November 2015

A14

AERIAL 1080 CONTROL OF POSSUMS & RABBITS:

STANDARD OPERATING PROCEDURES FOR REGIONAL GOVERNMENT

PRODUCED BY

Bionet.NZ

National Pest Control Agencies

ABOUT NPCA AND BIONET

This document was published by NPCA (National Pest Control Agencies) which, until part way through 2018, provided a co-ordinating forum for agencies and stakeholders to address vertebrate animal pest control in New Zealand. In 2018 its role was transferred to the Ministry for Primary Industries under its Bionet brand.

PUBLICATIONS

Most of NPCA's publications on animal pest control were partially updated in April 2018 and transferred to the library section of the Ministry for Primary Industries' 'Bionet' online portal. The updates reflect the transfer and also acknowledge the change in the regulatory regime during 2017 and 2018, while not fully incorporating these changes in the interim, pending further reviews of the publications. Written by experienced practitioners, the main titles cover:

- best practice guidelines on controlling and monitoring vertebrate pests; and
- information about relevant regulations.

The transferred publications can be found at www.bionet.nz/library

PRODUCED BY

Bionet.NZ

National Pest Control Agencies

1080 AERIAL CONTROL OF POSSUMS & RABBITS:

STANDARD OPERATING PROCEDURES FOR REGIONAL GOVERNMENT

Published November 2015 (minor revisions April 2020)

Bionet and National Pest Control Agencies (NPCA)
c/o Bionet Portal (Ministry of Primary Industries)
www.bionet.nz/contact-us/

ISBN: 978-1-877474-71-2

The guide may be updated from time to time, so please check that your version is current by checking the publications section on www.bionet.nz

SUMMARY OF AMENDMENTS IN THIS EDITION

This edition includes the following amendments to the preceding September 2011 edition.

1. Minor updates to correct organisation names where these had changed and, where necessary, to update website references, links and references to legislation and by-laws.
2. Minor amendments, which improve clarity or explanation but are not consequential content changes.
3. Section 2.2, under 'Toxic loading and bait size', change from 16 mm to 19 mm typical screen size.
4. Section 2.2, Modified McLean Scale updated to the 2012 version.
5. Section 3.2.2, lower rate of molasses to oats in bait used in some regions.

CONTENTS

PART 1. PURPOSE AND CONTEXT

1.1 PURPOSE

In August 2007, the Environmental Protection Authority (EPA) published its decision on the reassessment of 1080. The full decision document variously anticipates and recommends that additional best practices be developed, specifically that "*management practices around aerial drops of 1080 be standardised around best practice*".

For a large part the recommendation is concerned with issues around consultation and communication for aerial 1080 operations, which has been realised with the publication of the "*Communication Guidelines for Aerial 1080 Operations*"[1].

The purpose of this document is to deliver that more detailed practical guidance in the form of a Standard Operating Procedure (SOP) for local government interests. The Department of Conservation and TBfree New Zealand have already developed SOP's for their own purposes.

1.2 SCOPE AND OTHER GUIDELINES

The target audience of this SOP includes those responsible for planning and managing aerial 1080 operations for local government interests, and other people required to be directly involved[2]. The scope of the SOP includes aerial 1080 control of possums and rabbits, and proceeds from the point where the decision to undertake an aerial 1080 pest control operation has been made.

