



# 1080: THE FACTS

A JOINT FEDERATED FARMERS – FOREST & BIRD INITIATIVE

**Do you genuinely care about keeping New Zealand clean and green, but don't know who and what to believe when it comes to 1080? If you want to know the science-based facts about 1080 – what it is, why it's used and exactly what it does – take a moment to read these facts.**

## What is 1080?

1080 (sodium fluoroacetate) is a naturally-occurring toxin found in many plants throughout the world. Plants have developed it as a natural defence against browsing mammals. The active ingredient in 1080 is found naturally in tea and also appears to occur in puha.<sup>1</sup> It is manufactured for use in various types of baits for pest control operations and is highly toxic to mammals in particular.

## What does it do to the environment?

1080 is highly water soluble and breaks down in the environment into harmless substances.<sup>2</sup> It does not accumulate in the food chain

or in the soil.<sup>3</sup> Any animal ingesting a sub-lethal dose of 1080 will metabolise and eliminate the substance within 10 days.<sup>4</sup>

## Why is it used in New Zealand?

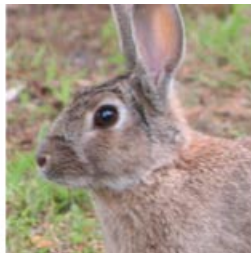
1080 has been used on a small scale in a number of countries, including Australia, the United States and the Galapagos Islands (Equador)<sup>5</sup>, but its use has been limited because of the need in these countries to protect native mammals. New Zealand, however, unlike almost all other countries, has no native land mammals (except bats)<sup>6</sup>, but a very large number of introduced, highly destructive mammalian pests, including possums, rabbits, rats, stoats, ferrets and feral cats.<sup>7</sup>



Possum



Rats



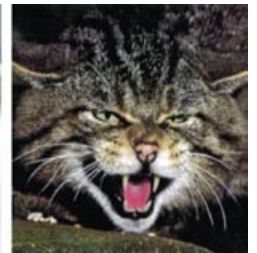
Rabbit



Ferret



Stoat



Feral cat

Photos: AHB, Nga Manu Images, ORC, ARC, NRC



Kakapo

Photo: Mike Brodie



North Island brown kiwi

Photo: Nga Manu Images

## Tough choices

Use of any type of toxin involves ethical issues and trade-offs, for example with regard to its humaneness relative to its effectiveness and also the suffering target pests inflict on their prey. Unfortunately, effective solutions involve tough choices, particularly when we are dealing with a major, human-induced threat to our biodiversity and our economy.

We have to choose between feeding our native and often rare species to introduced pests, or killing the pests so that the native species can survive.

We have the same issues with regard to protecting our stock from bovine TB. We have international as well as national responsibilities to ensure survival of our native species and to protect our farms from disease, and no one can fulfil those responsibilities on our behalf.

Scientists, farmers and conservationists are widely united in the view that for now, 1080 is the best solution we have, and until such time as an effective alternative is found, it must remain a key component of New Zealand's overall pest control strategy.



Possum feasts on kereru egg

Photo: Nga Manu Images

## Enemy number one: the possum

Many introduced mammalian pests have devastating effects on New Zealand's native plants, animals and ecosystems, so conservation is a major motive behind the country's pest control strategy. But enemy number one, the possum, is also a threat to our pastoral farming, because it is the host and carrier of a lethal disease, bovine TB.





# 1080 and TB

## Bovine Tuberculosis

Bovine tuberculosis (TB) is a serious, highly infectious disease found in cattle and deer herds, causing weight loss and death.

### Bovine TB

Possums are the main source and carrier of bovine TB in New Zealand, and the main self-sustaining reservoir of the disease in the wild. In the early 1970s, it was discovered that possums were the source of chronic infection in cattle herds. Bovine tuberculosis infection transfers relatively easily from possums to cattle and deer due to the proximity of farmland to bush areas in New Zealand. Possums are responsible for around 80% of new infection in cattle and deer herds.



Possum with TB lesions Photo: AHB

### Bovine TB is a major threat to our economy

Dairy and meat exports are worth more than \$12 billion annually to New Zealand. Rising international animal health standards and growing concern about food safety are now major factors governing and threatening access to premium overseas markets.

