kg; • Polymer gel block containing 1.5 g sodium fluoroacetate/kg. <p>Quantities equal to or greater than 1000 kg:</p> <ul style="list-style-type: none"> • Fishmeal pellets containing 1.0 g sodium fluoroacetate/kg; • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Apple-based paste containing 0.6–0.8 g sodium fluoroacetate/kg. <p>The signage must advise of the action to be taken in an emergency and must meet the requirements for comprehensibility and clarity as defined in Regulations 34 and 35 of the Identification Regulations.</p>

Control Code	Regulation and Explanation
Hazardous Substances (Personnel Qualification) Regulations 2001	
AH1	<p>Regulations 4-6 – Approved Handler requirements</p> <p>Formulated substances containing 1080 are required to be under the control of an approved handler during specified parts of the lifecycle. An approved handler is a person who holds a current test certificate certifying that they have met the competency requirements specified by the Personnel Qualification Regulations in relation to handling specific hazardous substances.</p> <p>Regulation 4 describes the test certification requirements, Regulation 5 describes the qualification (competency and skill) requirements and regulation 6 describes situations where transitional qualifications for approved handlers apply.</p> <p>Also see Control Codes T6 and E7.</p>
Hazardous Substances (Tracking) Regulations 2001	
TR1	<p>Regulations 4(1), 5, 6 – General tracking requirements</p> <p>Under regulation 4(1), formulated substances containing 1080 are subject to tracking requirements, ie the location and movement of the substance must be recorded at each stage of its lifecycle until its final disposal. The hazard classifications of the substances requiring tracking are listed in Schedule 1 of the Tracking Regulations.</p> <p>The person in charge of the place where the tracked substance is kept is responsible for ensuring that the necessary information is included in the record. This information to be provided is specified in Schedule 2 of the Tracking Regulations, and includes information on the identification of the approved handler, and on the identification, quantity, location and disposal of the substance. The record must meet the location and presentation requirements specified in Part 2 of the Identification Regulations, ie it must be accessible within 10 minutes and meet the performance standards for comprehensibility and clarity (Regulation 5(1) and (2)).</p> <p>If a tracked substance is transferred to another place, the person in charge must ensure that the record is retained for a period of 12 months. If the substance has undergone treatment that results in it no longer being a tracked substance, or if it has been intentionally or unintentionally disposed of, the record must be kept for 3 years. However these requirements do not apply to places that are vehicles (Regulations 5(3) and (4)).</p> <p>Regulation 6 prescribes requirements relating to the transfer of tracked substances from one place to another. Specifically, the person in charge may only transfer the tracked substance to another place if they have received confirmation that:</p> <ul style="list-style-type: none"> • an approved handler is present at the place receiving the substance; • the place receiving the substance meets any location test certification requirements; • any place where the substance is to be held during transit complies with the relevant requirements of the Hazardous Substances (Emergency Management) Regulations and Hazardous Substances (Classes 1 to 5 Controls) Regulations. <p>The following provisions of Schedule 2 to the Hazardous Substances (Tracking) Regulations 2001 are varied under section 77(3) (a) so as to add to clauses 2 (substance information), 5 (details of transfer to another place), and 6 (disposal of tracked substance), the requirement to record the unique identifier for the container that contains the relevant formulated substance containing 1080:</p> <p>Schedule 2, Clause 2 – Substance Information</p> <p>Clause 2A is inserted after clause 2:</p> <p>2A The unique identifier for the container that contains the tracked substance.</p> <p>Schedule 2, Clause 5 – Details of transfer to another place</p> <p>Subclause (aa) is inserted after subclause (a):</p> <p>(aa) the unique identifier for the container that contains the substance; and</p> <p>Schedule 2, Clause 6 – Disposal of tracked substance</p> <p>Subclause (e) is inserted after subclause (d):</p> <p>(e) the unique identifier for the container that contained the substance.</p> <p>The Committee is satisfied that these variations are necessary under section 77(3)(a) having regard to the adverse effects associated with the substances, in order to ensure the effectiveness of Additional Control 2 (below) (which requires packaging to be marked with a unique identifier to facilitate 'traceback' of individual packages in the event of an incident).</p>

Control Code	Regulation and Explanation
Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004	
Regulations 4 to 43 where applicable	<p>The Hazardous Substances (Tank Wagons and Transportable Containers) Regulations 2004 prescribe a number of controls relating to tank wagons and transportable containers which must be complied with as relevant.</p> <p>This control applies only to the following formulated substance containing 1080:</p> <ul style="list-style-type: none"> Soluble concentrate containing 200 g sodium fluoroacetate/litre.
Schedule 8 to the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 – stationary container systems	
<p>The controls relating to stationary container systems, as set out in Schedule 8 to the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 (Supplement to the <i>New Zealand Gazette</i>, 26 March 2004, No. 35, page 767), as amended, shall apply to the following formulated substance containing 1080, notwithstanding clause 1(1) of that Schedule:</p> <ul style="list-style-type: none"> Soluble concentrate containing 200 g sodium fluoroacetate/litre. 	
<p>The above controls relating to tank wagons, transportable containers and stationary container systems are varied under section 77(3) and (4) in order to ensure that they apply, as appropriate, to the only relevant (ie liquid) formulated substance containing 1080 namely <i>soluble concentrate containing 200 g sodium fluoroacetate/litre</i>. The variations are necessary to ensure that the risks associated with transporting or storing large quantities of the substance are properly managed.</p>	
Additional Controls on formulated substances containing 1080 imposed under section 77A	
Additional Control 2	Packaging of substances for sale for vertebrate pest control
	<ol style="list-style-type: none"> No person may pack any formulated substance containing 1080 for sale for vertebrate pest control unless the package is marked with a unique identifier. The unique identifier marked on the package must comply with regulations 35 and 36 of the Hazardous Substance (Identification) Regulations 2001. For the purposes of regulation 35(3)(c) of those regulations, the unique identifier is a secondary identifier. In this control, package means the smallest package in which the relevant substance is sold.
<p>This control is added to all formulated substances containing 1080 to facilitate the 'trace-back' of individual packages in the event of an incident involving controlled vertebrate poisons. The control complements the requirement to keep records of the unique identifier (Control Code TR1 – Tracking requirements). This control is justifiable given the widespread use of vertebrate poisons, the large number of people potentially involved in their application and the number of occasions that have required this 'trace-back' mechanism to be used by regulatory agencies in the past. The Committee is therefore satisfied that the suite of controls imposed under this approval will be more effective in terms of their effect on the management, use and risks of the formulated substances containing 1080 as a result of adding this control.</p>	
Additional Control 3	Restrictions on supply and acquisition of substances
	<ol style="list-style-type: none"> This clause applies to formulated substances containing 1080. No person may sell or otherwise supply formulated substances containing 1080 to any person unless the seller (or supplier) holds a licence in accordance with Additional Control 5. No person may purchase or otherwise acquire formulated substances containing 1080 unless the person is a person specified in subclause (2).
<p>This control is added in accordance with section 77A(2)(b). A controlled substances licence is required from both the Agricultural Compounds and Veterinary Medicines (ACVM) Group of NZFSA and ERMA New Zealand for all formulated substances containing 1080 (see Additional Control 5 below). The intention of the licence requirement is to ensure that a person is a 'fit and proper' person and has knowledge of the relevant legislation relating to the safe use of the substance (ie has an approved handler test certificate). Controlled vertebrate poisons such as formulated substances containing 1080, fall into the group of substances where it is considered appropriate that access be restricted to responsible individuals. For this reason, the Committee is satisfied that this additional control, together with Additional Control 5 is more effective in terms of its effect on the management, use and risks than other controls and thus may be added under section 77A.</p>	
Additional Control 4	Permissions required for application or use of substances
	<ol style="list-style-type: none"> No person may apply or otherwise use any formulated substance containing 1080 on land administered or managed by the Department of Conservation unless the person first obtains a permission under section 95A of the Act from the Authority. No person may apply or otherwise use any formulated substance containing 1080 in a catchment area from which water is drawn for human consumption or in any other area where a risk to public health may be created if the substance is applied or used unless the person first obtains a permission under section 95A of the Act from the Authority.

