

**ANNUAL REPORT
ON THE AERIAL USE OF 1080**

For the year ended 31 December 2015



Environmental
Protection Authority
Te Mana Rauhi Taiao



Cover photo: The South Island Robin is a key indicator of the benefit of the use of 1080 to protect species. Their rapid conspicuous recovery after 1080 operations is an indicator that, in the absence of pests, the native species can flourish. Photo by Herb Christophers, Department of Conservation.

ANNUAL REPORT ON THE AERIAL USE OF 1080

For the year ended 31 December 2015

ENVIRONMENTAL PROTECTION AUTHORITY
Te Mana Rauhi Taiao

Contents

Executive summary	4
Background	5
Organisations that use aerial application of 1080 for pest control	5
Application information	7
Aerial pest control operations	8
Post-operational reports	8
Communication	10
Monitoring	11
Incidents and public concerns	11
Incident summaries	13
Research	16

EXECUTIVE SUMMARY

1080 (sodium fluoroacetate) is used to control animal pests including possums, rabbits, stoats, and rats for conservation purposes, reducing the impacts on native animals and plants, and preventing the spread of bovine tuberculosis (TB).

It is one of the most closely monitored hazardous substances in New Zealand and the best form of pest control currently available to help protect native flora and fauna.¹

This report details the operations, covered land area, any incidents arising during those operations for the 2015 calendar year, and any research about 1080 up to July 2016. It is the ninth annual report of 1080 applications since controls on its aerial use (whereby aircraft are used to distribute bait) were tightened in 2007, and the eighth report to include data from those operations.

The 2015 aerial operations focussed on the protection of significant ecosystems, indigenous species and their habitats. This included at-risk populations of birds such as the parakeet, whio (blue duck), kea, mohua (yellowhead), kiwi, kokako, kaka, tui, kereru, and the long-tailed bat (pekapeka).

The targeted species were rabbits, possums, rodents, and wallabies.

In 2015 the Environmental Protection Authority (EPA) received a list of 56 proposed operations, and 45 final reports covering a total of 374,227 hectares. (This is the result of two operations being cancelled, and others merged.)

This number compares with 58 reports covering 967,012 hectares received in 2014. This larger area is almost three times that covered by 2015 operations. The reduction in area covered and number of operations in 2015 is primarily due to the one-off nature of the Battle for our Birds programme run by the Department of Conservation (DOC) during 2014, in response to a significant beech mast in the summer of 2013/14. Beech masts (high levels of seed production in our beech forests) lead to a rodent and stoat explosion that are a serious threat to our endangered native wildlife.

In 2015, there were six operator breaches of the Hazardous Substances and New Organisms (HSNO) Act – the same as in 2014. Most incidents were reported by operators and funding agencies rather than by members of the public or other agencies.

All breaches were investigated and no evidence of adverse effects on public and operators' health, waterways or land was reported.



Ray McMillan, Manager HS Compliance
Hazardous Substances and New Organisms Group

¹ Parliamentary Commissioner for the Environment, June 2011, *Evaluating the use of 1080: Predators, poisons and silent forests*; June 2013, *Update report on the original investigation, Evaluating the use of 1080: Predators, poisons and silent forests*.

BACKGROUND

A reassessment of 1080 for use in pest control was completed by the then Environmental Risk Management Authority (ERMA – known since 2011 as the EPA) in August 2007. A reassessment process found that the benefits of using 1080 outweighed the adverse effects. A decision was made to continue using 1080 with additional controls.

In reaching this decision, ERMA recognised the importance of engagement through better communication and consultation with the public, local communities, Māori, and special interest groups.

As a result, ERMA outlined a management regime for 1080 operations, which required operators to report on all aerial 1080 operations. ERMA and the EPA have since reported on the outcome of those operations.

Organisations that use aerial application of 1080 for pest control

Control of animal pests such as possums, wallabies, rabbits, rats, and stoats is done using ground-based and aerial application of poisons. Ground-based operations may include methods such as trapping, shooting, or placing various toxins in bait stations. The toxins, or vertebrate toxic agents, may include 1080.

Aerial application is considered by users of this method to be more efficient and effective, particularly over remote or rugged land. The organisations that apply 1080 aerially are:

- TBfree New Zealand
- Department of Conservation
- Regional/Unitary Councils
- Other land managers.

TBfree New Zealand

TBfree New Zealand (TBfree, a wholly-owned subsidiary of OSPRI New Zealand) is responsible for managing and implementing the National Pest Management Plan for Bovine Tuberculosis (TB Plan) in New Zealand, under the Biosecurity Act 1993.