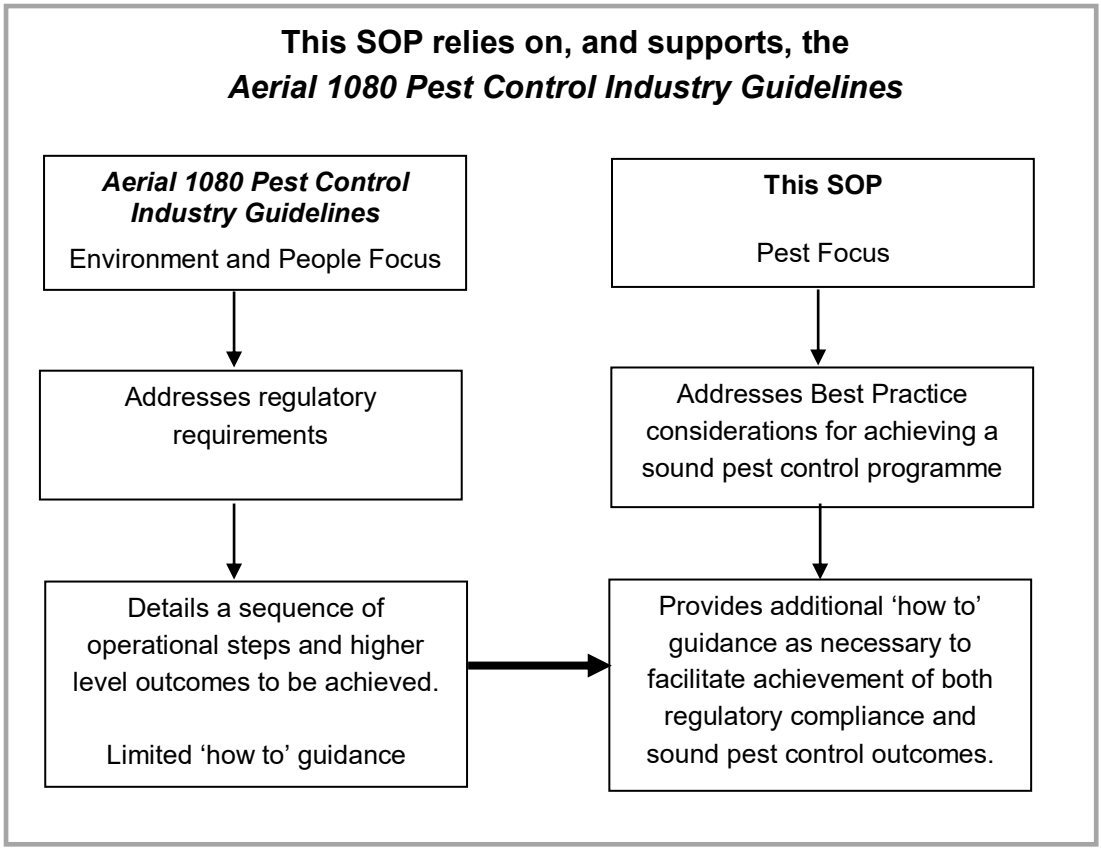
This SOP is designed to be read and used together with the *Aerial 1080 Pest Control Industry Guidelines*. While those guidelines are focused on the regulatory controls designed to safeguard people and the environment, this SOP is pest focused. Therefore this SOP supports the operational steps and outcomes of the guidelines by providing more detailed "how to" guidance, ensuring that both sound pest management principles are observed and that regulatory requirements are met.

For these reasons this SOP should not be used on its own.

The diagram below illustrates in broad terms the respective subject matter and relationship between the *Aerial 1080 Pest Control Industry Guidelines* and this SOP.

[1] Refer *Aerial 1080 Pest Control Industry Guidelines,* Part 5.1, item "B".

[2] While there needs to be integration between the aerial operator and the operations manager, these guidelines are not intended to be a primary reference for pilots. An appropriate Code for pilots, for example, is "*New Zealand Agricultural Aviation Association Code of Practice for the Aerial Application of Vertebrate Toxic Agents* "f"



For rabbit control, see also the Bionet publication number A5, *Pest Rabbits: Control and Monitoring – Best Practice Guideline,* available at www.bionet.nz .

1.3 STRUCTURE OF THIS SOP

1. This first part is introductory.
2. Part Two addresses good practice considerations to ensure robust pest control outcomes can be maintained in the long term.
3. Part Three presents operational good practice as necessary to support the achievement of the higher level outcomes prescribed in the *Aerial 1080 Pest Control Industry Guidelines*, and to ensure robust pest control outcomes.

1.4 ACKNOWLEDGEMENTS

This SOP was prepared in consultation with the Local Government Biosecurity Managers Group. Thanks to the biosecurity managers and to others who provided input to the development of this document.

PART 2. ACHIEVING GOOD PEST CONTROL OUTCOMES

As 1080 is an acute (fast acting) toxin, it is critical that aerial operations are well designed to ensure that sublethal poisoning is absolutely minimal. Both possums and rabbits remember sub-lethal 1080 poisoning events for their lifetimes.

So, if significant sublethal poisoning of a pest population occurs, not only is the immediate operational outcome compromised but, more significantly, future 1080 baiting of such 'bait-shy' populations will also be compromised.

The example of the rabbit problem over much of the South Island High Country illustrates the above point. Prior to the release of Rabbit Haemorrhagic Disease (RHD) in 1997, large areas of land were subject to intractable rabbit problems. High population densities of rabbits had become bait shy, or neophobic (wary of anything new in their environment), as a result of repeated control operations in the past. The Rabbit and Land Management Programme (R&LMP, 1989-1995) did make gains in these areas, largely by attempting to increase the intervals between poisoning events while using alternative maintenance control techniques such as helicopter shooting. When RHD arrived in 1997, rabbit populations were in the process of recovering from efforts applied during the discontinued R&LMP, which was replaced by essentially a 'user pays' management regime. Now that rabbit populations are once again increasing, as immunity to RHD increases, there is a real risk that mistakes of the past might be repeated.