Control Code	Regulation and Explanation
	<p>The requirement to obtain a permission prior to the application of formulated substances containing 1080 ensures that the risks associated with any general or particular use of the substance can be appropriately addressed and any additional controls required to manage the risks are imposed (by way of conditions imposed on the permissions under section 95A). For example, an application for a permission allows the risks arising due to the intended location of the operation to be considered by those with appropriate local knowledge of the intended application site.</p> <p>Currently, the Authority has delegated the power to issue permissions under section 95A to DoC and the Ministry of Health. DoC is delegated the power to issue permissions when formulated substances containing 1080 are to be applied or otherwise used on land managed by DoC.</p> <p>The Ministry of Health is delegated the power to issue permissions when formulated substances containing 1080 are to be applied or otherwise used in a catchment area from which water is drawn for human consumption or in any other area where a risk to public health may be created if the substance is used or applied.</p> <p>In situations where formulated substances containing 1080 are to be applied or otherwise used on land managed by DoC that is a catchment area from which water is drawn for human consumption or is in any other area where a risk to public health may be created if the substance is used or applied, a permission is required from both DoC and the Ministry of Health.</p> <p>The Committee is satisfied that it is appropriate to add this control under section 77A(2)(a), as it will be more effective in terms of its effect on the management, use and risks of the substances than other controls that apply under this approval. In particular, proper and effective use of the permissions regime is seen by the Committee as an essential tool in ensuring best practice in respect of key aspects of aerial application of formulated substances containing 1080 such as consultation and notification.</p> <p>One matter in particular which the Committee wishes to see addressed as part of a review of the permissions delegations is the implementation of best practice consultation with iwi/Māori whose land or other interests might be affected by the use of 1080, particularly when applied aerially. The Committee wishes to provide for better engagement with iwi/Māori and improved outcomes in terms of the management of taonga species and resources, and will be looking for this to be ensured as far as possible when permissions are granted for the aerial use of 1080. Many iwi/Māori submitters were concerned that “consultation” appeared to be given variable meanings, from notifying and informing at one end of the spectrum to acting/deciding together at the other end. The Committee notes the interpretation of “consultation” in ERMA New Zealand guidance,⁹² namely that the overall aim of good consultation is to provide easily understood information about the proposal; obtain the necessary information and understanding of Māori perspectives and views as they relate to specific issues associated with the proposal and discuss, where issues are raised by Māori, ways of minimising, mitigating or remedying any potential adverse effects and enhancing any potential benefits. The Committee expects that those seeking permission from DoC or the Ministry of Health for aerial application of 1080 will be required to demonstrate consultation with Māori to at least this standard.</p>
Additional Control 5	<p>Licence required for possession of substances</p> <ol style="list-style-type: none"> (1) No person may possess any formulated substance containing 1080 unless the person has a licence under section 95B of the Act from the Authority that is obtained before the person takes possession of the substance. (2) Despite subclause (1), a person who does not have a licence may possess a formulated substance containing 1080 if— <ol style="list-style-type: none"> (a) the person is under the immediate supervision of a person who has a licence in accordance with this clause; or (b) the person is deemed to comply with Regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001 by regulation 9A of those regulations.
	<p>This control is added in accordance with section 77A(2)(b). In addition to holding an approved handler certificate, no person may possess formulated substances containing 1080 unless they have a licence (controlled substance licence) granted under section 95B of the Act that is obtained from the Authority before the person takes possession of the substance. Exceptions to this requirement are if the person is under the immediate supervision (meaning within eye and ear shot at all times) of a person who has a licence or if regulation 9 of the Hazardous Substances (Classes 6, 8, and 9 Controls) Regulations 2001 is deemed complied with in certain transport situations through the provisions of regulation 9A (Control Code T6 and E7, above).</p> <p>The main purpose of the licensing requirement is to add a ‘fit and proper person’ consideration to an approved handler qualification. This requirement is generally restricted to those substances which could be used for illegal purposes and which could present significant security concerns.</p> <p>Formulated substances containing 1080 fall into the group of substances for which it is considered appropriate to require a controlled substance licence and the Committee is satisfied that this additional control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls that apply under this approval.</p>

⁹² User Guide *Working with Māori under the HSNO Act 1996: A Guide for Applicants* (ER-UG-01-4 04/05).

Control Code	Regulation and Explanation
	<p>Controlled substances licences are issued by test certifiers under delegation from the Authority through a process which covers both the HSNO Act and ACVM Group requirements.</p> <p>Additionally, the ACVM Group requires that, as part of the approval under the ACVM Act, certain vertebrate toxic agents may only be sold to and used by persons holding controlled substances licences (see Additional Control 3).</p>
Additional Control 6	<p>Restriction on aerial application of certain substances</p> <p>(1) No person may apply, or engage another person to apply, a formulated substance containing 1080 by aerial application unless—</p> <p>(a) aerial application is a permitted method of release for that substance in accordance with regulation 51 of the Hazardous Substances (Classes 6, 8 and 9 Controls) Regulations 2001 (Control Code E4 above); and</p> <p>(b) if required, the person has a permission or permissions (as the case may be) granted in accordance with Additional Control 4; and</p> <p>(c) a copy of each permission is supplied to the pilot of the aircraft; and</p> <p>(d) the person has given public notice in a newspaper available in the areas in which the substance will be applied of the proposed aerial application in accordance with subclause (2); and</p> <p>(e) the substance is applied no more than 2 months after the date of the public notice referred to in paragraph (d); and</p> <p>(f) if the person is not the owner or occupier of the area over which the substance will be applied, the person has given notice of the proposed aerial application to the officer in charge of the police station that is nearest to the application area.</p> <p>(2) The public notice referred to in subclause (1)(d) must—</p> <p>(a) be given with sufficient prior notification, but no more than 2 months, before the proposed aerial application; and</p> <p>(b) specify the following:</p> <p>(i) the approximate date on which the substance will be applied;</p> <p>(ii) the name and nature of the substance;</p> <p>(iii) a description of the area over which the substance will be applied, including—</p> <p>(A) the boundaries of the area; and</p> <p>(B) districts, roads, and other commonly known features that may identify the place;</p> <p>(iv) the location or locations where members of the public may view maps of the area over which the substance will be applied, and the times when such maps may be viewed;</p> <p>(v) the name and address of the person responsible for the application of the substance.</p>
	<p>This control applies only to the following formulated substances containing 1080 that are approved for aerial application, namely:</p> <ul style="list-style-type: none"> • Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg; • Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg; • Soluble concentrate containing 200 g sodium fluoroacetate/litre. <p>This control is added under section 77A as it is more effective in terms of its effect on the management, use and risks of aerial application of formulated substances containing 1080 than other controls under this approval. Specifically, the control ensures that potentially affected persons are notified of the approximate time and place of a proposed aerial application in their area and enables them to obtain further information if they require. In this way, the control aids more effective communication of risks relating to aerial applications to local communities and other potentially affected groups/persons.</p>
Additional Control 7	<p>Requirements for aircraft carrying out aerial application</p> <p>(1) An aircraft that is carrying out an aerial application must not, when flying to or from the area where a formulated substance containing 1080 is applied, fly over a—</p> <p>(a) place specified (if any) in a permission granted in relation to the substance in accordance with Additional Control 4 as being a place over which such an aircraft must not fly; or</p> <p>(b) public drinking water supply; or</p> <p>(c) waterway that is less than 100 metres upstream of a point of extraction from a water source for a drinking water supply (not being a water supply exclusively for stock).</p> <p>(2) Every aircraft that is carrying out an aerial application must use a navigational guidance system to ensure that the substance is applied within the application area.</p>

Control Code	Regulation and Explanation
(3)	Every aircraft that has carried out an aerial application , and all equipment used in connection with the aerial application , must be decontaminated before the aircraft or equipment is— (a) used for another purpose; or (b) removed from a place from which the application operation has been carried out.
(4)	When an aerial application being carried out on a day has ceased for that day, the loading area, and any area where the substance is stored in preparation for loading the substance on to or into the aircraft , must be— (a) decontaminated; or (b) fenced so that— (i) people do not inadvertently enter the area; and (ii) stock cannot gain access to the area.
(5)	An area that is fenced in accordance with subclause (4)(b) must have signs erected at the perimeter of the fence in accordance with subclause (6).
(6)	The signs referred to in subclause (5) must— (a) state that people and stock should stay out of the area until the signs, and any fence around the area, have been removed; and (b) identify the person responsible for the place, and provide sufficient information to enable the person to be contacted during normal business hours; and (c) identify the substance and state that it is toxic to human beings and ecotoxic to other vertebrates; and (d) comply with regulations 34 and 35 of the Hazardous Substances (Identification) Regulations 2001, except that regulation 35 applies as follows: (i) in relation to the information required to be included on the signs by paragraphs (a) and (b), as if the distances referred to in regulation 35(3)(c) of those regulations were a distance of not less than 2 metres; and (ii) in relation to the information required to be included on the signs by paragraph (c), as if the distances referred to in regulation 35(3)(c) of those regulations were a distance of not less than 10 metres.
(7)	The signs and the fence required by this clause must remain in place until the place is decontaminated.
This control specifies requirements for aircraft used to apply formulated substances containing 1080 that are approved for aerial application, namely:	
<ul style="list-style-type: none"> • Cereal-based pellets containing 0.4–0.8 g sodium fluoroacetate/kg; • Cereal-based pellets containing 1.5–2.0 g sodium fluoroacetate/kg; • Soluble concentrate containing 200 g sodium fluoroacetate/litre. 	
Specifically, the controls:	
<ul style="list-style-type: none"> • prohibit flying over public drinking water supplies and other protected waterways or areas; • require aircraft to have suitable navigational guidance systems in order to ensure accuracy of application. Normally, this will be achieved by use of a differential global positioning system; • decontamination of aircraft and ground loading or storage areas (with fencing/signing option if decontamination of ground areas is not possible). 	
The Committee is satisfied that all these requirements are appropriately added as controls under section 77A on the basis that they are more effective in terms of its effect on the management, use and risks of aerial application of formulated substances containing 1080 than other controls under this approval. Combined, they will ensure greater accuracy of application, and will help to limit the likelihood of traces of the substances coming into contact with aircraft/airport personnel or members of the public in places of public access.	
Additional Control 8	Misapplied, lost or spilt substances If a formulated substance containing 1080 is applied other than in the intended application area, or is lost or spilt, the person who is in possession of the substance at the time that it was misapplied, lost, or spilt must report the nature and quantity of the substance within 24 hours of the substance being misapplied, lost, or spilt to— (a) if a permission was granted in accordance with Additional Control 4 to apply or otherwise use the substance, the person who granted the permission; and (b) the officer in charge of the nearest police station to which the person has access; and (c) the nearest Medical Officer of Health or the Medical Officer of Health in whose region the substance was misapplied, lost, or spilt; and