The TB Plan was approved by the Government in 1998, then amended in 2004 and again in 2011. It provides for measures to control and eradicate TB in cattle and deer herds, and in wildlife populations that act as vectors and reservoirs for the disease. The plan operates in two ways:

Disease control – aiming to control and contain the spread of the disease within and between cattle and deer herds, leading to eradication of TB from herds.

Vector control – aiming to control and contain the wild animal species (in most cases possums) responsible for spreading the disease to cattle and deer.

TBfree uses a combination of ground-based methods and aerially applied 1080 in its strategy for containing and controlling possums. In 2015, TBfree treated 239,083 hectares of land using aerial application of 1080 (including a joint operation with DOC), which is about 64 percent of the total area covered in 2015.

Department of Conservation

New Zealand has many unique species of plants and animals which evolved without mammals being present. Many are vulnerable to introduced mammals such as possums, rats, stoats, and ferrets. These not only pose a serious threat to the survival of New Zealand's native species, they are also a major threat to the entire ecosystem through predation, browsing, and competition.

DOC manages approximately 8.75 million hectares of conservation land and a combination of ground-based methods and aerial application of 1080 to:

- improve the health of ecosystems by reducing the impact of browsing, competition, and predation by possums, rats, and other introduced pests
- protect threatened species from predators through direct control and secondary poisoning²
- control rabbits.

² Scavenging pests such as stoats are controlled by secondary poisoning when they feed on the dead or dying primary targets of 1080 operations (rodents and possums).

In 2015, DOC treated 103,820 hectares for possums or rats using aerial application of 1080; which is about 28 percent of the total area covered in 2015. This is a significant decrease compared with 2014, when DOC reported covering a total of 645,356 hectares due to the Battle for our Birds programme, undertaken to combat the beech mast-driven pest plague in 2014.

Regional/unitary councils

Under the Resource Management Act 1991, regional and unitary councils are responsible for maintaining indigenous biological diversity in their regions. They are also required to manage pests under the Biosecurity Act 1993. The councils achieve these responsibilities through:

- local regulation (for example, regional pest management plans)
- incentive and education schemes
- direct (regional council-managed) control.

Where councils directly control animal pests, they use a combination of ground-based methods and aerial application of 1080 to reduce the impact of browsing, competition, and predation by possums, and protect threatened species from other pests such as rabbits.

In 2015, councils reported aerially applying 1080 to 28,019 hectares of land, which is about 7.5 percent of the total covered area in 2015. These were joint operations between Auckland City Council, Waikato Regional Council, and DOC, covering a mix of private and public lands.

Other land managers

Farmers and land managers use a combination of aerial application of 1080 and other rabbit control methods like shooting and ground-laid poisons to reduce the environmental effects of rabbits. These pest control methods are used to meet the requirements of regional pest management plans, or to protect crops on individual farms.

In some areas referred to as rabbit-prone land, the rabbit population is not curbed sufficiently by natural mechanisms and numbers can increase quickly. An increase in numbers can cause environmental effects such as:

- a reduction in the diversity of plant species
- an increased risk of erosion³
- a reduction in soil quality
- adverse effects on indigenous and other fauna when predators of rabbits such as cats and mustelids target alternative prey (see footnote 3).

Large areas of the South Island are at risk from rabbits. Approximately 375,000 hectares of land are considered extremely rabbit prone, and about 630,000 hectares are considered highly rabbit prone. Most of this land is in Otago, Canterbury, and Marlborough.⁴ In 2015, 1080 was aerially applied for rabbit control over 2,515 hectares, similar to the 2014 figure.

Land managers such as foresters also use a combination of ground-based methods and aerial application of 1080 to reduce the impact of browsing by possums in indigenous and production forests.

Tumunui Trust funded an aerial 1080 operation in 2015 to cover 790 hectares within the Waikato region to protect and enhance the indigenous flora and fauna.

³ See www.ecan.govt.nz/advice/your-land/plant-animal-pests/managing-animal-pests/pages/rabbits.aspx.

⁴ Lough, RS, 2009. *The Current State of Rabbit Management in New Zealand*. MAF Biosecurity Contract Report, Wellington.

Application information

The pest management cycle for an area under sustained management can span several years. The management cycle could see parts of the larger area treated in rotation, some parts treated more frequently than others, or years with no treatment. For example, some parts of an area under sustained management may be treated by aerial application on a five to seven-year cycle, while other parts of the area may be covered annually by ground-based methods. Similarly, an area under sustained management to minimise the consequences of mast-driven pest plagues may be treated only infrequently, but individual treatments could occur close together. The annual treatment programme varies each year for each agency.

Table 1 shows treatment areas for different land managers from 2008 to 2015. Apart from 2014, it shows that the area of land treated by aerial application of 1080 has been comparable since 2008, when monitoring began.

