

# HOW 1080 BREAKS DOWN IN SOIL AND WATER

1080 does not remain or accumulate in soil and water due to dilution and biodegrading naturally.

## CONTROLLING POSSUMS WITH 1080

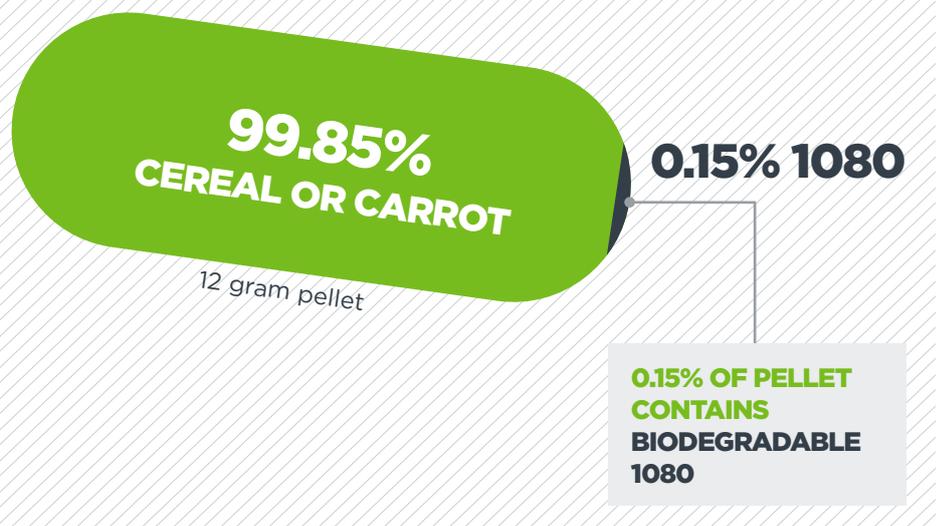
In New Zealand, possums are the main carrier and spreader of bovine TB to livestock. Once in a herd, the disease can spread within and to other herds. TB in cattle and deer herds can impact meat and dairy production which affects farmers' income and the willingness of export markets to buy New Zealand products.

Controlling pests is vital to eradicate TB from New Zealand. Possums are responsible for around half of all new herd infections, with the others due to stock movement. If we reduce possum numbers to below two possums per ten hectares for a number of years, the disease will eventually die out. Possum control has dramatically reduced the number of infected herds in New Zealand.

Depending on the area, OSPRI's TBfree programme does ground-based control with traps and baits or aerial control using sodium fluoroacetate (1080). Aerial control is much more suitable in large, difficult to reach areas with rugged terrain and is often more cost effective than ground control.



### MINIMAL AMOUNTS OF 1080 IN BAIT





1080 is aerially applied using strict quality control and safety systems. GPS technology ensures accurate bait placement and audits are completed to make sure that OSPRI's high standards are met. Consent from landowners and local authorities is required prior to an operation. The public are also consulted before every operation.

## WHAT'S IN 1080 BAIT?

Cereal pellet baits are used in most operations, but chopped carrot may still be used in some cases. The baits typically weigh 12 grams each, are dyed green and contain 0.15% biodegradable 1080 - the remaining 99.85% is ground cereal, flavouring and binding agents.

Research has allowed for dramatic improvements to the way we use 1080. Around two weeks before 1080 bait is aerially dropped, non-toxic bait is now dropped over the site. Possums are creatures of routine and this 'pre-feed' helps overcome their bait shyness. This increases the operation's effectiveness, so less toxic baits are needed. Sow rates have decreased from 30kg per hectare in 1970 to around 2kg or less per hectare today. That's only about five baits for an area the size of a tennis court.

### WATER SAMPLES TAKEN AFTER AERIAL OPERATIONS 2007-2015

3%

WATER SAMPLES HAD LESS THAN 0.1-9 PARTS PER BILLION

97%  
WATER SAMPLES WITH NO 1080



## MONITORING WATER AFTER AERIAL CONTROL

Water is routinely monitored after aerial 1080 operations. Samples are collected from waterways, especially those used for drinking water supply, in the two days after the application of toxic baits. Since 2007, there has been a requirement for operators to report results of such monitoring to the Environment Protection Authority.