Control Code	Regulation and Explanation
	<p>(d) each owner or occupier of land on which the substance may have been misapplied, lost, or spilt;</p> <p>(e) the person on whose behalf the substance is being applied;</p> <p>(f) the Regional Council or councils in whose area the substance is being applied; and</p> <p>(g) the Authority.</p>
	<p>This control is added under section 77A. While incidents involving hazardous substances are required under the Act to be reported to HSNO enforcement agencies, this control specifically clarifies who is responsible for reporting misapplications, losses or spillages arising from the use of formulated substances containing 1080. Notification must be to the listed agencies and owners and occupiers as well as to the Authority. The Committee is satisfied that this control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval as it enables the appropriate agencies and the Authority to monitor and be notified of any misuse or poor practices relating to the use of these substances. This will also ensure that the appropriate action is taken to address the issue and manage any adverse effects that may arise. The obligation to report such incidents to the Authority complements Additional Control 12 (provision of information to the Authority) relating to reporting on aerial application of formulated substances containing 1080.</p>
Additional Control 9	<p>Unauthorised persons to stay clear of application area of substances</p> <p>(1) A person who is not lawfully assisting in the application or use of formulated substances containing 1080 must not remain in the vicinity of the application or use of the substance (as the case may be).</p> <p>(2) An enforcement officer may order a person who contravenes subclause (1) to immediately leave the area in which the substance is being applied or used.</p>
	<p>This control is added under section 77A. The intent of this control is to ensure that people whose personal safety is at risk, or who are interfering with an operation, or who are likely to be directly in the flight path of an aerial operation can be asked to leave the operational area.</p> <p>For the purposes of this control, vicinity is taken to mean an area within which someone may be directly affected by, or having a direct effect on, the operation.</p> <p>The Committee is satisfied that this control is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval as it helps to ensure an appropriate level of personal safety for those who may be at risk from an operation whether voluntarily or not. In the case of the former, an enforcement officer may take appropriate action to order someone to leave the area.</p>
Additional Control 10	<p>Notification of changes of composition</p> <p>Any changes to the composition or proposed use of formulated substances containing 1080 must be notified to the Authority in writing before it is used such notification to include the following information, as applicable:</p> <ul style="list-style-type: none"> • the name of substance; • details of the original formulation; • details of the revised formulation clearly identifying the changed ingredients, their function in the bait, and their concentration and CAS number if appropriate; • the physical form, if different from the original; • bait colour; • changes in bait size; • the intended use(s) of the substance (to include target species, method(s) of release); • the physical properties of the substance (for example, flashpoint, pH) if different from the original; • the impurity profile and source of the 'active' ingredient, if different from the original; • any information on the effect that the formulation change may have on the risk profile of the substance, including the results of any palatability trials undertaken on both target and non-target species.
	<p>This control is added under section 77A as the Committee is satisfied it is more effective in terms of its effect on the management, use and risks of formulated substances containing 1080 than other controls under this approval. Changes in formulations and other matters such as bait size may alter the risk to non-target species, even though there are no changes to the hazard classifications. In order to ensure that there is as much information available as possible on the impact on and risks to non-target species, changes to formulations of existing substances must be notified to the Authority so that any changes to the risk profile of substances can be tracked and managed. Depending on the nature and extent of the changes, it may be necessary for this approval to be amended (or a new approval obtained) before the substance may lawfully be used.</p>

Control Code	Regulation and Explanation
Additional Control 11	<p data-bbox="383 324 893 347">Notification of aerial or ground-based operations</p> <p data-bbox="383 358 1372 459">(1) No person may apply, or engage another person to apply, a formulated substance containing 1080 by aerial application or ground-based application unless the person has given notice of the proposed application to occupiers and, as far as practicable owners, of land, dwellings or buildings immediately abutting the application area.</p> <p data-bbox="383 470 1372 784">(2) The notice referred to in subclause (1) must—</p> <p data-bbox="430 504 1372 571">(a) be given with sufficient prior notification, but no more than 2 months, before the proposed application and, if requested by the person notified, shall be repeated at a mutually agreed time before the proposed application; and</p> <p data-bbox="430 582 1372 784">(b) specify the following:</p> <p data-bbox="478 616 1372 638">(i) the approximate date on which the substance will be applied;</p> <p data-bbox="478 638 1372 660">(ii) the name and nature of the substance;</p> <p data-bbox="478 660 1372 694">(iii) a description of the area over which the substance will be applied, including—</p> <p data-bbox="526 694 1372 716">(A) the boundaries of the area; and</p> <p data-bbox="526 716 1372 750">(B) districts, roads, and other commonly known features that may identify the place;</p> <p data-bbox="478 750 1372 784">(iv) the name and address of the person responsible for the application of the substance.</p> <p data-bbox="383 795 1372 817">(3) This control shall come into force on 1 January 2008.</p>
<p data-bbox="199 828 1372 952">The Committee considers that landowners and occupiers immediately abutting the site of a proposed aerial or ground-based application should be advised with sufficient prior notification (but no more than two months) before the proposed application. The notification should include similar matters to those required for public notice of aerial applications (see Additional Control 6 above). Further, if a notified person so wishes, they may require the operator to repeat the notice at a mutually agreed time before the proposed operation.</p> <p data-bbox="199 963 1372 1120">The Committee is satisfied that this control should be added under section 77A as it is more effective in terms of its effect on the management, use and risks of aerial or ground-based application of formulated substances containing 1080 than other controls under this approval. Specifically, the control ensures that potentially affected persons are notified of the approximate time and place of a proposed application in their area and enables them to obtain further information if they require. In this way, the control aids more effective communication of risks relating to the use of formulated substances containing 1080 to local communities and other potentially affected groups/persons.</p>	
Additional Control 12	<p data-bbox="383 1131 1013 1153">Aerial application – provision of information to the Authority</p> <p data-bbox="383 1164 1372 1265">(1) Any person who applies, or engages another person to apply, a formulated substance containing 1080 by aerial application (“the operation”) must, as soon as reasonably practicable, but no later than six months, after the operation, provide a written report to the Authority, such report to include the following information—</p> <p data-bbox="430 1276 1372 1344">(a) the reasons for the operation, including information on pre-operation notification and the methods and outcomes of any pre-operation consultation (whether carried out under Additional Control 13 or otherwise);</p> <p data-bbox="430 1355 1372 1377">(b) details of the operation, including date(s), location and application rate;</p> <p data-bbox="430 1388 1372 1422">(c) a map of the operational area showing relevant waterbodies, any public drinking-water supply, nearby farmland, human habitations and recreational huts and tracks;</p> <p data-bbox="430 1433 1372 1489">(d) a measure of possum or other relevant pest numbers before and after the operation (if available);</p> <p data-bbox="430 1500 1372 1568">(e) reports on any incidents (for example, accidental releases or overflights) or complaints in relation to the operation, including details of relevant parties, locations, actions, impacts (if available);</p> <p data-bbox="430 1579 1372 1624">(f) details and results of pre- and post-operational monitoring of birds and invertebrates (if available);</p> <p data-bbox="430 1635 1372 1657">(g) details and results of post-operational monitoring of water quality (if available);</p> <p data-bbox="430 1668 1372 1713">(h) details and results of pre- and post-operational monitoring of key species of relevance to Māori (food, rongoa species) (if available); and</p> <p data-bbox="430 1724 1372 1747">(i) an overall assessment of the outcome of the operation.</p> <p data-bbox="383 1758 1372 1780">(2) This control shall come into force on 1 January 2008.</p>
<p data-bbox="199 1792 1372 1836">This control applies to the following formulated substances containing 1080 that are approved for aerial application, namely:</p> <p data-bbox="199 1848 1372 1870">Cereal-based pellets containing 0.4 – 0.8 g sodium fluoroacetate/kg;</p> <p data-bbox="199 1881 1372 1904">Cereal-based pellets containing 1.5 – 2.0 g sodium fluoroacetate/kg;</p> <p data-bbox="199 1915 1372 1937">Soluble concentrate containing 200 g sodium fluoroacetate/litre.</p>	

Control Code	Regulation and Explanation
	<p>The Committee is satisfied that this control should be added under section 77A as it is more effective in terms of its effect on the management, use and risks of aerial application of formulated substances containing 1080 than other controls under this approval. In many cases, the production of post-operation reports of this type is increasingly becoming standard industry practice. Specifically, the control is in response to the concerns expressed by many submitters in relation to aerial (as opposed to ground) applications and will provide a central repository for information on aerial operations. It also supports the Committee's desire to ensure best practice and a more consistent approach nationwide, in the planning, carrying out and reporting of aerial operations. In particular, reports must contain information on key areas on 'risk communication' in relation to aerial applications, namely pre-operation notification and consultation as well as any incidents or complaints received in respect of an operation. The Committee intends that the information contained in the reports provided under this control will be made publicly available.</p>

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Table B1: Assessment Table for Beneficial Effects (benefits)

Effect	Magnitude of effect	Likelihood	Level of benefit
Beneficial effects on the biological and physical environment – aerial application			
Biodiversity benefits of protecting vulnerable plant species	Massive	Very likely	F
Protection of native ecosystem	Major	Extremely likely	F
Creation of predator-free zones	Major	Likely	F
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel	Massive	Extremely likely	F
Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel)	Major	Likely-extremely likely	F
Reduced competition for food supply and some habitat resources for native birds particularly threatened species	Major	Very likely	F
Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats	Major	Likely	F
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs)	Moderate	Unlikely- likely	E
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food	Minor	Likely	E
Protection of <i>Powelliphanta</i> land snails from predation	Major	Very likely	F
Protection of habitat for native fish, eels and freshwater invertebrates from enhanced ecosystem services	Minor	Likely	B
Beneficial effects on the biological and physical environment – ground-based application			
Biodiversity benefits of protecting vulnerable plant species	Minor	Very likely	E
Protection of native ecosystems	Minor	Unlikely	D
Creation of predator-free zones	Moderate	Likely	E
Reduced predation of mohua (yellowhead), kakariki (orange fronted parakeets) and southern New Zealand dotterel	Major	Likely	F
Reduced predation of native birds, particularly threatened species (excluding mohua, kakariki and southern New Zealand dotterel)	Minor	Unlikely	D
Reduced competition for food supply and some habitat resources for native birds particularly threatened species	Minor	Very unlikely	C
Reduced predation of, and competition for food supply for native short-tailed and long-tailed bats	Minor	Unlikely	D
Reduced predation of and competition for food supply for herpetofauna (including native lizards, and frogs)	Minimal	Unlikely	C
Protection of native invertebrates (particularly threatened species) from predation and reduced competition for food	Minimal	Unlikely	C
Protection of <i>Powelliphanta</i> land snails from predation	Minor	Unlikely	D
Protection of habitat for native fish, eels and freshwater invertebrates from enhanced ecosystem services	Minimal	Improbable	A