On average, TBfree annually conducts aerial 1080 operations over a considerably larger total area; and applies more 1080 aerially than any other user. In most years, TBfree's treatment accounts for more than half of the total land treated with aerially applied 1080.

While TBfree is generally the largest user of 1080, the amount of land to which 1080 has been aerially applied over the past five years represents only 14 percent of TBfree's total pest control area of approximately 11 million hectares. This is because a significant proportion of the TB-related pest control area is on or near farmland, with aerial 1080 used mostly in remote fringe areas. The majority of TBfree aerial 1080 operations are largely on public conservation land (PCL) managed by DOC.

By comparison, a significant proportion of DOC's pest control occurs in more difficult forested terrain. However, only a small proportion of PCL is managed for small mammal pests by DOC; and not all of its pest control is carried out using 1080. For this reason, the proportion of DOC land managed with aerial 1080 is also small.

In the 2015 calendar year, DOC covered 1.2 percent of the total PCL using aerial 1080. In years without beech mast, the proportion of PCL managed for small mammal pest by DOC with all techniques is usually less than three percent, however this may rise to about 10 percent in beech mast years.

Table 1: History of treatment areas (thousands of hectares) for 1080 aerial applications

YEAR	NO. OF OPERATIONS	TBFREE	DOC	REGIONAL COUNCILS	PRIVATE LAND		TOTAL AREA
					RABBIT	POSSUM	
2008	75	425	107	5	14	13	564
2009	64	314	167	17	17	–	515
2010	45	254	171	5	9	–	439
2011	49	344 ⁵	127	5	10	5	491
2012	48	279 ⁶	136	5 ⁷	12	–	432
2013	57	298	126	16	7	–	448
2014	58	307	645 ⁸	12	2	–	967
2015	45	239 ⁹	104	28 ¹⁰	2 ¹¹	1 ¹²	374

A dash (–) indicates that no operations were reported. Figures are rounded to the nearest thousand hectares.

5 Includes combined TBfree and DOC operations of 31,500 hectares.

6 Includes combined TBfree and regional council operations of 27,084 hectares.

7 Includes combined council-led and DOC co-funded operations of 2,428 hectares.

8 Includes a joint TBfree and DOC operation of 5,629 hectares.

9 Includes TBfree and DOC co-funded operation of 5,617 hectares.

10 Includes public and private land for combined operations by Auckland Council, Waikato Regional Council and DOC.

11 Includes operation co-funded by a private landowner and DOC of 630 hectares.

12 Operation designed to control populations of wallabies, possums, mustelids and rats.

AERIAL PEST CONTROL OPERATIONS

Under the controls for 1080, operational managers are required to submit information after an aerial 1080 operation. The information must include:

- who undertook the operation and reasons for conducting the operation
- the 1080 formulations used and the application rates
- the location and size of the area covered during the operation
- monitoring information, including:
 - water monitoring, if carried out in conjunction with the operation
 - species monitoring, if carried out in conjunction with the operation
- an assessment of the operation's outcomes
- an overview of the communication activities (consultation and notification), and outcomes from that communication
- an overview of any incidents and complaints related to the operation, and actions resulting from those incidents and complaints
- a map of the operational area.

Individual post-operational reports are available on the EPA website: www.epa.govt.nz/about-us/monitoring/1080/1080-Watchlist/Pages/default.aspx?Archive=2015

Post-operational reports

Operation management

Most of the 374,227 hectares covered by aerial operations during 2015 was treated by TBfree (64 percent) and DOC (28 percent). The remaining area was treated by regional councils and other land managers.

The reported operations included:

- 23 funded by TBfree
- one jointly funded by DOC and TBfree
- eight funded by DOC
- two jointly funded by DOC and councils
- two funded by DOC and private land owners
- eight funded by other private land managers for rabbit control
- one funded by Tumunui Trust.

