

1080 as a tool for predator control

FREQUENTLY ASKED QUESTIONS



Department of
Conservation
Te Papa Atawhai



Front cover: Wairēinga/Bridal Veil Falls, Waikato.

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What is 1080?

1080 is the common name for a biodegradable bait pellet the Department of Conservation Te Papa Atawhai (DOC) and other organisations use to control rats, stoats and possums on public conservation land.



1080 bait pellets. *Photo: DOC*

Although we call it 1080, the toxic ingredient in the bait is sodium fluoroacetate.

Fluoroacetate is a naturally occurring toxin that is found in several poisonous plants around the world and provides some defence against mammals. 1080 bait contains a synthetic salt form of this toxin.

Sodium fluoroacetate is poisonous to mammals. This makes it an effective toxin for predator control in Aotearoa New Zealand, as the only native land mammals here are bats, which do not eat the bait pellets.

Manufacturers add sodium fluoroacetate to cereal bait pellets.

These biodegradable bait pellets are designed to attract rats and possums and deter native species. Stoats are also controlled, as they eat the carcasses of poisoned rats.

The bait pellets are made up of:

- sodium fluoroacetate (0.15% of each pellet)
- cereal
- sugar
- cinnamon flavour (to mask the smell of 1080 and attract predators)
- green dye (to deter birds).



1080 bait pellet. Photo: Anthony Behrens

Did you know?

Fluoroacetate was nicknamed 1080 by the US Fish and Wildlife Service in 1944 after its laboratory catalogue number.

Why does DOC use 1080?

1080 is the most effective and safest tool we have for controlling introduced predators and protecting threatened native species across large areas.

New Zealand's native plants and animals evolved over 80 million years without mammalian predators and browsers. This left them defenceless and extremely vulnerable when people introduced predators such as rats, stoats and possums.

Combined with other factors, such as habitat loss, introduced predators have contributed to more than 50 native bird species becoming extinct, along with some plants, frogs, reptiles and bats.



Juvenile tīeke/saddleback.

Photo: Leon Berard, leonberardphotography.co.nz



Douglas Range. Photo: Stefan and Kathrin Marks

Introduced predators kill an estimated 25 million native birds in New Zealand's forests every year. However, when 1080 is used to control introduced predators, populations of native birds, insects, plants, bats, frogs and reptiles have a much better chance of survival. Overall, when predators are under control, there are proven benefits for entire ecosystems.

If we didn't use 1080, many populations of native species would rapidly decline, as would the health of native forests. Some native animal populations would go extinct in just two human generations.

Many of New Zealand's wild places are steep, inaccessible and covered in thick forest. In these areas, it isn't safe or effective to use ground control tools such as traps and bait stations on their own. Trap lines would have to be cut and regularly maintained across huge landscapes with unsafe terrain, putting people at risk.

1080 bait pellets can be applied safely and accurately by helicopters to control up to 100% of predators across large forests and other designated areas. We aim to cover all parts of a given treatment area to prevent pockets of predators from surviving and repopulating the surrounding areas.



1080 operation helicopter. *Photo: DOC*

1080 protects native species from predator plagues.

Rat and stoat numbers can rapidly increase in years when the weather patterns cause trees to produce large amounts of fruits and seeds across the country. This period of heavy seeding in forests is called a mast.

In a mast year, when there is plenty of food available, rats can have litters of up to 14 pups five times a year. When the seeds run out, the rats switch to eating native wildlife. Stoats also increase after beech masts as they feed on rodents and then switch to native birds.

These heavy seeding events once benefited native species due to the higher availability of food. However, they have been hijacked

by predators, and uncontrolled mast events have led to local extinctions of some native birds.

The aerial application of 1080 bait pellets is the only method that can effectively control soaring rat numbers before they reach plague levels.

1080 is biodegradable.

1080 bait is broken down naturally into harmless compounds by microorganisms, fungi and plants and doesn't leave permanent residues in soil, water, plants or animals. Therefore, it doesn't damage the health-giving properties of plants or make forests or the wider environment unsafe.

How effective is 1080?

1080 bait is very attractive to introduced predators and can reduce predator numbers to undetectable levels.

1080 bait targets rats and possums, while stoats are controlled through scavenging on poisoned carcasses. On average, each predator control operation removes 95–100% of rats and 90–100% of possums and stoats. Operations need to be repeated as predator numbers recover over time.