The good practice considerations presented here are focused on minimising sublethal poisoning, and will hopefully demonstrate the false economy of taking operational short cuts to save a dollar in the short term. Rather, adherence to sound practice will ensure maximum advantage can be made of RHD, in extending return times for conventional control.

While good practice considerations are presented separately for rabbits and possums, the principles are the same; broadly:

- Almost all individuals of a target pest population must be killed by the operation.
- Therefore, the pests must want to eat the bait presented. The bait must taste good, and the pests should be used to eating it (i.e. pre-feeding with non-toxic bait is critical).
- There must be enough bait, containing enough 1080, to ensure that the pests ingest a lethal dose.

When the above are achieved, return times (time until the next operation is necessary) are extended, which is where true cost savings are realised. However, population recovery is not only a function of having a very low post-control population density, but also of immigration pressure. Minimising immigration is, therefore, another important good practice principle, which can be achieved by various means, including:

- Maximise the operational area.
- Work to natural boundaries or other barriers (e.g. rabbit fences).
- Integrate with operations in adjacent areas.

2.1 GOOD PRACTICE CONSIDERATIONS - POSSUMS

Critical considerations include:

- **Ensure each single bait comprises a lethal dose.** This ensures possums do not have to find a second bait before the effect of 1080 spoils their appetite, which can be as soon as 30 minutes later. That, in turn, means low sowing rates of around 2 kg/ha can be utilised with confidence. The larger 11 gm and 20 mm diameter cereal baits, with a toxic loading of 0.15% w/w 1080 achieve this objective. Carrot bait should meet similar specifications.
- **Ensure bait is palatable - cereal.** Both Wanganui No.7 and RS5 cereal baits are palatable to possums. The No.7 baits are well suited to possum control as they are stronger and less prone to rapid breakdown in the field by moisture; however, RS5 remain popular where a dry environment allows their use. The following standards should be met, prior to use, to ensure palatability (good taste):
    - bait stored for minimal time, and not longer than 3 months;
    - moisture level should not exceed 17%;
    - no rancid or mouldy odour, or visible mould;
    - double lured (0.3% w/w) to mask toxicant (usually cinnamon lure).
- **Ensure bait is palatable – carrot**. Carrots should be a table variety such as Royal Chantenay, or a variety of similar size and characteristics. Carrot should be clean-pulled within four days of delivery, and free of carrot worm, stem rot, woody pith, mould, bruising, weed and seed, stones or other foreign objects.
- **Pre-feed.** Pre-feeding is important to get possums used to a novel food in their environment. Many animals, when they first encounter a new food, only sample a little the first time to see how it goes. If no adverse effect ensues, they will eat more the next time. The purpose of pre-feeding is to ensure that when the toxic bait is subsequently applied, possums are confident of it and will eat it straight away. For possums, one non-toxic pre-feed is enough, at a similar application rate and using the same bait type as for the toxic bait. The pre-feed should be applied 2-4 weeks prior to the toxic bait application. However, the pre-feed effect is known to last at least 6-8 weeks (and probably longer).
- **Minimise immigration and return times.** To maintain the benefit of a reduced possum population, operational planning should aim to maximise the operational area, utilise natural barriers such as rivers or high ridgelines, and integrate with operations in adjacent areas. Where that is not achievable, there will need to be ongoing maintenance control to keep the possum population down. Aerial 1080 application is not suited for such ongoing maintenance control, and aerial application should, in any, case not occur more often than once every 3 years.
- **Timing**. Typically, aerial operations are targeted to winter on the basis that natural food resources are limited at that time. However, successful operations have also been carried out at other times and summer drought conditions can also impose resource restrictions for possums. Pre-feeding does, however, appear to overcome any issues relating to food availability.