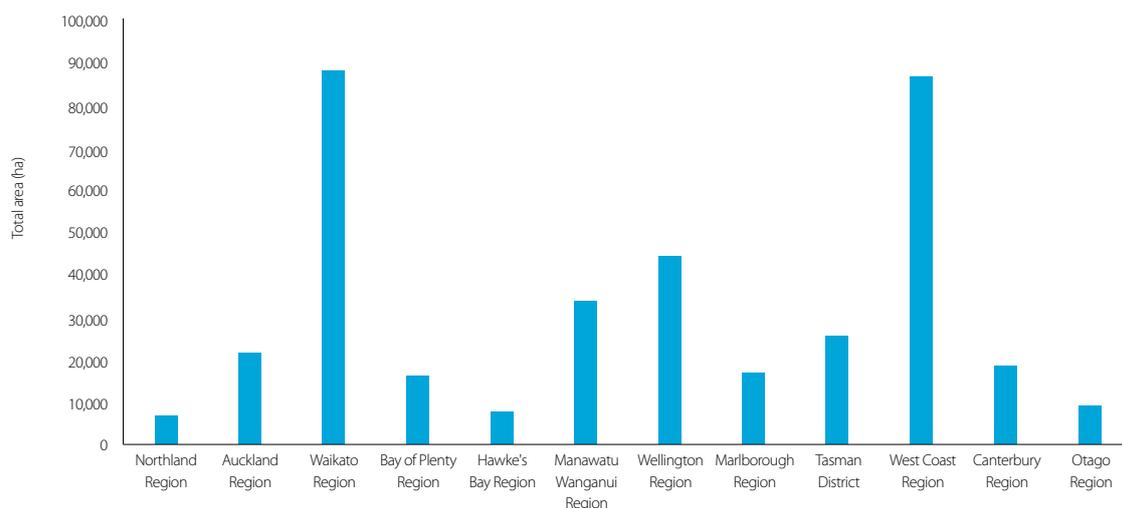
Formulations and application rates of 1080

All of the aerial operations to control possums, rodents, or both, used 1080-laced cereal baits with a 1080 concentration of 1.5 grams (just over ¼ teaspoon) per kilogram of bait. Cereal baits coated with deer repellent were used in nine of the 45 operations. Carrot baits were used in one operation to control wallabies, possums, mustelids and rats.

All reported rabbit control operations used carrot baits laced with 1080 at the concentration of 0.2 grams per kilogram of bait. The different concentrations of 1080 for rabbit and possum bait are due to the difference in toxin susceptibility between the species.

Bait application rates for possum and rodent control operations varied between 0.29 and 2.5 kilograms of bait per hectare (a hectare is roughly the size of a rugby pitch). Rates for rabbit control varied between 10 and 30 kilograms of bait per hectare. The difference in application rates reflects the variance in pest numbers and feeding patterns between target species.

Figure 1: Total area (in hectares) per region, for aerial applications of 1080 in 2015



Despite the differences in toxic concentrations and application rates, the average application rate of 1080 was slightly lower than in previous years for both rabbit and possum, and/or rodent control operations. The average application rate was approximately 0.26 grams of 1080 per hectare for possum control and 0.5 grams per hectare for rabbits. Both application rates are significantly below the maximum allowable rate of 30 grams of 1080 per hectare, set by the 2007 reassessment conditions.

Location of operations

The number of aerial 1080 operations in each region and the sectors using 1080 varies according to the purpose of the operation, topography, and land cover.

The regions with the largest number of aerial 1080 operations were Otago with 12; Waikato with nine; and the West Coast with six operations.

However, as the target for the operations differ, the area treated also differs. The Waikato is highly pastoral with most operations being for TB control. The West Coast has 37 percent coverage of indigenous forest, and aerial application of 1080 for possum control is considered a key tool in possum and rodent control programmes. In Otago, most of the aerial 1080 operations are carried out for rabbit control.

Size of operations

The total land area of 1080 aerial application in 2015 was 374,227 hectares. The average size of aerial application was 8,316 hectares, with the largest application covering just over 30,000 hectares and the smallest covering 60 hectares. DOC and TBfree carry out most of the aerial 1080 operations to control possums and other predators over larger tracts of land more efficiently than by using ground-based methods.

Bigger operations can increase the time for pest numbers to rebuild, as it takes longer for pests to migrate into the heart of treated areas.

The average size of aerial 1080 applications was about 11,100 hectares for DOC and about 10,000 hectares for TBfree. By comparison, the average size of aerial 1080 rabbit control operations by other land managers was about 200 hectares.

The graph above shows the total number of hectares per region treated aerially with 1080 in 2015. The largest area of application was in the Waikato Region, followed by the West Coast and Wellington regions.

Communication

Good communication can reduce public concern and result in fewer incidents. The EPA expects operators to carry out consultation with, and to notify neighbours, affected groups, and communities to an extent that is appropriate for each operation.

Consultation with iwi/Māori

The *Communications Guideline for Aerial 1080 Operations* (2009)¹³ states that Māori groups should be engaged as early as possible in the planning process when an aerial 1080 operation may be carried out on public land, or in an area where the public may be affected by the application. Māori should also be engaged in discussions, with the aim of establishing a good relationship with relevant hapū and iwi.

In 2015, Māori stakeholders were consulted in 29 out of 34 aerial operations on public land (85 percent). This is a slight decrease in Māori consultation compared with 2014 when 49 of 53 operations on public land involved consultation with Māori (92 percent). Changes as a result of consultation with Māori occurred in five operations, as listed below:

- removal of some areas from the aerial programme, and boundary changes for two operations
- financial support from several groups, including iwi, for two operations
- regular communication with iwi to ensure consultation needs were being met.