Many of our trading competitors, including Australia, are classed as being free of the disease.<sup>13</sup> As at August 2009, New Zealand had 0.35% of cattle and deer herds infected with bovine tuberculosis.<sup>14</sup> This equates to around 131 herds. As a nation with bovine TB infection, New Zealand is banned from exporting live cattle and deer to TB-free countries, including North America and Australia.

Through a nationally coordinated programme comprising ground and aerial control methods and TB-testing cattle and deer, the Animal Health Board (AHB) (the agency charged with controlling bovine TB in New Zealand) has in the past decade reduced the number of TB-infected herds by more than 90%. Aerial 1080 operations account for less than 20% of the AHB's control programme, which also uses traps and a range of pest control toxins.

If AHB's bovine TB eradication programme were to stop, the potential cost to New Zealand as a country has been estimated at \$5 billion over 10 years.<sup>15</sup> AHB is on track to reach the internationally recognised target for official TB freedom of 0.2% infected cattle and deer herds by 2013.

## Some facts about 1080 operations

1080 is the only toxin currently registered for use on mainland New Zealand as suitable for aerial targeting of possums.

Aerial application of 1080 using helicopters is a carefully planned process, targeting and avoiding specific areas and boundaries using GPS technology.<sup>16</sup> Aerial targeting is an essential part of the strategy:

- for reaching areas that are inaccessible or dangerous by land, and



Ground-based operation Photo: AHB

- protecting TB-free areas throughout the country by creating an effective buffer zone from TB-infected areas.

Ground-based operations are used in about two thirds of the areas where it has been identified that possum control is necessary. Very strict notification procedures are followed prior to all 1080 operations, including the approval of the local public Medical Officer of Health.<sup>17</sup>

Dogs are very vulnerable to 1080, up to ten times more so than other animals. Dog owners are warned to keep their dogs well away from 1080-treated areas.

In spite of careful procedures, including extensive signposting, occasional dog deaths do occur. Where there is any possible risk, muzzles should be used to protect dogs from eating baits or poisoned carcasses. If a dog inadvertently ingests 1080, it should



Rabbit infested farmland in Central Otago

Photo: Stephen Jaquiere, ODT

### Protecting our grasslands

1080 is also a key weapon in the ongoing battle against rabbits, which are now becoming resistant to rabbit hemorrhagic disease (RHD). Farmers and land managers are having to increase their use of 1080 to protect pastoral land from rabbits and preserve the gains made in recent years through the use of RHD.<sup>12</sup>

be taken to a vet immediately. Acetamide has proven an effective emetic and should be administered as soon as possible.<sup>18</sup> Farmed mammals and other introduced domestic mammals are also vulnerable to 1080 if they gain access to the baits.

While DOC, AHB and regional councils are all bound by very strict operational regulations and procedures, from time to time accidental poisoning of non-target animals does occur. Avoiding such incidents is a high priority goal and to this end protocols and operating practices are subject to rigorous review and continuous improvement.

### Ensuring effective targeting

The organisations that use 1080 have always been very concerned to ensure that it effectively targets the introduced pests and has minimal impact on native species which they are trying to protect. For example, 30 years ago a standard operation used around 30kg of un-dyed carrot bait per hectare. Today a standard operation would use between 1.5kg and 3kg of dyed cereal bait. Landcare is carrying out research for DOC and AHB to reduce the sowing rate down to just 0.25kg per hectare.<sup>19</sup>

# 1080 and conservation

## Our natural environment: easy prey for predators

New Zealand's unique flora and fauna is highly vulnerable: it evolved over 80 million years with no browsing or predatory mammals.



### Protecting our vulnerable species

New Zealand in its unspoilt state was an aviary. So it's hardly surprising that introduced mammalian pests - brought here either to be domesticated, by accident, for hunting, for the fur trade, or to control other introduced pests - have driven some of our most vulnerable species to the brink of extinction.