2.2 GOOD PRACTICE CONSIDERATIONS - RABBITS

Critical considerations include:

- **Ensure bait is palatable**. Most rabbit control is undertaken during winter, at which time carrot is the most commonly used bait type with a good history of efficacy. Oats are typically used during summer/early autumn. Cereal pellet baits can also give good results, subject to suitably dry conditions. Whichever bait is used, it must be fresh and in good condition. Under no circumstances should deteriorated bait be used for pest control.
- **Ensure bait does not become tainted**. Be careful that bait product does not become tainted in any way, as this will put rabbits off the bait. For example, if bait is being transported by a truck with an overhead exhaust, ensure the load is covered with a tarpaulin. If a super bin is used at the loading site, ensure all traces of contaminant are removed prior to use.
- **Pre-feed at least twice**. Because rabbits are naturally cautious feeders, pre-feeding is absolutely critical. At a minimum, two pre-feeds must be applied prior to aerial application of toxic carrot bait. If, after the second pre-feed, there is any reason to believe all rabbits are not readily taking the bait, or if the application of toxic bait is delayed for more than 2 weeks after the second pre-feed, then a 3rd pre-feed should be applied. Failure to observe these pre-feeding requirements will almost certainly create bait shyness in the population. The pre-feed phases are used to confirm that rabbits are taking the bait, and that the application rates are appropriate.
- **Application rates**. Application rates are dependant on population density[3]. At lower densities, aerial 1080 control should not be contemplated at all.
    - At medium density (MacLean Scale 3-4) pre-feed with 10-20 kg/ha.
    - At high density (MacLean Scale 5-6) pre-feed with 20-35 kg/ha.
    - At very high density (MacLean Scale 6+) pre-feed with 40[4] kg/ha.

    The rate of bait disappearance (Appendix 2) indicates whether the bait application rate is correct. If bait is eaten in less than three days, too little was applied. If bait is still present after a week too much was applied, or rabbits are not accepting the bait. Use this information to fine-tune the application rates for the second pre-feed and the toxic application. Toxic bait must not be applied before all pre-feed bait has been consumed.
- **Toxic loading and bait size**. For rabbits, a toxic loading of 0.02% w/w 1080 for carrot, and 0.04% w/w 1080 for oats is specified on the label. The legal requirement under HSNO controls is that mean bait weight is 6 gm, and not more than 1.5% by weight of chaff content (chaff means pieces less than 0.5 gm). Screening is, however, not required for pre-feed bait. A 22 mm cutter grill and a 19 mm screen are typically used for screening.
- **Minimise immigration and return times**. To maintain the benefit of a reduced rabbit population, operational planning should aim to maximise the operational area, utilise natural barriers such as rivers, high ridgelines or shady faces, and integrate with operations in adjacent areas. In most cases an operation will need to include a number of

[3] There is some evidence that insufficient bait application rates compromise efficacy. A rhodamine trial in Canterbury (Canterbury Regional Council report ref. L7/2/1) found that at extreme rabbit population levels 100% of rabbits exposed to rhodamine bait at 60 kg/ha were marked, while in a similar adjacent trial block where 25 kg/ha was applied only 85% of rabbits were marked.

[4] Note: these recommended application rates are starting points, with subsequent applications fine-tuned, dependent upon bait disappearance rates. However, the maximum application rates allowed per label instructions is 40 kg/ha.

neighbouring properties cooperatively. Where that is not achievable, there will need to be ongoing maintenance control to keep up with immigration pressure. Aerial 1080 application is not suited for such ongoing maintenance control, and aerial application should, in any case, not occur more often than once every 3 years.

- **Timing**. Rabbits can only be effectively targeted outside their breeding season and at a time when natural food resources are most limited. April to August is, therefore, the winter season for aerial 1080 baiting, and January to April the summer season (although this may be extended up to a month at either side if rabbits are not breeding). Within these seasons localised events can also be relevant. Experience shows that carrot bait is most readily accepted in conjunction with frosts, for instance.
- **Minimise disturbance**. Ensure the rabbit population is quiet. No shooting should be carried out for at least three months prior. As far as possible, do not disturb rabbits after the poisoned bait is laid, even with vehicle activity, for at least two days.
- **Control History**. Control history is relevant. If previous control has been unsuccessful, or has been applied within the past 3 years, shyness may be developing. If in doubt, undertake rhodamine trials to confirm that bait acceptance is > 90% (see Appendix 1). Alternatively, monitor bait disappearance during pre-feeding and do not proceed if bait acceptance is compromised (Appendix 2).

Modified McLean Scale 2012

1	No sign found. No rabbits seen.
2	Very infrequent sign present. Unlikely to see rabbits.
3	Pellet heaps spaced 10m or more apart on average. Odd rabbits seen; sign and some pellet heaps showing up.
4	Pellet heaps spaced between 5 m and 10 m apart on average. Pockets of rabbits; sign and fresh burrows very noticeable.
5	Pellet heaps spaced 5 m or less apart on average. Infestation spreading out from heavy pockets
6	Sign very frequent with pellet heaps often less than 5m apart over the whole area. Rabbits may be seen over the whole area.
7	Sign very frequent with 2-3 pellet heaps often less than 5 m apart over the whole area. Rabbits may be seen in large numbers over the whole area.
8	Sign very frequent with 3 or more pellet heaps often less than 5 m apart over the whole area. Rabbits likely to be seen in large numbers over the whole area.