Decades of monitoring and research have shown that one aerial 1080 operation every 2–3 years on average can keep the number of predators low enough for native species to survive and breed and for their populations to increase. Operations may be needed more often in some situations to protect highly endangered species or when forest masts occur more frequently.



Nest predation.
Photo: John Innes

Did you know?

Without predator control, only 5% of North Island brown kiwi chicks make it to breeding age (4 years old), but with effective predator control, which includes the use of 1080 and ground control tools, 60% of chicks can survive to this age, after which they are better able to fight off predators.

What happens to 1080 in the environment?

I 1080 breaks down rapidly in the environment.

1080 doesn't accumulate in the environment or remain in the food chain. It is biodegraded or broken down by microorganisms in the soil and it dilutes to harmless levels in waterways.

It also doesn't build up in insects, aquatic life or plants, and it doesn't damage the health-giving properties of plants or forests or make them unsafe.

1080 breaks down in the following ways.

1. 1080 is rapidly diluted in water and is almost always undetectable after 24 hours.

Any uneaten bait pellets become soft from rain or dew. This allows the 1080 to leach out into leaf litter and soil, where it is diluted further.

If there's a lot of rain, 1080 dilutes rapidly to undetectable amounts in groundwater and streams. The amounts are so small that they have no toxic effects on land animals or aquatic wildlife.

2. Any remaining traces are broken down in the soil.

Any remaining traces of 1080 are broken down into non-toxic components by bacteria and fungi in the soil.

Once 1080 has biodegraded, all that remains in the soil are natural compounds and minerals, including glycolate, fluoride and carbon, at levels that are normally found in the environment.

Is there support for the use of 1080?

The use of 1080 is supported through extensive research by independent scientists and other experts.

The Environmental Protection Authority has approved the use of 1080 as a tool for predator control in New Zealand.

All 1080 predator control operations require permission from the Ministry of Health, and DOC consults and/or partners with the relevant rūnanga, hapū and/or iwi for each operation.

Many conservation groups and organisations endorse the use of 1080, including Forest & Bird, Federated Farmers, OSPRI, the World Wildlife Foundation (WWF), the Environmental Protection Authority and the Ministry of Health.

There is also widespread support from community conservation groups because 1080 operations bolster their efforts to protect native species through the use of bait stations and trapping networks.



Southern rātā.
Photo: Baptiste Maryns

Did you know?

In 2011, the independent Parliamentary Commissioner for the Environment conducted a review of the use of 1080. The report assessed 1080 for its effectiveness, safety and humaneness and found that not only should we continue to use 1080 to protect our forests, but we should use more of it.

Does 1080 affect human health?

There have been no recorded cases of aerial 1080 operations causing harm to human health.

The tight regulations around the use of 1080 mean that people should not come into contact with it and drinking water supplies are safe.

1080 is not a hormone or endocrine-disrupting chemical and is highly unlikely to cause cancer.

The same chemical that is used in 1080 pellets to kill pests (fluoroacetate) is also found in tea and pūhā in tiny amounts. Several other plants also naturally produce this toxic chemical to prevent them from being eaten by animals.

Before we can use 1080 for any operation, DOC has to apply for a consent from the local public health unit (PHU) of the Ministry of Health. Once granted, the PHU consent may contain conditions to mitigate risks to human health, such as excluding public water catchment areas or requiring water testing.

Does 1080 poison native animals?

1080 can be used to control introduced predators without impacting most native species.

New Zealand is an unusual country in that, aside from bats, there are no native land mammals here.

1080 is far less toxic to birds than mammals, but some of our native birds are susceptible to it, including weka, robins, tomtits, takahē and kea.

Measures such as applying less bait and making bait pellets less attractive to birds by dyeing them green and using cinnamon (which attracts rats and possums but deters birds) are all helping to significantly reduce the risk to native birds.

Monitoring has shown that the small number of birds that are affected is far outweighed by the population gains for their species and the overall benefits to ecosystems. The breeding success and numbers of many native species increase significantly in areas where 1080 is regularly used to control predators.



Kākāriki karaka/
orange-fronted parakeet.
Photo: Sabine Bernert

Did you know?

Rats and stoats have destroyed entire populations of kākāriki karaka in areas that haven't been treated with 1080. However, a combination of aerial 1080, traps and bait stations is helping some populations to recover, including in the Hawdon and Hurunui South Branch valleys in Canterbury.

Does 1080 affect drinking water?