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of benefit
Beneficial effects on human health and safety			
Reduced chance of contracting Tb from close contact with infected animals (herds or feral) resulting in inhalation of contaminated aerosols	Minor	Improbable	B
Reduced chance of contracting Tb from consumption of milk and dairy products from infected herds	Minor	Improbable	B
Reduced chance of contracting Tb through consumption of meat (farmed and feral) from infected animals	Minimal	Highly improbable	A
Reduced exposure to diseases and illness carried by pest species (excluding bovine Tb) including protozoa such as giardia and cryptosporidium	Minor	Improbable	B
Reduced availability of 1080 for pest control is likely to result in increased use of agents associated with higher meat residues, in particular secondary anti-coagulants (brodifacoum/pindone)	Minimal	Very unlikely	B
Beneficial effects on the relationship of Māori to the environment			
Positive impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment	Major	Very likely	F
Protection of taonga species and resources from browsing by pest species supporting the ongoing roles and responsibilities of iwi/Māori as kaitiaki	Major	Extremely likely	F
Protection of iwi/Māori economic interests	Moderate	Very likely	F
Beneficial effects on society and communities			
Reduced concern about native ecosystem degradation	Moderate to major	Unlikely	E
Enhanced pride and pleasure from the protection of New Zealand's natural heritage	Not assessed	Not assessed	
Reduced concern about bovine Tb risk (stress to farming communities)	Minor	Unlikely	D
Enhanced enjoyment of recreational activities	Minor	Likely	E
Beneficial effects on the market economy			
Reduced likelihood of losing access to/sales in export markets for beef, venison and dairy products	Major	Unlikely	E
Reduced likelihood of restrictions on market access for live animals	Not assessed	Not assessed	
Reduction in loss of livestock to bovine Tb	Minimal	Unlikely	C
Reduced costs to farmers for vector control	Minimal	Likely	D
Removal or relaxation of restrictions on livestock movements	Minor	Unlikely	D
Reduced competition for grazing from pests	Minor to moderate	Very unlikely	C-D
Improved water quality	Not assessed	Not assessed	
Reduced costs of vector control (government and pest control agencies)	Minimal	Unlikely	C
Reduction in crop damage/losses due to possum browsing (for orchards etc)	Minimal	Highly improbable	A
Reduction in damage to exotic forestry plantations, particularly seedlings	Not assessed	Not assessed	
Benefits for tourism as a result of maintenance of healthy forest habitat and native biodiversity	Not assessed	Not assessed	
Benefits to the New Zealand economy from ecosystem services	Not assessed	Not assessed	
Reduced costs from erosion and flood damage	Not assessed	Not assessed	

Table B2: Assessment table for adverse effects (risks and costs)

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Adverse effects on the biological and physical environment					
Manufacture, transport and disposal					
Environmental effects resulting from an accident during road transport of the solid technical grade active from the Port of Auckland to the manufacturing sites.	Minimal – moderate	Improbable	A-B	HSNO identification and emergency management regulations.	
Environmental effects resulting from an accident during road transport of the stock solution from Animal Control Products (ACP), Wanganui, to ACP, Waimate, and to sites for preparation of coated baits.	Minimal – moderate	Improbable	A-B	HSNO identification and emergency management regulations.	
Environmental effects resulting from exposure of the environment during manufacture of pellets, pastes, soluble concentrate and gels; including accidental spillage of formulated products.	Minimal	Highly improbable	A	Discharge consents under the Resource Management Act apply to discharges to land, air and water from manufacturing sites. HSNO identification and emergency management regulations address spills at manufacturing sites.	
Effects on fauna within a landfill resulting from exposure through disposal of solid waste to landfill; disposal of wastewater through local sewerage systems; disposal of the solid technical active ingredient via a waste contractor.	Minimal	Improbable	A	Landfill should be managed under their resource consent conditions to ensure that hazardous waste is buried or otherwise treated to prevent access by fauna. Discharges to sewerage systems require trade waste licences from local authorities.	
Environmental effects resulting from an accident during transportation of packaged goods by from the manufacturing site to the application site.	Minimal-moderate	Improbable	A-C	A large spill to water may have significant localised effects if remote from emergency services. HSNO identification and emergency management provisions intended to manage risks.	Given the existing controls and the Committee's approach to risk, the level of risk has been adjusted to: A where spill is on land. B where spill is into water.
Ground-based application					
Uncontained application methods					
Soil micro-organism Plants	Minimal	Highly improbable	A	Uncontained ground-based methods result in	Given the existing and new controls,

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Native bats	Moderate	Very unlikely	D	<p>smaller areas being treated compared to aerial application, but may result in localised areas of higher bait density. Overall exposure of non-target species to substances containing 1080 is reduced at a population level.</p> <p>Compliance with best practice for preparation and distribution of bait minimises risks.</p> <p><i>Changes to controls relevant to risks to the species listed</i></p> <p>Restrictions on use of some substances to contained ground-based methods only:</p> <ul style="list-style-type: none"> peanut-based paste, fish paste; polymer gel block; cut apple bait. <p>Minimum carrot bait size and content specified. Refer Control Code E4 and requirement to notify formulation changes (Additional Control 10).</p> <p>Recommendation – operational best practice (section 11).</p> <p>Threatened species – loss of a small number of individuals may affect population viability.</p> <p>See controls and recommendations as above.</p> <p>Minimal – highly improbable applies to ‘common’ species with high reproductive and dispersal capacity.</p> <p>Moderate – very unlikely – higher rating for threatened species, reduction in scale of use reduces the magnitude of effect relative to aerial operations.</p> <p>See controls and recommendations as above.</p>	<p>and recommendations to all users of substances containing to adopt best practice, the level of risk is assessed as C.</p>
Native birds	Minimal-moderate	Highly improbable – Very unlikely	A-D	<p>Compliance with best practice for preparation and distribution of bait minimises risks.</p> <p><i>Changes to controls relevant to risks to the species listed</i></p> <p>Restrictions on use of some substances to contained ground-based methods only:</p> <ul style="list-style-type: none"> peanut-based paste, fish paste; polymer gel block; cut apple bait. <p>Minimum carrot bait size and content specified. Refer Control Code E4 and requirement to notify formulation changes (Additional Control 10).</p> <p>Recommendation – operational best practice (section 11).</p> <p>Threatened species – loss of a small number of individuals may affect population viability.</p> <p>See controls and recommendations as above.</p> <p>Minimal – highly improbable applies to ‘common’ species with high reproductive and dispersal capacity.</p> <p>Moderate – very unlikely – higher rating for threatened species, reduction in scale of use reduces the magnitude of effect relative to aerial operations.</p> <p>See controls and recommendations as above.</p>	<p>Given the existing and new controls, and recommendations to all users of substances containing to adopt best practice, the level of risk is assessed as A-C.</p>

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Native lizards and frogs	Minimal-moderate	Improbable	A-C	Threatened species – loss of a small number of individuals may affect population viability; frogs and lizards less sensitive to 1080 than birds and mammals. Amended control requires screening of carrot bait to remove small highly toxic pieces (refer Control Code E4). See controls and recommendations as above.	Given the existing and new controls, and recommendations to all users of substances containing to adopt best practice the level of risk is assessed as A-B .
Terrestrial invertebrates	Minimal-minor	Highly Improbable	A	Smaller treatment areas minimise exposure to populations.	
Contained application methods					
Soil micro-organisms Plants	Minimal	Highly improbable	A	Contained methods of application (Control Code E4) minimise exposure of non-target species to all substances containing 1080; some spillage may occur when bait is being accessed by target species. Any effects will be highly localised.	
Native bats	Minimal	Highly Improbable	A		
Native birds	Minimal-minor	Highly improbable – Improbable	A-B		
Native lizards and frogs	Minimal-minor	Highly improbable	A		
Terrestrial invertebrates	Minimal-minor	Highly improbable	A		
Aerial application of pellets and coated baits containing 1080					
Loading of baits into aircraft	Minimal	Highly improbable	A	Additional Control 7 requires decontamination of loading sites.	
Contamination of soil	Minimal	Highly improbable	A	Low sowing rates and low toxicity to soil micro-organisms Recommendation – operational best practice – see section 11.	
Freshwater vertebrates and invertebrates	Minimal	Highly improbable	A	Best practice – low sowing rates and use of larger baits reduces exposure, use of improved application technology reduce deposition of bait into water. Additional Control 8 reporting requirements for loss/spillage of bait.	