Consultation with hunting groups

Hunting groups are usually consulted when an aerial 1080 operation is to be carried out on public land where hunting could be affected. Early engagement with these groups is especially important in recreational hunting areas¹⁴ and where animals are commercially harvested for meat. Hunting groups were consulted in 88 percent (29 of 33) of the operations on public land in 2015. This is an increase from the rate of 83 percent reported in 2014. Hunting groups were notified via letters, emails, meetings and public notices.

Changes to operations as a result of consultation

In 2015, 27 post-operational reports identified one or more changes to the operational plan following consultation as listed below:

- Boundary changes were reported for 22 operations.
- Five operations had boundary changes due to the exclusion of sensitive sites (which can include areas like water supply, huts, and stock that may be at risk from accessing baits).
- The timing was changed for four operations to allow stock rotation or hunting.
- Eleven operations changed from aerial to ground application of 1080 for parts of the treatment area.
- Two operations added deer repellent.

Communications guideline for aerial 1080 operations

Operators must consult before applying for permission to use 1080, and provide evidence of consultation in their application. Before granting permission for an aerial 1080 operation, HSNO enforcement officers of Public Health Units (PHU) assess the consultation carried out against the *Communications Guideline for Aerial 1080 Operations*. The Ministry of Health (MoH) reports the results of these assessments to the EPA.

MoH reported that 53 of the 55 (96 percent) applications for permissions for aerial 1080 operations assessed against the communications guideline met the requirements in 2015. The remaining two required more consultation to meet the standard before permission was issued. One permission was not granted due to the operator not responding to requests for information, and one permission was revoked due to proposed changes to the operation's area and different baiting method. It was subsequently re-issued.

Not all of the 53 applications for 1080 operations assessed by the HSNO enforcement officers of PHU resulted in completed operations due to weather and other site-specific conditions.

¹³ Available on the EPA website: www.epa.govt.nz/Publications/ERMA-1080-Guidelines.pdf

¹⁴ The eight recreational hunting areas are North Pureora Conservation Park, Kaimanawa, Kaweka, Haurangi, Lake Sumner, Mt Oxford and Mt Thomas, Greenstone/Caples beside Lake Wakatipu, and the Blue Mountains.

Monitoring

Water monitoring

If an aerial 1080 operation is within the catchment of a drinking water supply, the local HSNO enforcement officers of the PHU may require water monitoring before intakes are reconnected. This ensures drinking water does not contain 1080 residues that breach the tolerable exposure limit (TEL) of 3.5 micrograms of 1080 per litre of water. The TEL is set at a level that protects human health and is based on the Provisional Maximum Acceptable Value (PMAV) in drinking water (*Drinking water Standards for New Zealand, 2005, revised 2008* MoH-set MAV 0.0035 mg 1080/ litre water).

Water monitoring may also be required in other water catchments as part of environmental monitoring for resource consents or for research purposes. It may also be used to provide evidence where PHUs are investigating concerns about alleged water contamination. The water testing can detect levels above 0.1 micrograms of 1080 per litre of water (0.1 parts per billion).

Post-operational water monitoring was carried out for 13 of the aerial 1080 operations in 2015, with 446 samples taken. None of the 446 samples contained 1080 above the level of detection and hence the TEL was not exceeded in any of the sampled operations.

Since the reassessment in 2007, more than 1,140 water samples from drinking water catchments and other water bodies have been analysed for 1080 (including the 2015 water samples). Of these samples, 15 were above the method detection limit of 0.1 parts per billion, and all were below the human health TEL. Operators and regulatory bodies are likely to continue to test water to verify that specific operations pose no risk to water supplies.

Species monitoring

Plant and animal species are monitored to determine the need for pest control operations and the success of operations. Species monitoring is not a mandatory requirement for 1080 operations, but where monitoring is carried out operators must report the results to the EPA.

Pre-operational monitoring of pest species was carried out for 10 (22 percent) of the aerial 1080 operations undertaken

in 2015. Eight were DOC operations, one was a council operation, and one was a TBfree operation.

Operators reported meeting or partly meeting their stated target for pest control in 22 operations.¹⁵

In 10 operations, species that benefit from 1080 applications were monitored for the effects of 1080. These species included kokako, tui, kaka, kereru, pekapeka, kakariki, local indigenous vegetation, domestic cattle and deer stock. This type of monitoring is generally carried out over several years so that trends can be identified in populations of native species following pest control operations.

Incidents and public concerns

The EPA is advised of complaints, incidents, and activities associated with 1080 use in three ways:

1. the public registering concern – when an individual contacts us to express concern about a particular 1080 operation or related practice
2. incident reporting – when an operator or agency contacts us to express concern about a particular 1080 operation or related practices
3. media monitoring – when we learn through our media monitoring service about incidents or concerns reported in the news.