1080 operations have never contaminated drinking water in New Zealand.

Comprehensive regulations and practices are in place to prevent 1080 from contaminating drinking water and affecting the water quality of streams and rivers.

To ensure that our drinking water is always safe, the Ministry of Health has set a stringent guideline that 1080 can only be present at levels below 2 parts per billion (ppb). This is equivalent to about three pin heads on a football field.

At these extremely low levels, an adult weighing 70 kg would have to drink 70,000 litres (or 230 baths full) of contaminated water in one go to receive a fatal dose. No tests of drinking water after 1080 operations have ever come close to this limit.

For more information about 1080 and drinking water, visit doc.govt.nz/1080-and-tap-water.



Upper Nihotupu Reservoir.
Photo: Brendan Bombaci

Did you know?

More than 2000 samples of water used for human drinking supplies were tested between 1990 and 2023, and only 4 of these contained traces of 1080 at concentrations of 0.1 to 0.2 ppb. These are extremely low levels that pose no risk to human health.

How have aerial 1080 operations changed over time?

Early predator control operations didn't have access to the extensive research and technological advancements we have today.

Modern 1080 operations are much safer and more effective than they were in the past. Unfortunately, old stories continue to circulate, creating a false picture of today's conservation efforts.

In operations conducted by the New Zealand Forest Service in the 1960s and 70s:

- cubed carrots were sprayed with 1080, which often left bait fragments or 'chaff'
- large quantities of bait were used at application rates of up to 32 kg per hectare
- baits were spread more widely and less accurately from light aircraft
- in some cases, these factors led to higher rates of poisoning in non-target species.

In modern-day operations:

- the use of 1080 is very carefully managed and is strictly regulated and monitored by independent authorities
- we use cereal bait pellets that do not break up into small fragments
- bait pellets are dyed green and scented with a cinnamon lure to deter birds and attract possums and rats

- the quantity of bait pellets has been reduced to just 1–3 kg per hectare for most operations – this is an average of 4–6 bait pellets applied in an area about the size of a tennis court
- helicopters distribute the bait pellets using GPS technology to enable very accurate and consistent placement, and flight paths are reviewed immediately after landing.



1080 operation helicopter. *Photo: DOC*

Did you know?

The above improvements, in conjunction with improved consultation with communities, has massively reduced the risk of poisoning in non-target species such as farm animals, dogs and native birds.

Is it ethical to poison predators?



Stoat with chick.
Photo: David Hallet

Introduced predators kill an estimated 25 million native birds in New Zealand each year.

Some 4000 native species are threatened or at risk of extinction, meaning that New Zealand has one of the highest proportions of threatened species in the world.

DOC's responsibility is to protect native species, not rats, stoats and possums, which are native to other countries and a primary threat to New Zealand's native species.

We face a choice: leave pests unchecked and have silent, bare forests, or control predators and help native species to survive.

While we have clear goals to control and eradicate mammalian predators in New Zealand, we need to do this in a way that is as humane and effective as possible.

Choosing any tool for predator control raises ethical issues, and it's understandable that some people may be concerned about controlling introduced predators with toxins.

As we make progress towards eradicating rats, stoats and possums to achieve Predator Free 2050, the need for ongoing predator control will be reduced.

Learn more about Predator Free 2050 at doc.govt.nz/pf2050.

Is there an alternative to 1080?

At present, there are no practical alternatives to using aerially applied 1080 bait pellets for predator control over large landscapes and rugged terrain.

In accessible areas, traps and bait stations are often used in addition to aerial operations. However, these ground control tools are unable to effectively protect vast, remote areas.

Right now, 1080 is needed to protect our native species. If we were to stop and wait for an alternative, progress would be lost and many native species would face a grim future. Some native species populations would become extinct in just two human generations and overall forest health would decline.

The Predator Free 2050 Tools to Market Programme is investing in the accelerated development of new and existing predator control tools and technology.

For more information, visit doc.govt.nz/tools-to-market.



Kererū. Photo: © Janice McKenna

How does 1080 affect dogs?

I Dogs are highly susceptible to 1080 poisoning.

As scavengers, dogs are at greater risk of 1080 poisoning than other domestic animals – and when dogs eat bait pellets or the carcasses of poisoned rats, stoats or possums, the outcome is usually fatal.

To keep dogs safe, they should be kept away from predator control areas until the poisoned carcasses have disintegrated. This usually takes 4 to 8 months from when 1080 is distributed.