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
				Recommendation – operational best practice – see section 11.	
Terrestrial plants	Minimal	Highly improbable	A	Low sowing rates result in exposure levels too low to cause effects. Recommendation – operational best practice – see section 11.	
Native birds	Minimal-major	Improbable-very unlikely	A-E	Compliance with best practice for preparation and distribution of bait minimises risks. Specified bait colour Control Code E4 reduces visual attractiveness to birds.	Given the existing and new controls, and recommendations to all users of substances containing to adopt best practice, the level of risk is assessed as A-D .
Native bats	Major	Very unlikely	E	Risk to threatened species is rated higher as loss of a few individuals may affect the viability of a species. Minimal-improbable for 'common' species with high reproductive capacity and dispersal ability. Major-very unlikely for threatened species. <i>Changes to controls relevant to risks to birds and other native fauna</i> Restrictions on use of some substances to contained ground-based methods only: <ul style="list-style-type: none"> cut apple bait treated with soluble concentrate containing 200 g sodium fluoroacetate/litre. Minimum carrot bait size and chaff content. Refer Control Code E4 methods of release and bait size and requirement to notify formulation changes Additional Control 10. Recommendation – operational best practice – see section 11.	Given the existing and new controls, and recommendations to all users of substances containing to adopt best practice, the level of risk is assessed as D .

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Native terrestrial invertebrates	Minimal-moderate	Highly Improbable	A-B	Low sowing rates and use of larger baits reduces exposure. Recommendation – operational best practice – see section 11.	
Native frogs and lizards	Minimal-major	Improbable	A-D	As for birds/bats/invertebrates but frogs and lizards considered less sensitive to 1080 than birds and mammals therefore lower likelihood of effect occurring. Compliance with best practice for preparation and distribution of bait minimises risks. Risk to threatened species rated higher as loss of a few individuals may affect viability of species. Refer Control Code E4 methods of release and bait size and requirement to notify formulation changes Additional Control 10. Recommendation – operational best practice – see section 11.	Given the existing and new controls, and recommendations to all users of substances containing to adopt best practice, the level of risk is assessed as A-C .
Exposure of soil and plants to the stock solution during the preparation of coated baits at the operation site.	Minimal	Highly improbable	A	Additional Control 7 requires decontamination of loading sites. Recommendation – operational best practice – see section 11.	
Indirect (secondary) exposure – independent of method of application					
Secondary poisoning of native fauna (scavengers, predators and insectivores) feeding on carcasses or live kill of lethally or sub-lethally exposed animals.	Minimal-Minor	Highly improbable – improbable	A	Birds most susceptible to secondary poisoning through ingestion of poisoned possums and rodents ie ruru/morepork, weka, kahu/harrier are not threatened species and not affected at a population level. Insectivorous birds such as robins and tomits not affected at a population level. Magnitude of effect greater with aerial application due to larger scale exposure.	

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Disposal post application					
Environmental effects resulting from contamination of soil or groundwater during wash down of equipment and PPE and during disposal of waste to a ground sump and solid waste to landfill.	Minimal	Improbable	A	HSNO disposal regulations.	
Adverse effects on human health and safety					
Adverse human health effects (both short and long term) from exposure of occupationally exposed persons (or bystanders) to 1080 during transportation of technical grade 1080 from Port of Auckland to Animal Control Products (ACP) Wanganui manufacturing plant, and transportation of the Stock Solution and all types of 1080-containing bait from the manufacturing factories (at Wanganui or Waimate) to distribution points or aerial drop areas.	Moderate/ Minor	Highly improbable	A/B		
Adverse human health effects (both short and long term) from exposure of occupationally exposed persons during the handling of: (a) sodium fluoroacetate (1080) during the manufacture of soluble concentrate at Animal Control Products (ACP) Wanganui manufacturing plant; (b) soluble concentrate during the manufacture of formulated substances containing 1080 at the factories (Wanganui and Waimate); (c) soluble concentrate during the manufacture and handling of treated carrot and apple baits on-site in the field.	Moderate	Unlikely	E	The Committee recommends to the companies involved in the manufacture and use of baits in these situations to ensure strict compliance with the controls, particularly personal protective equipment and attention to personal hygiene. The Committee also recommends the use of biological monitoring regularly to monitor the adequacy of compliance with the controls.	Taking into account the approach to risk and the expectation that compliance with controls will prevent excessive exposure, the level of adverse effect was reduced from E to D .
Adverse human health effects (both short and long term) from exposure of occupationally exposed persons to 1080 in both liquid and solid forms during the disposal of small quantities of technical 1080, Stock Solution and manufactured bait from the factories (Wanganui and Waimate) or elsewhere as a result of clean-up of spills, surplus packaging or protective clothing and disposal of this material at controlled waste disposal facilities.	Minor	Improbable	B		
Adverse human health effects to the general public from acute (short-	Moderate	Highly Improbable	A		

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Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
term) exposure to Pellet bait (0.4–0.8, 1.5–2.0 g/kg) and 1080-coated baits (carrot/apple) from aerial application.					
Adverse human health effects the general public from acute (short-term) exposure to Pellet bait (0.4–0.8, 1.5–2.0 g/kg) and 1080-coated baits (carrot/apple) from contained and uncontained ground application.	Moderate	Highly Improbable	A		*
Adverse human health effects (both short and long term) from exposure of the general public to contaminated drinking water (whether a public water supply, a private supply or from direct surface water collection following aerial application of 1080.	Minimal	Highly Improbable (public) or Improbable (private/other)	A	Recommended further research on degradation of 1080 in water and soil – see section 11.	
Adverse human health effects (both short and long term) from exposure of any person to 1080-contaminated farmed meat resulting from ground or aerial application of 1080.	Minimal	Highly Improbable	A		
Adverse human health effects (both short and long term) from exposure of any person to 1080-contaminated feral meat, resulting from ground or aerial application of 1080.	Minimal	Improbable	A		
Adverse human health effects (both short and long term) from exposure of any person to 1080-contaminated vegetation, resulting from ground or aerial application of 1080, and collection of the vegetation for food or medicinal (roanga) purposes.	Minimal	Highly Improbable	A	Notwithstanding the low level of adverse effect estimated, the Committee concluded that the lack of data relating to residues in watercress if it is grown in contaminated water is a research gap which needs to be remedied.	
Adverse effects on the relationship of Māori to the environment					
Negative impact on tikanga and mātauranga Māori resulting from the use of 1080 in the environment.	Moderate	Likely	E	Recommendation – Research and/or dialogue requirement regarding the non-biophysical effects of the use of toxins like 1080 in the environment.	Given the existing and additional controls and recommendations, any change in the level of adverse effect is dependant on the outcomes of the recommended research therefore no change is assessed – E.
Undermining of the roles and responsibilities of kaitiaki.	Moderate	Likely	E	Permissions Control (Additional Control 4) – Requirement for consultation prior to aerial 1080 operations on DoC land and where public	Given the existing and additional controls and recommendations, a significant improvement in the

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
				health issues are posed in accordance with Best Practice guidelines. Control – Reporting consultation activity and outcomes on ERMA New Zealand’s 1080 watchlist. Recommendation – DoC review of its implementation of its iwi/Māori consultation requirements to achieve consistency across conservancies.	involvement of iwi/Māori throughout the processes for the use and management of 1080 would occur. This would change the likelihood of this adverse effect to improbable giving a revised level of adverse effect – C .
Negative impact on the physical and spiritual health and wellbeing of iwi/Māori caused by the compromising or contamination of traditional healing practices and wild foods.	Moderate	Very unlikely	D	Control – Reporting aerial operation details and outcomes on ERMA New Zealand’s 1080 watchlist. Recommendation – Research on the effects of 1080 on plant species of specific importance to the practice of rongoa.	Given the existing and additional controls and recommendations, any change in the level of adverse effect is dependant on the outcomes of the recommended research therefore no change is assessed – D .
Negative impact on the economic development potential of iwi/Māori.	Minimal	Unlikely	C	–	
Adverse effects on society and communities					
Loss of opportunity to hunt due to reduced deer populations (includes loss of amenity and loss of food source).	Minor	Very unlikely	C	Alternative public conservation areas where 1080 is not used are available to hunters. There is major uncertainty around the impact of deer repellent in terms of its effectiveness in reducing by-kill of deer. Recommendation – that users of 1080 consult with the Deerstalkers’ Association at a national and local level prior to major operations in areas where hunting may be affected.	
Anxiety resulting from disagreement between hunting community and government/pest control agencies.	Minor	Unlikely	D	Adverse effect can be reduced (though not removed) by appropriate comprehensive and meaningful consultation and dialogue with communities including listening to community concerns and taking account of community perspectives.	The Committee considers that the adverse effect can be ameliorated by improved consultation and communication and has reassessed the effect as Minor

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
				Recommendation – best practice communication and consultation.	Improbable B.
Anxiety resulting from perceived loss of control over own environment.	Not assessed	Not assessed			
Negative experience in recreational and rural areas due to pest control.	Not assessed	Not assessed			
Grief caused by pet suffering or mortality resulting from pest control operations.	Minor	Improbable	B	Controls in place to ensure that dogs are not exposed are adequate. Recommendation – best practice communication and consultation.	
Concern for animal welfare.	Minor	Very Unlikely	C	Target animals deserve to be treated humanely and suffering should be minimised. While effects on non – target animals pertain to both ground and aerial application of 1080, the public appears to be more anxious about aerial use.	
Concern about incidents around 1080 operations.	Not assessed	Not assessed		Recommendation – best practice communication and consultation.	
Concern resulting from perceptions of ecosystem degradation.	Moderate	Unlikely	E	This effect is countered by the equivalent beneficial effect. Recommendation – best practice communication and consultation.	
Concern that the use of 1080 is adversely impacting on New Zealand's clean green image.	Not assessed	Not assessed		Unsupported. Perception countered by reduced concern about New Zealand's clean green image from reduction in possum numbers.	
Concerns about sabotage.				Any such concerns would be similar to concerns about all vertebrate toxins.	
Adverse effects on the market economy					
Loss of livestock from poisoning.	Minimal	Very unlikely – improbable	B	Small numbers affected – localised and short term effect.	
Loss of working dogs from poisoning.	Not assessed	Not assessed		Small numbers reported – deaths can be minimised by careful management including use of muzzles.	
Costs associated with the removal of stock during pest control operations.	Not assessed	Not assessed		Greater accuracy of aerial dropping minimises any impact.	