PART 3. OPERATIONAL GOOD PRACTICE

The following operational good practice guidance is presented further to and in reliance on the operational sequence and requirements presented in the *Aerial 1080 Pest Control Industry Guidelines*. The following guidance, therefore, must not be used in isolation. Most of the necessary steps presented in the *Aerial 1080 Pest Control Industry Guidelines* are self-explanatory in that document and are not referred to again here.

3.1 PRE OPERATIONAL

3.1.1 Pre-order Bait

Where large quantities of cereal pellets will be required, try to give at least 4 months' notice to the manufacturer to ensure your order can be filled at the required time.

Large quantities of carrot may need to be grown under contract, requiring a lead-in time of approximately 6 months. Contract specifications should be explicit as to the quality standards for carrot as follows:

- Table varieties such as Chantenay, Egmont Gold, Koyo or Top Weight are preferred because they do not tend to grow coarse or woody. Carrots should be clean-pulled within four days of delivery, without tops and free of carrot worm, stem rot, woody pith, mould, bruising, weed and seed, stones or other foreign objects. It is recommended that a minimum of 90% of carrots have a crown diameter exceeding 35 mm to minimise wastage to chaff. Wash carrot as near as possible prior to use because the washing process abrades the skin and speeds rotting. If pre-washed carrots are obtained of necessity, be aware that the shelf life will be compromised.
- The best oat varieties are fat, white oats such as Oare, Markaru, Omihi and Owapuni. The grain must be in top condition, free of weed seeds, loose husks and dust. Purchasing dressed oats ensures they are free of contaminants. Oats are a favoured bait because of the ease with which they can be stored.

3.1.2 Bait Storage and Assessment

Cereal Bait.

Plan to have bait in storage for minimal time and, in any case, not longer than 3 months. Store bait in a cool, dry and well ventilated area. Bags of bait (20 kg) should be stored off the ground (e.g. on pallets) and stacked not more than 5 bags deep. Leave approximately 0.5 metres between pallets to facilitate airflow. Ensure any shrink wrapping is removed immediately.

The following standards may be used to confirm bait quality:

- moisture level should not exceed 17%;
- no rancid or mouldy odour, or visible mould;
- toxicity of toxic bait within 0.1% of nominal toxicity (e.g. 0.15% w/w bait should be between 0.14% and 0.16% w/w 1080);

- bait should be hard enough for aerial application equipment (if in doubt, test strength using a 2 mm penetrometer probe on the side wall of the pellet to be at least 4.5 kg cm^2).

A sample of 20 baits from one bag is sufficient in order to avoid unnecessarily compromising packaging.

Carrot Bait.

Bulk carrots should be tipped onto a clean and stone-free area with free drainage and not piled higher than 3 metres; less if the carrots will not be used straight away. The carrots should be assessed upon receipt to confirm that they meet the following specifications:

- clean-pulled within four days of delivery;
- green tops removed;
- free of carrot worm, stem rot, woody pith, mould, bruising, weed and seed[5], stones or other foreign objects;
- preferably at least 90% of the carrots will have a crown diameter exceeding 35 mm.

Carrots have a short shelf life and, if they cannot be used shortly after delivery to the site as planned, they must be regularly assessed to confirm quality. Assessments are to confirm the absence of rotting or white fungus, or fermentation (heat, smell, softness).

Spoiled non-toxic carrot should be buried, or stacked and left to rot down. Under no circumstances may deteriorated bait be used for pest control.

Oat Bait.

Oats should be stored in clean, dry, mouse and bird proof silos or sheds. Contamination from fuels, insecticides and fertilizers must be avoided. Silos of oats can be fumigated to kill unwanted insects and rodents. Phosphine is a common fumigant for this purpose.

3.1.3 Site Selection and Preparation

Aerial sites should ideally be:

- located for best coverage of the operational area and shortest ferrying times, ideally within the operational area itself;
- elevated and provide for take-off into the prevailing wind;
- accessible to vehicles and trucks even after an extended period of wet weather;
- away from hazards such as power lines. Preferable away from stocked land and dwellings;
- laid out with clearly demarked loading, refuelling, bait preparation and non-operational areas according to the operational plan;
- have a back up in case the preferred loading site or airstrip cannot be used;

[5] It is important to ensure an aerial operation does not introduce weeds into new areas.