The Ministry of Health has set the maximum acceptable value for 1080 in water at 3.5 parts per billion. This concentration is not considered to cause any significant health risk to anyone that drinks that water for a lifetime (taken as 70 years). As a precautionary measure, the Ministry of Health also recommends that water taken from catchments sown with 1080 baits should not be used for human supply until tests show that the concentration of 1080 is below 2 parts per billion, almost half the accepted value.

Laboratory analysis can detect 1080 in water at concentrations as low as 0.1 parts per billion. From 1990 to February 2015, 3271 water samples taken after aerial operations have been tested for 1080. There was no detectable 1080 in 97% of these samples. Concentrations of 1080 in the remaining 3% ranged from

0.1 to 9 parts per billion. The only two samples with over 3.5 parts per billion were recorded in 1998 and 1999. Of the total samples, 1095 were taken from waterways used as human or stock drinking supply – only four of these contained detectable 1080 residues at 0.1 to 0.2 parts per billion. So no tests of drinking water have exceeded the Ministry of Health's precautionary value of 2 parts per billion.

The water monitoring data shows that contamination of water by 1080 occurs infrequently, and when it does the concentrations are low and temporary. This is supported by results of laboratory and field-based research which together demonstrate that dilution and biodegradation operate together to greatly reduce the concentration of 1080 as soon as it enters natural waterways.

## HOW 1080 DILUTES AND BIODEGRADES IN WATER

Chemically, 1080 is highly soluble in water so dilutes readily. In a large body of water, especially if that water is flowing, the amount of 1080 in a pellet will rapidly dilute to undetectable concentrations. We know that pellet bait can sometimes fall into small waterways as the result of aerial

## HOW 1080 BIODEGRADES IN WATER

Enters waterway



1080 bait loses structure and becomes soft



1080 dilutes and moves with flowing water



1080 is biodegraded by microorganisms in natural waterways



## HOW 1080 BIODEGRADES IN SOIL

Rain / dew



1080 bait loses structure and becomes soft



1080 dilutes and moves with ground water



1080 is biodegraded by microorganisms in plants and soil



application, however research where bait was deliberately placed in small streams found that 1080 was undetectable in the water after only eight hours. Trials in four West Coast streams using ten times the number of pellet baits that would be expected to enter streams during aerial treatment showed no detectable effect on aquatic life in the streams.

Biologically, animals and plants metabolise sublethal exposures of 1080 to less toxic compounds within days. Laboratory studies have found a wide range of microorganisms present in natural environments (such as bacteria and fungi) also have the ability to degrade 1080 by a process of defluorination, to produce non-toxic compounds.

## 1080 IN SOIL

After aerial application, many pellet baits will be eaten by the targeted pests (possums and rodents). The uneaten pellets will degrade through exposure to moisture. Rainfall is an important factor in degradation rate, as pellets (made mostly of compressed cereal) quickly lose their physical structure within as little as a few hours when they become wet. On exposure to water the 1080 in the bait dissolves in the water and leaches from the bait into soil.

Once in the soil, 1080 from the bait moves with water through the soil, diluting as it moves. Microorganisms present in soil will also degrade 1080, mostly to form hydroxyacetic acid (glycolate) and carbon dioxide. Temperature is an important influence on how quickly this occurs in soil – the biodegradation of 1080 is faster under warmer conditions (20°C)

but still occurs at 5°C. At cooler temperatures rates of degradation are slower and in the absence of dilution, residual concentrations of 1080 reach undetectable levels within about 100 days.



## FURTHER INFORMATION

**THE ENVIRONMENT AND 1080**  
[epa.govt.nz](http://epa.govt.nz)

**WATER SAMPLING REPORT**  
[npca.org.nz](http://npca.org.nz)

**WHY 1080 IS USED IN NEW ZEALAND**  
[1080facts.co.nz](http://1080facts.co.nz)

## REFERENCES

MS Srinivasan, A Suren, J Wech & J Schmidt (2012) Investigating the fate of sodium monofluoroacetate during rain events using modelling and field studies. *New Zealand Journal of Marine and Freshwater Research*, 46:2, 167-178.

Alastair M. Suren (2006) Quantifying contamination of streams by 1080 baits, and their fate in water. *New Zealand Journal of Marine and Freshwater Research*, 40:1, 159-167.

Alastair M. Suren & Paul Lambert (2006) Do toxic baits containing sodium fluoroacetate (1080) affect fish and invertebrate communities when they fall into streams? *New Zealand Journal of Marine and Freshwater Research*, 40:4, 531-546.

*This information was developed in partnership with Landcare Research.*



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