Information about the precautions we put in place and how dog owners can work with us to keep dogs safe during predator control operations can be found at doc.govt.nz/1080-and-dogs.

Did you know?

DOC takes many steps to prevent dogs from being harmed by 1080, including erecting warning signs and sending out public alerts when predator control operations are being planned. Farmers are offered muzzles to help prevent farm dogs from eating poisoned animals, as well as emetic pills to induce vomiting in an emergency.



Pru, rodent detection dog.
Photo: Adeline Bosman, DOC

How does 1080 affect game animals and hunting activities?

Deer, goats, pigs and other introduced game animals are susceptible to 1080 poisoning, but 1080 is not used to control their populations.

We recognise the value of hunting in New Zealand, and we work with hunting groups to understand the impacts of our predator control operations.

Following each operation, there is a caution period during which hunters are advised not to take meat from the operational area. However, there are always alternative areas of public conservation land open to hunters during that time.

Detailed maps and updates for predator control operations across the country are available at doc.govt.nz/pesticide-summaries.



Pirita/suplejack.
Photo: DOC

Did you know?

Local observations suggest that pig populations rebound quickly following predator control operations and can increase in size because the reduction in possums means that pigs have more food (eg berries). As with other animals, if pigs eat 1080 bait pellets and don't die, the 1080 is quickly broken down and excreted within days.

Does 1080 affect invertebrates and fish?



*Powelliphanta snail.
Photo: Jeremy Rolfe*

1080 has no known impacts on invertebrates or fish.

1080 has had no detectable effects on any of the invertebrate populations monitored during nine aerial operations, and there is no evidence that poisoned invertebrates are an important cause of secondary poisoning in other animals. But aerial treatments have brought substantial benefits to populations of threatened land snails.

Similarly, 1080 in water doesn't affect the adults or larvae of invertebrates such as caddisflies, mayflies, midges and kōura/freshwater crayfish. Nor does it affect native fish (including eels) or introduced trout, which are not attracted to 1080 pellets. Therefore, it is safe to eat kōura and fish from within predator control areas.

For more information, visit doc.govt.nz/1080-and-trout.

Does 1080 affect bees?



Honey bee.
Photo: Jeremy Rolfe

The use of 1080 poses a very low risk to honeybees and honey products.

Where there is sufficient food available, honeybees from healthy, unstressed hives are unlikely to be attracted to 1080 bait pellets. Furthermore, honeybees are only likely to encounter large quantities of 1080 bait while it is concentrated in one location (eg at a loading site), rather than from individual pellets distributed over a wide area.

While it is very rare, honeybees might show an interest in 1080 bait pellets under certain conditions. If honeybees are foraging for protein at a time when there is a lack of pollen in the environment and poor weather, they may be attracted to 1080 bait pellets, and this can be fatal for them.

Although 1080 operations pose a very low risk to honeybees and honey products, beekeepers are encouraged to assess factors such as food availability that may affect the risk to their hives. Beekeepers are also best placed to make decisions about the location of their hives in relation to 1080 operations.

Before a 1080 operation, we consult with landowners, occupiers and concessionaires within and adjacent to the operational area and bait loading site. We ask about any beekeeping activity and ensure that beekeepers are informed about the operation. We then provide information about the research and best practices relating to honeybees and 1080.

To learn more about 1080 and bees, visit doc.govt.nz/1080-and-bees.

How is 1080 regulated and reported on?

Several government agencies oversee the use of 1080 in New Zealand to ensure that it is safe and effective, including the Environmental Protection Authority and the Ministry of Health.

There are regulations for health and safety, community consultation, animal welfare, bait manufacturing, and other practices.

We welcome rigorous, independent assessments of our systems and processes. You can find official information about the work we do on the DOC website. Visit:

- doc.govt.nz/pesticide-summaries
for information on all current pest control operations
- doc.govt.nz/1080results
for regular updates on the results of 1080 operations
- doc.govt.nz/predator-control-programme
for the results of DOC's National Predator Control Programme in 2022
- epa.govt.nz/resources-and-publications/1080-aerial-operators-reports
for the Environmental Protection Authority's annual reports on the use of 1080
- doc.govt.nz/oia-responses
for Official Information Act responses that have been published after being deemed of high public interest.



Piwauwau/rock wren. Photo: © James Reardon, jamesreardon.org

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For further information on recent research,
visit doc.govt.nz/1080-research-and-references.





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