- marked with ‘restricted area’ tape, or signs, at points of access and the perimeter to warn unauthorised persons to keep out;
- compliant with all regulatory conditions, and any specific conditions imposed by consenting and permitting authorities.

Aerial loading site (image courtesy Marlborough District Council).

3.2 OPERATIONAL

3.2.1 Carrot Cutting

The machine operator shall ensure all machinery is operated and maintained in accordance with the manufacturer’s instructions. The machinery should be checked on an ongoing basis:

- check the condition of all grills, knives and cutter bar blades for visible signs of damage including, chips, bends or cracks;
- check for an uneven grill pattern by visually monitoring the quality of the output bait.

Ensure a reconditioned grill section and cutter bar are on site all times.

Bait is to be cut on a ‘just in time’ basis to avoid unnecessary disposal of un-used bait. Cut carrot does not keep well and should not be stored for use the next day.

The machine operator shall visually confirm during the cutting process that bait size and chaff characteristics comply with specifications.

In addition, toxic bait output should be sampled once per operating day, preferably after the first 15 minutes of operation, as follows[6]:

- collect, in a plastic bucket, approximately 2 kg of bait from the bait output auger of the screener;
- correct the sample on accurate scales to 1 kg;
- remove all chaff (pieces less than 0.5 gm) and weigh the total chaff. Total chaff weight must be no more than 15 gm to meet the 1.5% chaff-by-weight specification. Record the result;
- count all baits remaining after the chaff is removed. The mean bait weight (gm) is 1000 gm divided by the total number of baits. There should be no more than 166 baits in the sample to meet the 6 gm mean bait weight specification. Record the result.

3.2.2 Oat Preparation

Oats must be lightly cooked to prevent germination and improve palatability. Overcooking is thought to adversely affect palatability and soft overcooked baits can be difficult to work with.

Place the oats in a covered cooking vessel and just cover them with water. Bring to the boil and add molasses at the rate of up to 0.5 L per 35 kg of oats (lower rates of 1 L per 150 kg are also used successfully in some regions). A little salt may also be added, which is believed to improve palatability.

Boil the oats for about 20 minutes. If the kernel pops out of the husk when squeezed between the fingers, they are ready. Drain off excess liquid and place oats on tables covered with mesh or netting to cool them. They are then ready to be distributed as pre-feed or to have toxin applied. Judgement is needed as to how much molasses to add for cooking subsequent amounts of oats because some molasses will remain in any cooking liquid that remains in the cooking vessel from previous batches.

Use the oats as soon as possible after cooking as they ferment after about a day if kept in bulk. Do not use bait if fermentation has commenced (detectable by odour). If the weather is cool and dry, the oats can remain in good condition for 2-3 days if turned each day.

Always transport oats in clean, well aired containers or sacks. Regular washing and drying of the sacks will prevent them smelling musty or sour. Yeasts etc will readily grow in any molasses adhering to the sack.

Oats for large rabbit operations are often carted in the back of an open steel-tray truck. In this situation ensure the oats are properly cooled, otherwise residual heat may overcook the oats during transport.

3.2.3 Toxin Application

Always comply with label directions, and observe Safety Data Sheet procedures (refer Appendices 3 - 6). For guidance on legal requirements associated with 1080 storage, transport, use, emergency management and disposal refer to the *Aerial 1080 Pest Control*

[6] While there is no legal requirement to sample bait size, HSNO controls apply regardless.

Industry Guidelines. Below follows some practical guidance to be read together with and subject to the guidelines.

Field solution is to be batch-made for immediate requirements. For un-lured bait (e.g. 0.02% w/w 1080 carrot for rabbits), the field solution comprises (per 10 litres):

- 1 L of 1080 stock solution
- 1 L of dye mix (dye mix comprises 1 kg dye powder per 5 L water)
- 8 L of water.

Increase the proportion of stock solution in field solution to provide higher toxic loadings as required.

- e.g. for 0.04% w/w 1080 oats: use: 2L stock solution, 1 L dye mix, 7 L water
- e.g., for 0.15% w/w 1080 carrot for possums: use 7.5 L stock solution, 1 L dye mix, and 0.5 L water.

The stock solution contains 20% 1080 w/w. Do not attempt to apply more than 10 litres per tonne of field solution to bait, as the bait may not effectively absorb that much extra liquid.