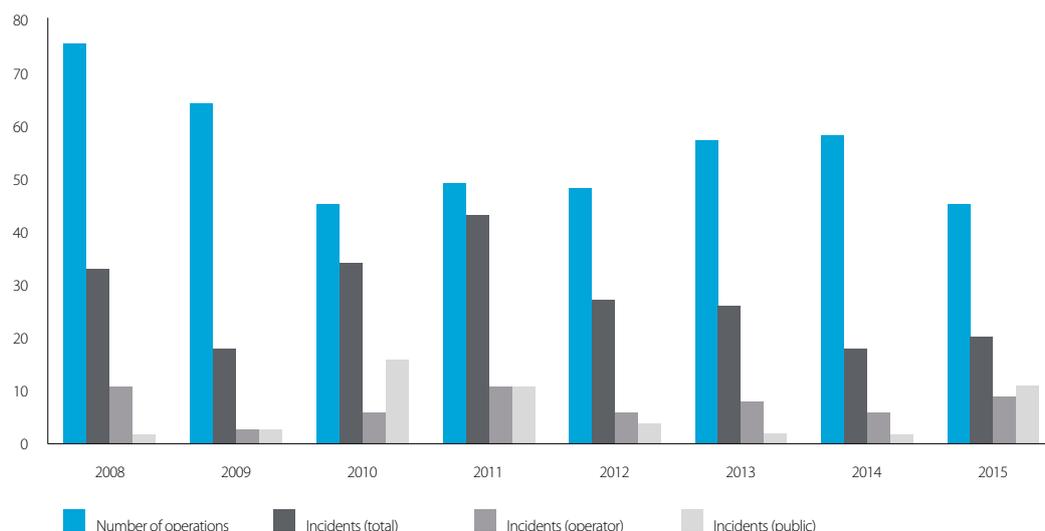
Incidents related to specific operations are described in post-operational reports. The reports for operations undertaken in 2015 are available on the EPA website: www.epa.govt.nz/about-us/monitoring/1080/1080-Watchlist/Pages/default.aspx

Industry practices, as well as available enforcement methods, have largely improved since 2008:

- Operators are now subject to greater accountability when conducting aerial 1080 operations.
- Permissions are granted through clearer conditions.
- Industry has developed standard operating procedures and better mapping of boundaries and exclusion zones.
- Enforcement and funding agencies have more resources for responding to public concerns.
- The majority of the complaints and incidents are now reported to the EPA by operators.

¹⁵ Target results vary according to monitoring method and are included in post-operation reports available on the EPA website: www.epa.govt.nz/about-us/monitoring/1080/1080-Watchlist/Pages/default.aspx?Archive=2015

Figure 2: History of incidents and public concerns reported to the EPA¹⁶



Overview of incidents and public concerns

Incidents involving 1080 are defined as any breach¹⁷ of HSNO conditions; any event resulting in an increased risk to public, worker, and environmental safety; and any event that causes significant public risk. The total number of reported incidents may include incidents that are not related to the hazardous substances legislation.

There were 20 incidents; breaches, objections or concerns reported to the EPA in 2015 (see Figure 2), nine of which were regarding the activities of operators; and 11 involved members of the public. The total number of incidents reported was greater than in 2014. Fifteen incidents were investigated. Two incidents relating to operator signage vandalism were not investigated.

Figure 2 shows a comparison between total number of operations per year and total reported incidents for the last eight reporting years.

The number of breaches by operators remains low. There were eleven breaches reported in 2008, three in 2009, six in 2010, twelve in 2011, five in 2012, eight in 2013, six in 2014, and six in 2015.

The West Coast and Waikato regions (the largest treated areas) presented the greatest number of incidents during 2015.

¹⁶ For some years, the total number of reported incidents and public concerns for specific operations may be greater than the combined breaches shown. Not all investigations revealed breaches.

¹⁷ A breach is a non-compliance with HSNO controls, RMA permit conditions, as well as any other legal requirement associated into a 1080 aerial-application operation.

Incident summaries

This section outlines a brief description of incidents reported to the EPA in 2015, including accidents, objections, concerns, and any compliance issues from operators or members of the public (by region, north to south).

NORTHLAND

There was one incident involving misapplication of the baits and water and land contamination.

OPERATION: WARAWARA

Type: Operator breach of the treatment block boundary

Date occurred: 15 October 2015

The treatment block boundary line was misread by the pilot. The incident happened at 13:00 hrs approximately. On Friday 16 October, the boundary breach area on the Panguru side was visited by DOC. Baits were found on the river bed and in the river. Those in the water were soft and dissolving.