Appendix B: Identification and assessment of the risks, costs and benefits of the substance

Effect	Magnitude of effect	Likelihood	Level of adverse effect	Comment Controls/ Recommendations	Adjusted level of risk
Negative impact on market values and access for agricultural and horticultural products.	Not assessed	Not assessed		Farmed animals are excluded from treated areas and strict protocols are applied to feral meat to ensure that they are not sourced from 1080 treated areas.	
Negative perceptions of large scale aerial application of pesticide and impact on tourist spending.	Not assessed	Not assessed		Market impact small – more appropriately considered as a social effect.	
Negative financial and commercial impacts from restrictions on hunting.	Not assessed	Not assessed		Any effect would be localised and short term – taking a national perspective the impact on the market economy would be very small. While deer by-kill has adverse social effects as discussed in section 10.6, adverse effects on the (national) market economy due to loss in trade have not been shown since in most cases hunters are able to move to alternative areas.	
Negative impact on possum fur industry.	Not assessed	Not assessed		No need for conflict between industry and use of 1080 since most major 1080 aerial operations are on land areas that it is either impossible or very uneconomic to cover using ground control methods. Recommendation – that DoC and AHB work with the fur industry to ensure that where possible fur hunters are able to access the resource.	
Reduced opportunities for employment from trapping and hunting for control of possums and other pests.	Minimal	Improbable	A	Net effect, since it is a “reduced opportunity”.	
Negative impact on trade in feral venison and other game animal-based industries.	Not assessed	Not assessed		Collapse of feral venison industry in 1990s due to a range of factors. Current industry small, and unlikely to be affected by use of 1080.	

Appendix C: Qualitative descriptors for risk/benefit assessment

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C1 Assessing risks, costs and benefits qualitatively

This section describes how the Agency staff and the Authority address the qualitative assessment of risks, costs and benefits.

Risks and benefits are assessed by estimating the magnitude and nature of the possible effects and the likelihood of their occurrence. For each effect, the combination of these two components determines the level of the risk associated with that effect, which is a two dimensional concept.

Because of a lack of data, risks are often presented as singular results. In reality, they are better represented by ‘families’ of data which link probability with different levels of outcome (magnitude).

C2 Describing the magnitude of effect

The magnitude of effect is described in terms of the element that might be affected. The qualitative descriptors for magnitude of effect are surrogate measures that should be used to gauge the end effect or the ‘what if’ element.

Tables C1 and C2 contain generic descriptors for magnitude of adverse and beneficial effect. These descriptors are examples only, and their generic nature means that it may be difficult to use them in some particular circumstances. They are included here to illustrate how qualitative tables may be used to represent levels of adverse and beneficial effect.

The sample qualitative descriptors for effects on the market economy listed in the ERMA New Zealand technical guide to decision making⁹³ include representative numbers. These ‘economic’ descriptors were developed prior to the publication of the technical guide on identification and assessment of effects on the market economy,⁹⁴ which refines the approach that ERMA New Zealand applies to identifying and assessing economic effects. These numbers do not align well with the qualitative descriptors in the other categories (effects on the environment, effects on human health, and effects on society and communities), as they relate more to an event than an effect. In particular the numbers are unclear about how they take account of time (are they annual, or over the life of the activity) and they do not have a local, regional or national context.

ERMA New Zealand has adopted a revised set of qualitative descriptors for the magnitude of effect on the market economy, as shown below.

Table C1: Magnitude of adverse effect (risks and costs)

Descriptor	Examples of descriptions: ADVERSE
Minimal	<p>Mild reversible short term adverse health effects to individuals in highly localised area</p> <p>Highly localised and contained environmental impact, affecting a few (less than ten) individuals members of communities of flora or fauna, no discernible ecosystem impact</p> <p>Local/regional short-term adverse economic effects on small organisations (businesses, individuals), temporary job losses</p> <p>No social disruption</p>
Minor	<p>Mild reversible short term adverse health effects to identified and isolated groups</p> <p>Localised and contained reversible environmental impact, some local plant or animal communities temporarily damaged, no discernible ecosystem impact or species damage</p> <p>Regional adverse economic effects on small organisations (businesses, individuals) lasting less than six months, temporary job losses</p> <p>Potential social disruption (community placed on alert)</p>
Moderate	<p>Minor irreversible health effects to individuals and/or reversible medium term adverse health effects to larger (but surrounding) community (requiring hospitalisation)</p> <p>Measurable long term damage to local plant and animal communities, but no obvious spread beyond defined boundaries, medium term individual ecosystem damage, no species damage</p> <p>Medium term (one to five years) regional adverse economic effects with some national implications, medium term job losses</p> <p>Some social disruption (e.g. people delayed)</p>
Major	<p>Significant irreversible adverse health effects affecting individuals and requiring hospitalisation and/or reversible adverse health effects reaching beyond the immediate community</p> <p>Long term/irreversible damage to localised ecosystem but no species loss</p> <p>Measurable adverse effect on GDP, some long term (more than five years) job losses</p> <p>Social disruption to surrounding community, including some evacuations</p>

⁹³ ERMA New Zealand. 2004. *Decision Making: A Technical Guide to Identifying, Assessing and Evaluating Risks, Costs and Benefits*, ER-TG-05-01. Wellington: Environmental Risk Management Authority.

⁹⁴ ERMA New Zealand. 2005. *Assessment of Economic Risks, Costs and Benefits: Consideration of Impacts on the Market Economy*, ER-TG-06-01. Wellington: Environmental Risk Management Authority.

Descriptor	Examples of descriptions: ADVERSE
Massive	Significant irreversible adverse health effects reaching beyond the immediate community and/or deaths Extensive irreversible ecosystem damage, including species loss Significant ongoing adverse effect on GDP, long term job losses on a national basis Major social disruption with entire surrounding area evacuated and impacts on wider community

Table C2: Magnitude of beneficial effect (benefits)

Descriptor	Examples of descriptions: BENEFICIAL
Minimal	Mild short term positive health effects to individuals in highly localised area Highly localised and contained environmental impact, affecting a few (less than ten) individuals members of communities of flora or fauna, no discernible ecosystem impact Local/regional short-term beneficial economic effects on small organisations (businesses, individuals), temporary job creation No social effect
Minor	Mild short term beneficial health effects to identified and isolated groups Localised and contained beneficial environmental impact, no discernible ecosystem impact Regional beneficial economic effects on small organisations (businesses, individuals) lasting less than six months, temporary job creation Minor localised community benefit
Moderate	Minor health benefits to individuals and/or medium term health impacts on larger (but surrounding) community and health status groups Measurable benefit to localised plant and animal communities expected to pertain to medium term. Medium term (one to five years) regional beneficial economic effects with some national implications, medium term job creation Local community and some individuals beyond immediate community receive social benefit.
Major	Significant beneficial health effects to localised community and specific groups in wider community Long term benefit to localised ecosystem(s) Measurable beneficial effect on GDP, some long term (more than five years) job creation Substantial social benefit to surrounding community, and individuals in wider community.
Massive	Significant long term beneficial health effects to the wider community Long term, wide spread benefits to species and/or ecosystems Significant ongoing effect beneficial on GDP, long term job creation on a national basis Major social benefit affecting wider community

C3 Determining the likelihood of the end effect

Likelihood in this context applies to the composite likelihood of the end effect, and not either to the initiating event, or any one of the intermediary events. It includes:

- the concept of an initiating event (triggering the hazard), and
- the exposure pathway that links the source (hazard) and the area of impact (public health, environment, economy, or community).

Thus, the likelihood is the likelihood of the specified adverse effect⁹⁵ resulting from that initiating event. It will be a combination of the likelihood of the initiating event and several intermediary likelihoods.⁹⁶ The best way to determine the likelihood is to specify and analyse the complete pathway from source to impact.

Likelihood may be expressed as a frequency or a probability. While frequency is often expressed as a number of events within a given time period, it may also be expressed as the number of events per head of (exposed) population. As a probability, the likelihood is dimensionless and refers to the number of events of interest divided by the total number of events (range 0–1). (See Table C3.)

Table C3: Likelihood

	Descriptor	Description
1	Highly improbable	Almost certainly not occurring but cannot be totally ruled out
2	Improbable (remote)	Only occurring in very exceptional circumstances.
3	Very unlikely	Considered only to occur in very unusual circumstances
4	Unlikely (occasional)	Could occur, but is not expected to occur under normal operating conditions.
5	Likely	A good chance that it may occur under normal operating conditions.
6	Very likely	Expected to occur if all conditions met
7	Extremely likely	Almost certain

C4 Using magnitude and likelihood to construct risk

Using the magnitude and likelihood tables a matrix representing a level of risk can be constructed (Table C4).

Table C4: Level of risk

Likelihood	Magnitude of effect				
	Minimal	Minor	Moderate	Major	Massive
Highly improbable	A	A	B	C	D
Improbable	A	B	C	D	E
Very unlikely	B	C	D	E	E
Unlikely	C	D	E	E	F
Likely	D	E	E	F	F
Very likely	E	E	F	F	F
Extremely likely	E	F	F	F	F

The level of risk/benefit can be assigned as follows in Table C5.