If lure is to be included for possum bait, mix 100 mls of lure (e.g. cinnamon) to 900 mls of monopropylene glycol and include in the field solution mix at the rate of 1 litre per 10 litres. Never use lure for rabbit baiting.

Dye must be well mixed into hot water. Straining the finished dye solution through a fine filter to remove any small lumps is recommended, especially if the spray gear is not fitted with its own filter.

Prepared bait (carrot or oats) is sprayed with the field solution at the rate of 10 litres per 1 tonne of bait. Ensure that:

- the correct volume of field solution is being applied. To achieve this, the spray equipment must be calibrated, measuring the amount of liquid applied to a known quantity of bait; and
- the resulting bait product has an even coverage (colour), and
- that no excess liquid is running or dripping off the bait as it leaves the equipment.

Achieving a consistent toxin application relies on a consistent feed of bait material into the spray application equipment. Whether using hopper or conveyor type feed, ensure bait input can be consistently managed.

Fixed wing rabbit control operation (image courtesy D Grueber).

3.2.4 Bait Toxin Assessment

The machine operator shall visually confirm proper operation of the spray equipment in achieving uniform coverage.

Toxic loading may be assessed on site by ensuring that the specified volume of field solution is being used for the tonnage of bait processed (measured for instance by the number of aircraft loads). Record every hour the amount of bait processed and the quantity of field solution used, and ensure the application rate remains within 5% of specification.

Also collect one sample approximately 100 gm per operating day of for later assay, if necessary[7]. Store the sample in a container which meets HSNO requirements for VTA packaging and labelling (e.g. a leak-proof plastic container with a lid and label). Mark the sample container, identifying time, place and date. Keep a record of times at which samples were taken. Store samples, frozen, in a compliant storage facility until dispatched for assay to an appropriate laboratory, or disposed of.

[7] Typically one assay per season is sufficient, but it is recommended that daily samples be taken and kept in frozen storage in case toxic loading needs to be confirmed at a later date.

PART 4. APPENDICES

APPENDIX 1. Rhodamine Trial

Although rarely utilised in an operational sense, a rhodamine trial may be undertaken where bait acceptance needs to be confirmed.

The trial comprises two feeds of un-dyed bait, followed by one rhodamine dyed feed and then collecting a sample of at least 40 rabbits from the trial area by night shooting. At least 90% of the shot sample should be marked with the dye to confirm that the proposed control operation can reliably proceed.

Rhodamine Dye

Rhodamine is available from Animal Control Products in powder form in 400 gm sachets. This should be mixed with water at the rate of 400 gm of powder to 10 litres of water to create a 0.04% field solution.

- Select a site out of the wind (rhodamine is a very fine powder).
- Wear appropriate protective clothing, a respirator (use dust cartridges) when handling the powder, impermeable gauntlet type gloves, overalls, gumboots, an impermeable apron and eye protection.
- Mix powder in a large (20 L) bucket with 10 L warm water until the powder is dissolved.
- Filter the resulting solution through a funnel and fine strainer (pantyhose are good) to remove any lumps which might block spray application equipment.

Rhodamine field solution is applied to the bait at the rate of 10 ml/kg. So, 10 litres of field solution will treat one tonne of bait. This may be achieved using a concrete mixer for smaller amounts (slowly pouring or spraying into the mixer the required amount of field solution as it is turning the bait over), or using the spray application equipment associated with cutting equipment for larger amounts.

Trial Area

The trial area should be 10-25 ha of representative habitat such that you are confident a sample of at least 40 rabbits can be shot. Ideally, the trial area will have some gullies and ridges to facilitate later night shooting. There should be some areas of cover, so that rabbits do not run out of the trial area when night shooting commences, but not so much that shooting becomes impractical.

Baiting

- Apply the first feed at the same rate and method as is proposed for the operation itself. However, hand broadcast is an acceptable alternative to aerial application if necessary.
- Apply the second feed of plain undyed bait 3-7 days after the first was applied and after about 70% of the first feed has been taken.
- Apply the rhodamine dyed bait a further 3-7 days after the second feed and after at least 90% of the bait from the non-dyed feeds has been consumed.

Night shooting

One night after the rhodamine bait has been applied, the area is to be night-shot with a sound moderated .22 rifle. Obtain a sample of at least 40 rabbits including as many as possible from the centre of the trial area. Do not shoot any rabbit that has left the trial area.

Assessment

A portable UV light with a wavelength of 377 NM should be used. It is expedient to assess shot rabbits immediately in the field. However, as the battery powered lights are quite weak, any rabbits that do not show evidence of Rhodamine staining in the field should be collected and assessed the following day in a dark room.