The location of each bait was recorded via GPS before they were collected and removed from the area.

AUCKLAND

There were two reported incidents of vandalism

OPERATION: HUNUA RANGES AERIAL PEST CONTROL

Type: Vandalism

Date occurred: 21 August 2015

Sign vandalism occurred mostly through people writing anti-1080 messages over the content. In some instances this resulted in important safety information being covered up. Vandalised or removed signs were replaced as reported or identified through the maintenance programme.

Type: Vandalism

Date occurred: 30 September 2015

The council received a report of a person dumping a possum from a sack onto Moumoukai Road. The possum was collected and disposed of within the operational area. It was unclear where this possum had come from or the motive for dumping it. The incident was reported to the NZ Police.

WAIKATO

There were two alleged non-compliance issues incidents, two by-kills and one vandalism incident.

OPERATION: TUMUNUI

Type: Alleged non-compliance

Date occurred: 13 August 2015

Landholder contacted DOC to say they had not been contacted about control operation. They had been contacted three times prior to aerial operation occurring.

Type: Stock death

Date occurred: 27 August 2015

Alleged sheep deaths associated with aerial control were reported, although no fallen stock had been seen and this was not quantifiable. The landholder reported he had not received enough prior knowledge of the drop. Records show this information had been relayed 23 days prior to toxic bait application.

OPERATION: WAITOMO1A, TE HAPE WAIATARA AS1, WAIMIHA AS2, HAUHUNGAROA STG2 AS1 T WEST

Type: Non-compliance / Accident

Date occurred: 21 August 2015

Eighteen baits were found by contractor staff within one of the transit zones. These were removed, and all transit zones were re-checked the following day. No baits were found in any of the other zones.

OPERATION: TURANGI 2B AND MT PIHANGA

Type: Dog deaths

Date occurred: 15 September 2015

A dog broke off its chain and wandered into the treatment area and ate a dead possum. The dog was treated by a veterinarian, but later died.

OPERATION: SOUTHERN COROMANDEL

Type: Vandalism**Date occurred:** 16 September 2015

1080 pellets appear to have been illegally tampered with. The positioning of the bait was not consistent with the spread of bait achieved in a 2kg/ha 1080 aerial operation. Threats were also made against DOC in regards to this operation. Subsequently, the NZ Police, the Medical Officer of Health and the Waikato Regional Council were notified and the incident was investigated, but no evidence was found other than a reference via social media.

BAY OF PLENTY*There was one report of Public objection.*

**OPERATION: WHIRINAKI RATA,
WHIRINAKI RIVER WHIO**

Type: Objection**Date occurred:** 18 September 2015

An information day was held at Murupara. Approximately 50 people attended the day and most were opposed to the operation. Protesters made a peaceful protest.

HAWKE'S BAY*There was one incident related to operation warning signage.*

OPERATION: TIMAHANGA AERIAL PROJECT

Type: Warning signs**Date occurred:** 14 September 2015

A hunter entered the Timahanga North operation area and didn't see any warning signs or any information on his hunting permit / pesticide summary about 1080 being present. He found bait and left the area. Further along the boundary of the operational area, he found a poison sign. The contractor replaced signs and erected new signs where original signs had been vandalised. Extra signs were also placed at recommended sites.

WELLINGTON*There were two incidents related to non-compliance issues.*

OPERATION: EASTERN TARARUA AERIAL

Type: Operator breach of HSNO controls**Date occurred:** 30 November 2015

Bait was found in open waterway.

Type: Non-HSNO breach**Date occurred:** 03 December 2015

The boundaries of the treatment area for this project – one approved by Regional Public Health under the HSNO Act, another by Greater Wellington Regional Council under the RMA, differed in size. The area approved under HSNO was slightly larger than the other.

Approximately four hectares of private land were treated by an accidental helicopter overfly of the area.

The overfly breached the limits imposed by the RMA permit, but it occurred within the approved boundary under HSNO.

WEST COAST

There were five incidents related to public objection and protesting.

OPERATION: BULLER NORTH

Type: Public objection

Date occurred: 31 March 2015

A member of the public reported that an aerial spray flight had passed over the Solid Energy Cypress mine. The boundaries were checked and found to have been flown as agreed with Solid Energy. The company resolved the issue internally.

Type: Public objection

Date occurred: 31 March 2015

A member of the public complained that the aircraft was applying bait outside of the block into a water supply exclusion. Flight paths were downloaded and sent to the area Public Health Unit. These showed the aircraft was inside the block at all times.

Type: Anonymous activity

Date occurred: 01 April 2015

The loading site was trespassed via the bush. The trespasser was approached by security.

Type: Anonymous activity

Date occurred: 13 April 2015

Photographs of bait removed from the operational area were posted on social media. The removal of bait was reported to the Police.