### Killers of the night

Possums, rats, ferrets, stoats and feral cats all kill both adult birds and chicks and raid nests for eggs.<sup>8</sup> They also compete for, and wipe out, critical food sources for birds such as supplies of berries, flowers, fruits and invertebrates. Predators are blamed for an estimated 61% (26,628,940) of chick and egg losses every year.<sup>9</sup>

**These predators prey on native species that are:**

- **in immediate danger of extinction:** mohua, southern New Zealand dotterel and kakariki
- **acutely threatened:** rowi/Okarito brown kiwi, kaka and North Island kokako
- **nationally critical:** several species of giant New Zealand snail, Powelliphanta, and
- **common species:** tui, bellbird, fantail and whitehead.<sup>10</sup>

Introduced pests have also devastated our forest canopy and stripped vast tracts of native bush. Rata, kamahi, pohutukawa, mistletoe and fuchsia are particularly badly affected.<sup>11</sup>

### Aerial 1080

It is our unique lack of native land mammals that enables New Zealand to use 1080 aerially, and this has now become a vital tool in the battle to control introduced pests and protect New Zealand's native species. See the *Case studies* section for examples.

### The 'triple predator' benefit

Aerial 1080 operations involving pre-feeding of baits are also increasingly reliable in achieving high kills not only of possums but also rats and stoats via secondary poisoning. This 'triple hit' of the three major bird predators over a large area provides a breeding 'window' that is crucial to increasing female and chick survival.



Rat killing chick Photo: Nga Manu Images

## Studies

The effectiveness and safety of 1080 as we use it in New Zealand has been the subject of many studies and extensive published scientific research over the past 30 years.

### Some key findings:

#### Water

Between 1990 and May 2010 extensive water monitoring (2442 samples) was undertaken after a large number of aerial 1080 operations.<sup>21</sup> This is a requirement of the Ministry of Health and more recently has been required for ERMA watchlist reporting purposes. The following are examples from the programme:

- After 34 different aerial 1080 operations in the Wanganui area between 1990 and 2008, 76 water tests found no trace of 1080 in any domestic reticulated water supplies.<sup>22</sup>
- In 2006, a set of trials was conducted in four streams on the West Coast, using 10 times the number of 1080 baits that might normally be expected to enter streams during aerial treatment. These trials showed that even this large number of baits had no detectable effect on aquatic life in streams.<sup>23</sup>

**The conclusion of this extensive water monitoring programme was that there is no risk to human health from the aerial 1080 operations currently being undertaken in New Zealand.**

For more information visit [www.1080facts.co.nz/water](http://www.1080facts.co.nz/water)

#### Food chain

- Trials show that 1080 is rapidly biodegraded by aquatic and land plants, and by micro-organisms in water and soils.<sup>24</sup>
- Trials also show that animals ingesting sub-lethal doses of 1080 rapidly excrete the poison or metabolise it into non-toxic products.

All traces of the poison in live animals are gone within 10 days.<sup>25</sup>

- Fish were fed 1080 baits in separate studies in the United States and New Zealand. Of the fish tested in both trials, 100 percent survived and none showed any ill effects.<sup>26</sup>
- Sausages containing 1080-poisoned possum meat were also fed to eels in the New Zealand study. After eating all of the sausages, all of the eels survived and none became ill. The eels rapidly eliminated the toxin from their bodies.<sup>27</sup>

### Bird populations

- DOC monitors bird populations and bush health following 1080 applications in many parts of the country. Long-term assessments demonstrate that native bird populations are not damaged by 1080, and indeed that most native bird species show net benefits, especially from the impact of the 'triple predator' by-kill effect of aerial 1080, referred to above. The benefits for native bird populations of effectively taking out three major predators at once are in some cases spectacular.<sup>28</sup>
- Some inadvertent by-kill of native birds has been recorded, but is more than made up for by the subsequent increase in populations. Up to 50% of kea nests are wiped out where they are unprotected from predators. Since 7 kea died in an operation in 2008, DOC have been working with the Kea Conservation Trust on intensive research to determine how to prevent this recurring in future.<sup>29</sup> No further kea deaths have been recorded.