⁹⁵ The specified effect refers to scenarios established in order to establish the representative risk, and may be as specific as x people suffering adverse health effects, or y% of a bird population being adversely affected. The risks included in the analysis may be those related to a single scenario, or may be defined as a combination of several scenarios.

⁹⁶ Qualitative event tree analysis may be a useful way of ensuring that all aspects are included.

Table C5: Assignment of level of risk/benefit

A & B	Negligible
C	Low
D	Medium
E	High
F	Extreme

Appendix D: Names of those who made oral presentations at the hearings

Submission number	Submitter
Dunedin – Day 1 (14 May 2007)	
–	Al Morrison, Director-General of the Department of Conservation; and John Dalziell, Chairman of the Animal Health Board ⁹⁷
8510	M R Skerrett Te Ao Marama Inc (Donald Mowat, Chairman, speaking)
9052	Tony Chittock
9011	Mr & Mrs LR Gardyne
8931	Anthony Mallon
9078	Chaz IH Forsyth
9295	Shirley Hudson, Hokonui Environment Action Group (Mrs L R Gardyne speaking on her behalf)
Dunedin – Day 2 (15 May 2007)	
9336	Otago Regional Council (represented by Jeff Donaldson)
9221	TauTuku Block X Section 3C Trust (Ted Palmer speaking)
8841	Dr Joanna Christine Pollard
8559	Carolyn Rogers
9128	Stephen Allan Woodhead
9099	Alan Mackie
8328	Environment Southland (represented by Gretchen Dobson, Dave Burgess and Richard Bowman)
9059	Philip W Hunt
9077	Otago Regional Animal Health Committee (RAHC) (Philip W Hunt and Stephen Koteweg speaking)
9076	Southland RAHC (Mike O'Brien speaking)
9270	Maniototo Pest Management Ltd (John Beattie and Frank Rosie speaking)
9230	CE Henderson
Christchurch – Day 1 (16 May 2007)	
–	James Ataria and Shaun Ogilvie of Ngā Kaihautū Tikanga Taiao
9304	North Canterbury NZ Deerstalkers' Association (David Hodder speaking)
9338	NZDA (John Hay speaking)
9299	William S Gardner
9360	Federated Farmers NZ (Frank Brenmuhl speaking)
9310	South Island High Country Federated Farmers (Bob Douglas speaking)
9297	Te Rapana Trust (Murray Parsons speaking)
9361	Mackenzie Branch Federated Farmers (John Murray speaking)
1927 + 7849 (combined)	Westland Milk Products and Dairy Companies Association of New Zealand (Sue Cotton speaking)
9751	Kees van Beek
8517	Andreas Lageder
7777	Anne Simpson

⁹⁷ Opening address by applicants.

Appendix D: Names of those who made oral presentations at the hearings

Submission number	Submitter
8991	Te Runanga o Ngai Tahu (Edward Ellison speaking)
9103	Te Runanga o Kaikoura (Raewyn Solomon speaking)
9293	The Game and Forest Foundation of New Zealand (Garry Ottmann speaking)
9183	Kath & Dan Lane and Phil Paterson
8277	Guy Brown
9075	Frida Inta
8332	Environment Canterbury (represented by Rob Johnston (Deputy Chair), Kevin Gallagher and Tamsin Page)
Christchurch – Day 2 (17 May 2007)	
8513	Canterbury RAHC (Malcolm Gilbert speaking)
7343	Mary E Molloy (teleconference)
7342	Lindsay B Molloy (teleconference)
8965	West Coast RAHC (Helen Lash speaking)
9344	Andrew John Simpson (Lesley Shand speaking on his behalf)
9330	Soil and Health Association of New Zealand Inc (teleconference – Steffan Browning speaking)
8852	Sally & Dick Tripp
8709	Ashburton Royal Forest & Bird Protection Soc Inc (Gillian Pollock speaking)
8692	Joe Bell (teleconference)
Nelson (18 May 2007)	
9339	Nelson Federated Farmers (Edwin Newport speaking)
8997	Tanya Davey
9136	Royal Forest & Bird Protection Society (Nelson/Tasman Branch) (Jocelyn Bieleski speaking)
8633	Royal Forest & Bird Protection Society (Golden Bay Branch) (Murray Gavin speaking)
9448	John Hellstrom
9287	Harvey Morrow
8996	Lloyd Hanson
8353	Michael William Grant
8887	West Coast Regional Council (represented by Andrew Macalister)
8512	Tasman RAHC (Doug Thorneycroft, Chair, speaking)
8514	Marlborough RAHC (Chris Bowron, Chair, speaking)
North Shore (21 May 2007)	
8953	The Dropping Dead from MAF Moth Spray Committee (Donna Bird speaking)
9096	Auckland RAHC (Keith Kelly speaking)
9770	Federated Mountain Clubs (Viv Milne speaking)
9123	Bruce Donovan
8744	Grant Philpott
8518	Wyn Hibberd
8962	Bryan Backhouse-Smith
9200	Sheryll Backhouse-Smith
9125	Taheke Hapu Resource Management Roopu (Fiona Reihana Ruka speaking)
9471	Boy Yates
8955	Damien Johansen
9369	Friends of the Earth (Paul Tucker speaking)

Appendix D: Names of those who made oral presentations at the hearings

Submission number	Submitter
9094	Northland RAHC (Neil MacMillan – Mark Farnsworth speaking)
9196	NZDA (North Auckland) (Denis Moloney speaking)
9139	Frank Fergusson
9212	Waipoua Forest Trust (Stephen King speaking)
8985	Dr Keith Corbett
8590	Waitakere Forest & Bird (Mark Bellingham speaking)
Hamilton – Day 1 (22 May 2007)	
9068	Blair Fothergill
9098	New Zealand Society of Medical Officers of Health (Dell Hood speaking)
7341	NZ Agricultural Aviation Association (John Maber speaking)
9060	Technology Transfer Ltd (Rod McDonald speaking)
9050	Neil Stewart
9140	Paul McMillan
9329	Ruapehu Federated Farmers (Richard Steele speaking)
9047	Brett Leslie Millward
9043	Kerry Witchell
9048	Bruce Wilson
Hamilton Day 2 (23 May 2007)	
8516	Environment Waikato (represented by Councillors David Peart and Louis Livingstone)
8756	Environment Waikato's North & South Biosecurity Advisory subcommittees (D E Wright speaking)
9449	Mairi Jay
9092	Waikato RAHC (Leith Chick speaking)
9093	Leith Chick (personal submission)
9430	George Holland
8511	Allan Jackson
9091	Bay of Plenty RAHC (Ray Hayward, Chair, speaking)
8540	Rotorua NZDA (Rod Wheeler speaking)
9223	Derek Lovell
9055	Rob McGregor
8346	Te Puke Branch Forest & Bird (Carole Long, Chair, speaking)
9229	Whitianga Pig Hunting Club (James Whitford, President, and Colin Harris, Secretary speaking)
9070	Te Kuiti Pig Hunting Club (Nigel Keall speaking)
8452	Hawkes Bay RAHC (Dennis Mitchell speaking)
9349	Aongatete Forest Restoration Trust (Basil Graeme speaking)
9320	EcoFX Ltd (Kevin Christie speaking)
9142	Environmentally Safe Pest Control (ESPC) (Graham Sperry speaking together with Graham Higginson (7627), Graeme Sturgeon (8858), Dean Maisey (9066), the Graf Boys, Robert Peeters, Margie Jarman and Steve Boot)
Hamilton – Day 3 (24 May 2007)	
9054	Theodora C Ward
8900	Anne Ward
9201	D R Gardner
9194	Sharon Hall

Appendix D: Names of those who made oral presentations at the hearings

Submission number	Submitter
9301	Peter Scanlon
8813	Reihana Robinson
8930	Clare St Pierre
9198	Pat Whiting-O'Keefe
Hamilton – Pohara Marae (24 May 2007)	
9134	Ngati Kahungunu Iwi Inc (Morry Black speaking)
9217	Te Whakaoranga o Karioi Inc (Malibu Hamilton speaking)
9180	Des Baker on behalf of Marcus Kautawhiti James
9296	Te Mana Taiao Charitable Trust (Gina Rangi speaking)
9316	Hera Naera
9298	Lake Taupo & Lake Rotoria Forest Trusts (Geoff Thorp speaking)
Wellington (25 May 2007)	
9069	Local Government New Zealand (represented by Ian Buchanan and Susan Edwards)
9307	NZ Conservation Authority (Kay Booth speaking)
9291	Royal Forest & Bird Protection Society (represented by Kevin Hackwell and James Griffiths)
9209	Council of Outdoor Recreation (Hugh Barr speaking)
9324	Hugh Barr (personal submission)
9334	Wellington Conservation Board (Andy Foster speaking)
9313	NZDA Hutt Valley (Gordon N George speaking)
9359	John Bryce
9199	Wellington Botanical Society (JC Horne speaking)
9322	NZDA (Trevor Dyke speaking)
9213	Wellington RAHC (Peter Gaskin speaking)
9210	JB Henderson (also speaking on behalf of Tony Orman (9261))
9045	WF Benfield
9131	Iwi, Te Atiawa Maori National Network (Fred Allen speaking)
9129	Ministry of Health (Dr Michael Taylor speaking)
9073	1080 National Network of NZ (Kate Winters speaking)
9251	Toxins Action Group (Alison White speaking) (also speaking on behalf of Claire Bleakley (8586))
8898	Ngati Haua (Nyree Nikova speaking)
9138	Mark Coghlan
9071	NZDFA (Tony Pearse speaking)
9135	Greater Wellington Regional Council (Wayne O'Donnell speaking)
9356	Andy Maloney
9120	Stephen Veail
9249	Regional Public Health (Stephen Palmer speaking)
9326	Biosecurity NZ (Andrew Harrison speaking)
9282	Environment and Conservation Organisations of NZ (Aaron Packard and Barry Weber speaking)
	John Ombler, General Manager, Research, Development and Improvement, Department of Conservation; and John Dalziel, Chairman, Animal Health Board ⁹⁸

⁹⁸ Closing statements by applicants.