OPERATION: WAIMEA KAWHAKA

Type: Anonymous activity

Date occurred: 17 November 2015

Warning signs and wooden stakes were removed. These were replaced during the weekly sign-check while baits were still toxic.

Type: Anonymous activity

Date occurred: 20 November 2015

As above.

CANTERBURY

There were two reports of bait misapplication.

OPERATION: POULTER VALLEY

Type: Misapplication

Date occurred: 18 February 2015

Approximately 400 kg of 12 g baits were loaded into the bucket hopper instead of 6 g baits and used for this operation at Lake Sumner Conservation areas (see below). The Health Protection Officer who assessed the incident and reported it to the EPA, said the final concentration of 1080 was the same across both bait sizes.

OPERATION: HURUNUI LAKE SUMNER FOREST PARK
– SOUTH BRANCH HURUNUI

Type: Misapplication

Date occurred: 18 February 2015

Same description as above.

RESEARCH

Following the release of the decision on the reassessment of 1080 by ERMA in 2007, the need for more research into alternative methods of pest control was stressed and government support was sought to develop a research programme.

This section summarises research on 1080 up to July 2016. There are three distinct areas:

- investigate alternatives to 1080
- improvements in the current use of 1080
- other research related to 1080 use.

A number of projects are ongoing, as extensive data collection and analysis are necessary to deliver well-informed conclusions. The research has been funded and/or carried out by DOC, TBfree NZ, Connovation Ltd., LandCare Research and the Ministry for Business, Innovation and Employment (MBIE).

Alternatives to the use of 1080

One final update of a research project considering new toxins was received. The research has been seeking to extend the utility¹⁸ of PAPP (para-aminopropiophenone) and other new predator control products; including toxins, baits, lures and delivery systems and methods. This project ended in September 2015. The generated results will support the registration of new toxins and delivery methods for animal pest control. However, these have not yet been published.

Laboratory trials were undertaken on the rat-selective toxin norbormide and a paper on the research was published (Jay-Smith M. et al. 2016. *Stereoselective synthesis of the rat selective toxicant norbormide*. Tetrahedron 72(35)).

Improvements in the use of 1080

Three updates were received in relation to research studies looking for different strategies in order to optimise cost-effectiveness in the use of 1080 baits and their delivery methods. Two of these projects are now finalised and one field study assessing the optimal size for cereal pellet baits had its last data collection season between June and September 2016.

Projects aiming to improve strategies for achieving multi-pest control have also reported their updates. Three projects have been completed and two are still ongoing. Of the finalised projects; one focused on pest repopulation and the effect of non-toxic pre-feeding, another project assessed the efficacy of a thermogenic encapsulated additive in pellet bait, in terms of its acceptance by rats and possums. The third project tried to determine the feasibility and cost of commercially manufacturing cereal 1080 bait with an encapsulated additive.

The ongoing projects focus on the effects of beech mast events on pest populations and are still in the data collection phase.

A number of other projects focused their efforts in trying to determine the ecological consequences of mast events; the aerial application of 1080; and the use of bird repellents on native bird populations where data was collected through bird counts, nesting success and survival assessments. Three out of the 11 projects that we received updates on have been completed. A number of publications in peer-reviewed journals have been produced in this area (references available in the extended version of this summary).

¹⁸ Utility in this context refers to increasing the operational attractiveness of the bait over VTAs currently in use, by increasing scope of use and cost effectiveness.

Other 1080 research

One project studying the change in the population of long-tailed bats after a mast event, with and without 1080 aerially applied, has been finalised but too few bats were caught to be able to usefully report on the effect of 1080 in bats.

Three research studies focused on different strategic aspects of the 1080 aerial application process, aiming to achieve high possum mortality and maintaining low densities of rats and possums. One project has been finished but a final paper is yet to be submitted, and the other two were finished during 2016.

New research

Alternatives to the use of 1080

No new research projects have been identified.

Research on alternative toxins

No new research projects have been identified.

Improvements in the use of 1080

No new research projects have been identified.

Other research

No new research projects have been identified.

For more information about these research projects, see:

TBfree New Zealand / Animal Health Board:
<http://tbfree.org.nz>

Department of Conservation: www.DOC.govt.nz/publications/science-and-technical/products/series/DOC-research-and-development-series/archive/

Connovation Ltd: www.connovation.co.nz/

Landcare Research: www.landcareresearch.co.nz/publications/newsletters/possnews/

Level 10, 215 Lambton Quay
Wellington 6011, New Zealand
Phone +64 4 916 2426
Fax +64 914 0433

www.epa.govt.nz

ISSN 1174-9873 (Online)
EPA00xx

New Zealand Government