### Insect populations

- Monitoring of ground-based insect populations show minimal loss of insect life from 1080, and an increase after aerial 1080 targeting as a result of reduced insect predation from introduced mammalian predators.<sup>30</sup>



# The ERMA Review

The Environmental Risk Management Authority (ERMA) is New Zealand's independent public watch dog, and is charged with analysing all actual and perceived risks to the New Zealand environment. During 2007 ERMA undertook a rigorous, comprehensive review of 1080, including a series of nationwide public hearings. All interested parties were invited to present written and oral submissions to an independent committee. The committee spent four months of intensive deliberation, which included an independent analysis of all the scientific data. ERMA concluded that the benefits of using 1080 clearly outweighed the risks, and approved its continued use in aerial and ground applications, subject to strict controls.<sup>20</sup>

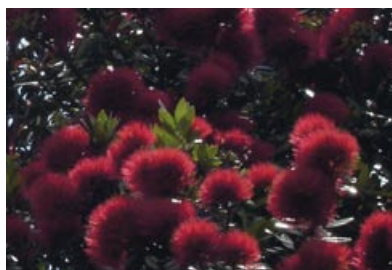
## Case studies

### Kapiti Island

In 1983 Kapiti Island was made possum-free. This programme involved two thirds ground control covering the accessible areas and aerial application on inaccessible areas (around 17% of the island). Native vegetation kohekohe, rata, and fuchsia rapidly recovered. By 1988 monitored native bird densities had doubled.<sup>31</sup>

### Rangitoto Island

Prior to a 1990 possum eradication programme using 1080, Rangitoto Island's pohutukawa forest was dying. Rangitoto is now ablaze with healthy pohutukawa, flowering throughout the summer. Monitored bird life records show that since possums were eradicated there are 10 times more tui and silvereye living on the island.<sup>32</sup> Honey production on the island pre-1080 possum control was 7kg per hive. One year later it rose to 25kg per hive, and two years later it was 50kg per hive.<sup>33</sup>



*Pohutukawa in blossom* Photo: Phoebe Harrop

### Kahurangi National Park

Kahurangi National Park was suffering declining populations of native snails. In 1997 a major aerial 1080 targeting was undertaken. Pre-1080, there were 54 snails found on a 500sq m grid. One year after 1080 was applied, 147 snails were found on the same plot.<sup>34</sup>



*Powelliphanta (NZ native snail)*  
Photo: K J Walker



*Kiwi chick* Photo: DOC

### Tongariro Forest

Nationwide studies show that on average only 5% of kiwi chicks survive to adulthood. Prior to an aerial 1080 application in Tongariro Forest in 2001, 32 kiwi chicks were radio-tagged. After the 1080 programme, 40% of the radio-tagged chicks survived to adulthood.<sup>35</sup>

### Pureora Forest Park

In Pureora Forest Park 20 kaka were radio-tracked in an area to be treated with aerial 1080 in 2001. In nearby Waimanoa Forest, which was not to be treated with 1080, nine kaka were radio-tracked. In the area where 1080 was used, all 20 birds survived that season. Of the nine birds tagged in the untreated area, five were killed by predators that same season.<sup>36</sup>

### Hurunui, Hawdon and Eglinton valleys

The South Branch of Hurunui, Hawdon and Eglinton valleys all had substantial populations of mohua. All three populations declined during the 1990s and all collapsed to very low levels during a rat and stoat plague over the 1999-2000 season. After a comprehensive pest control programme, including aerial 1080 application in 2006 mohua are now abundant in areas that received treatment but have declined elsewhere.<sup>37</sup>

### Whirinaki Forest

During a 1998 to 2002 study in Whirinaki Forest 17 kaka and 15 kereru were radio tagged and monitored throughout an aerial 1080 operation, and for two weeks afterwards. All of the 17 kaka and 15 kereru survived in the area treated with 1080.<sup>38</sup>



*Kereru*

Photo: Southstar

### Kaka

In total, 73 kaka have been radio-tagged and monitored through four 1080 drops. In two studies they were monitored for a year afterwards. Every single bird lived.<sup>39</sup>



*Kaka pair*

Photo: Jordan Kappely





# SEEING IS BELIEVING

## Stories from New Zealanders

**Maryann Ewers and Bill Rooke, owner operators, Bush and Beyond, and chair and secretary, Friends of Flora Inc**



Bush and Beyond is a guided walking business that has operated in Kahurangi National Park for 17 years.

"We are conservation based, and all trips have an emphasis on conservation issues in New Zealand. Our aim is to educate people on our fragile ecology and what we must do to save what is left.