Appendix E: Decision path for the reassessment of 1080

Context

This decision path describes the decision-making process for the application to import and manufacture 1080 and formulated substances containing 1080. This application is made under section 63 (Reassessment) of the HSNO Act, and determined under section 29 of the Act.

Introduction

The purpose of the decision path is to provide the Authority with guidance so that all relevant matters in the HSNO Act and the Methodology have been addressed. It does not attempt to direct the weighting that the Authority may decide to make on individual aspects of an application.

In this document ‘section’ refers to sections of the HSNO Act, and ‘clause’ refers to clauses of the ERMA New Zealand Methodology.

The decision path has two parts –

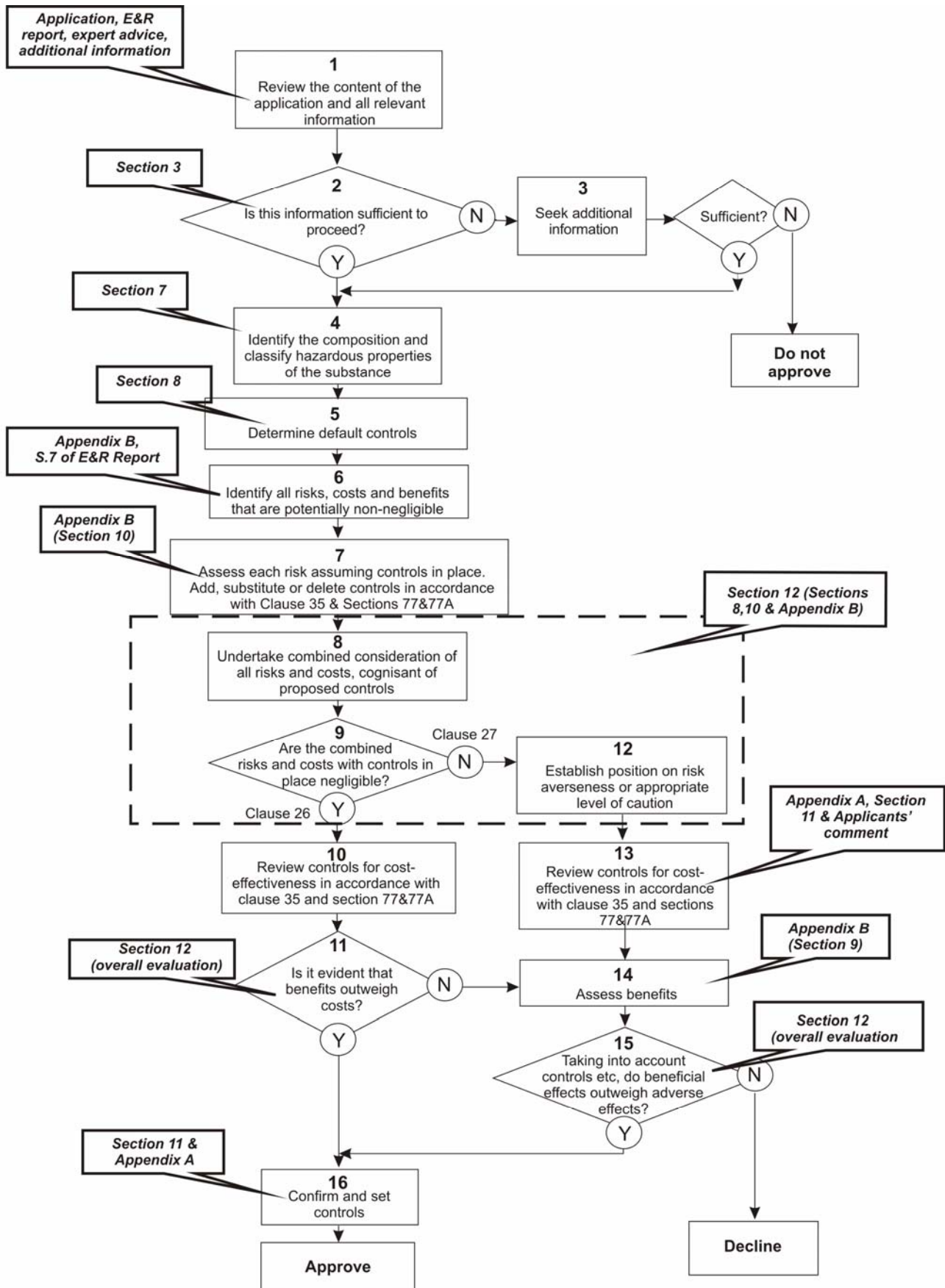
- **Flowchart** (a logic diagram showing the process prescribed in the Methodology and the HSNO Act to be followed in making a decision), and
- **Explanatory notes** (discussion of each step of the process).

Of necessity the words in the boxes in the flowchart are brief, and key words are used to summarise the activity required. The explanatory notes provide a comprehensive description of each of the numbered items in the flowchart, and describe the processes that should be followed to achieve the described outcome. Additional cross-references to the relevant sections in the E&R Report and the draft decision are also included for ease of reference.

1080 Decision Making Committee

Decision path for 1080 and formulated substances containing 1080 – FLOWCHART (application made under section 28 of the Act and determined under section 29)

For proper interpretation of the decision path it is important to work through the flowchart in conjunction with the explanatory notes



EXPLANATORY NOTES

- Items 1, 2 & 3:** Information that should be reviewed includes that in the application, the E&R Report, from experts and in submissions (where relevant). Review should occur in terms of section 28(2) of the Act and clauses 8, 15, 16 and 20 of the Methodology. Additional information may need to be sought under section 52 and 58 of the Act. When considering the adequacy of the information the information category should be considered.
If the applicant is not able to provide sufficient information for consideration then the application is not approved. In these circumstances the Authority may choose to decline the application, or the application may lapse.
- Item 4:** Confirm the composition of the substance and establish the hazard classifications for the identified substance.
- Item 5:** Determine the default controls for the specified hazardous properties using the regulations ‘toolbox’.
- Item 6:** The range of risks, costs and benefits to be identified should be that covered by clauses 9, 10 and 11 of the Methodology. This is a two step process.
Step 1: Identify all possible risks, costs and benefits
Step 2: Eliminate those risks, costs and benefits that can be readily concluded to be negligible
- Item 7:** The assessment of risks and costs should be carried out in accordance with clauses 12 to 14, 22, 25, and 29 to 32 of the Methodology. The process of risk assessment includes the estimation of the likelihood and magnitude of each effect. The assessment is carried out with the default controls in place.

The assessment also includes the following steps.
Step 1: Consideration of the extent to which the risk will be mitigated by the default controls.

Step 2: Consideration of how risk averse or cautious the Authority should be in giving weight to the residual risk (clause 33 of the Methodology), where residual risk is the risk remaining after the imposition of controls.

Note that only risks and costs are assessed at this stage, since assessment of benefits depends on whether the decision follows the clause 26 or clause 27 path.
Add substitute or delete controls in accordance with section 77 of the Act.
- Item 8:** Once the risks and costs have been assessed individually, consider all risks and costs together.
- Item 9:** Consider whether any residual risks are negligible. An holistic perspective should be adopted, taking into account the particular characteristics of the substance and the feasibility of the combined controls.

- Item 10:** This item taken in sequence from item 9 constitutes a decision made under clause 26 of the Methodology.
Consider (a) whether any of the non-negligible risks can be reduced by varying the controls in accordance with section 77 of the Act, and (b) the cost-effectiveness of the controls. Where relevant and appropriate, add, substitute or delete controls whilst taking into account the view of the applicant, and making sure that the benefits of doing so outweigh the costs.
- Item 11:** This item constitutes a decision made under clause 26 of the Methodology. If risks are negligible and there are no external costs (costs accrue only to the applicant), then the fact that the application has been submitted is deemed to demonstrate existence of benefit, and no further benefits need be considered.
However, if external costs exist then all benefits need to be assessed
- Item 12:** Although ‘risk averseness’ is considered as a part of the assessment of individual risks, it is good practice to consolidate the view on this if risks are non-negligible. Clause 33 of the Methodology applies, as does section 7 of the Act dealing with caution in the face of scientific and technical uncertainty.
- Item 13:** This constitutes a decision made under clause 27 of the Methodology (taken in sequence from items 9, 12, 13 and 14).
Consider (a) whether any of the non-negligible risks can be reduced by varying the controls in accordance with section 77 of the Act, and (b) the cost-effectiveness of the controls. Where relevant and appropriate, add, substitute or delete controls whilst taking into account the view of the applicant, and making sure that the benefits of doing so outweigh the costs.
- Item 14:** Assess benefits in terms of clause 13 of the Methodology.
- Item 15:** In weighing up adverse and beneficial effects, clause 34 of the Methodology applies. The weighing up process takes into account controls proposed in items 5, 10 and/or 13. Where this item is taken in sequence from items 12, 13 and 14 (ie risks are not negligible) it constitutes a decision made under clause 27 of the Methodology, and adverse effects comprise risks and costs.
Where this item is taken in sequence from items 9, 10, 11 and 14 (ie risks are negligible, and costs do not accrue only to the applicant) it constitutes a decision made under clause 26 of the Methodology, and adverse effects comprise costs.
- Item 16:** Controls have been considered at the earlier stages of the process (items 5, 10 and/or 13). However, the final step in the decision-making process confirms and sets the controls.