After spending years working in the Kahurangi National Park, we have consistently seen the effects before and after a 1080 application, and have no doubts about the value of this method of pest eradication. We have witnessed time and again the return of birdsong within one breeding season after 1080 is used. We speak from experience - unlike many opponents of 1080, who base their opinions on media hype or self-interest.



Whio

Photo: Alan Reith

We help run a major conservation trapping project, plus one of our own. We are out to save our birdlife - we don't have any hidden self-agenda regarding 1080. We wouldn't be supporting it if we had any evidence it was killing the very birds we are trying to protect. We see aerial 1080 as the best method we have at this stage to protect our flora and fauna on a large scale like Kahurangi National Park."

**Read more about Maryann and Bill's work, including returning whio to the Flora catchment on [www.1080facts.co.nz](http://www.1080facts.co.nz)**

### **Daphne Climie GP and passionate conservationist**

Daphne arrived in New Zealand with her family in 1965 and simultaneously fell in love with the country and her future husband, Graeme. They shared many treasured conservation experiences here including finding female kakapo on Stewart Island with friends and taking them to grow up on Little Barrier Island.



"We helped with the first feeding supplement programme and fed both Wendy and Snark who are mainstays of the programme now.

Many common species that carpeted the forest floor in my tramping days of the '70s are now almost extinct, and our most spectacular native flower, the mistletoe, has been very rarely seen. But this summer I've been privileged to see it flowering in incredible profusion following an aerial 1080 programme in the Blue Mountains.

I've practiced medicine as a GP full time for 33 years. In four years' time I plan to retire to Stewart Island to concentrate on the smaller picture and the creatures with whom I share my world.

Our country is an aviary and, unbelievably, we've brought in mammalian predators. At the present time aerial 1080 combined with ground control is our only effective tool, and we must urgently continue with it to save our forests from inevitable death."



Kakapo chicks Photo: Dianne Mason

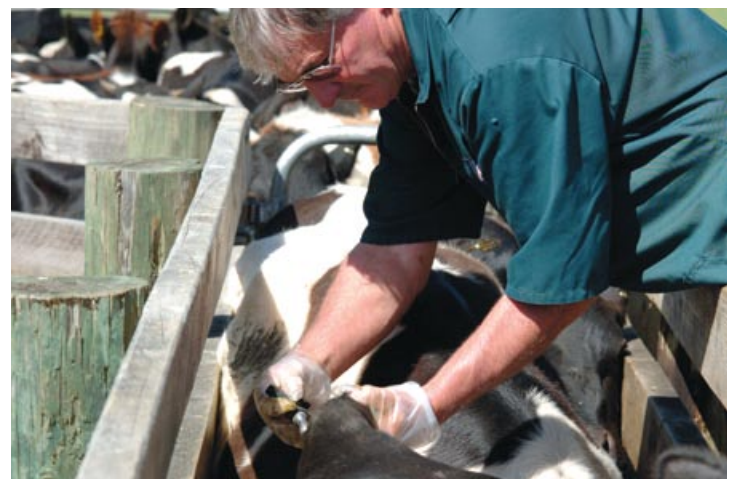
### **Don and Diane Bradley, farmers**

Farmers in Arnold Valley since they were married in 1971, Don and Diane Bradley have experienced first-hand the misery of having a TB-infected herd. Since the devastating first TB-positive test, they've lost 60 to 70 cows to the disease at an average of \$1200 a head. At its worst in 2006 the Bradleys' farm was placed on "high risk" status, meaning there was a complete restriction on all sales and movement of stock from their farm.

The Bradleys have worked with TBfree New Zealand since 2001 and are now TB-free.

"People don't really realise the stress and strain having TB puts you under unless they've been through it themselves. Now we just have to keep on our toes to make sure our herd isn't re-infected by possums or new livestock.

I just couldn't get my head around having to watch the young animals we had raised and got ready for production being sent out the gate and off to slaughter before they had even had a chance to work on the farm for us."



TB testing cattle

Photo: AHB

# ORGANISATIONS SUPPORTING THIS FACTSHEET



Department of Conservation  
*Te Papa Atawhai*



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For more information, or to support this project, contact:

The Pest Control Education Trust, P O Box 1362, Wellington  
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