- First check around the mouth and anus for the characteristic reddish-orange fluorescence of rhodamine when exposed to UV light.
- If none is detected, open the rabbit up and check the entrail and stomach contents for any evidence of rhodamine.
- If you are not sure, store the rabbit in a separate bag for later analysis. Alcohol enhances the visibility of rhodamine, so portions of the gut and contents can be placed in a white dish containing ethyl alcohol to confirm the presence or absence of rhodamine under the UV light.

For each rabbit, record the presence or absence of rhodamine. At least 90% of rabbits sampled should be rhodamine positive, otherwise review the proposed methodology and timing of the proposed operation.

APPENDIX 2. Bait Acceptance

Before the advent of GPS guidance for aircraft, running lines were commonly used to confirm good bait coverage and to determine bait acceptance (by measuring the rate of bait disappearance). With accurate GPS data routinely available today, the need for running lines to confirm bait distribution is obsolete. Bait disappearance rates are still important, however, and a modified version of the running line technique can be applied to quantify bait disappearance.

Formal quantification of bait disappearance is not always necessary especially as experienced staff will be able to assess this visually. When it is required, the following technique may be used.

- Select at least 5 line start points evenly distributed throughout the block and in typical rabbit habitat (random or systematic sampling may be used, but that is not critical).
- At each start point, place a small wooden peg in the ground (big enough to be easily relocated but not so intrusive as to modify the rabbits' behaviour). Use a 1.25m string and count the number of carrot baits present within the circle (whose centre is the peg and radius is 1.25m).
- It is important that the centre of the plot can be precisely relocated so that the comparative before and after counts for each plot are taken in exactly the same place.
- Repeat for a total of 10 pegged plots on each line, spaced approximately 20m apart (pacing the 20m out is sufficient), giving a total of 50 plots over 5 lines.
- The first count should be made on the day of application (Day One) of a pre-feed (applies for all pre-feeds).
- The second count should be made on Day Three.
- The third count (if necessary) should be made on Day Seven.

Interpreting the Results

Calculate the percentage of baits remaining after 2 days. For example, if a total of 500 baits were counted on the day of application, and a total of 100 baits were counted on Day Two, then the % remaining will be 100/500*100 = 20%.

- If on Day Three of the first feed less than 10% of the bait remains, then the second pre-feed can be applied. The rapid removal of bait indicates the application rate was too low and will need to be increased for the second feed.
- If on Day Three of the first feed between 10-50% of bait remains, then the application rate is probably about right but it is too early to apply the second feed. Undertake a further bait count on Day Seven to confirm that less than 10% of bait remains and then apply the second feed.
- If on Day Three of the first feed more than 50% of bait remains, either the application rate was too high or the rabbits are not taking the bait well. Undertake a further bait count on Day Seven and decide whether to proceed with further pre-feeding based on the outcome.

The second pre-feed can be assessed and interpreted in a similar manner.

It is important that toxic bait is not applied until all pre-feed has been taken and you are confident that the pre-feeding has achieved its objective of getting all the rabbits onto the bait. Additional pre-feeding may be required if bait disappearance rates are lower than expected for the given population density.

APPENDIX 3. Stock Solution Label

DANGER - DEADLY POISON

KEEP OUT OF REACH OF CHILDREN. ECOTOXIC.

HSNO CLASSES: 6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.3A, 9.4B

1080 SOLUTION

To be incorporated into baits for poisoning of rabbits, possums, deer or wallabies.

Soluble concentrate containing 200g/litre sodium fluoroacetate.

Acutely toxic: May be fatal if swallowed, inhaled or absorbed through the skin. Repeated exposure may damage fertility, the unborn child, and internal organs. When handling open containers or baits, wear full protective equipment as shown in precautions box below in order to avoid all skin and eye contact.

Very toxic to terrestrial animals and phytotoxic to many plants: Take measures to reduce the risk to non-target animals which may either eat baits treated with the substance or which may scavenge the carcasses of poisoned animals.

Very toxic to aquatic life: Manage bait application rates carefully and comply with any restrictions imposed on placing baits over or near waterways. Avoid pollution of any water supply with the substance or used container.

Symptoms of poisoning: Early Symptoms: Nausea, vomiting, tingling and numbness in face and hands, stomach pains, apprehension and anxiety. Later Symptoms: Muscular twitching, blurred vision, mental confusion. Severe Symptoms: Coma, convulsions, death.

First Aid: Act immediately if poisoning is suspected. DO NOT induce vomiting. Call a doctor or emergency physician at your nearest hospital immediately. For further advice contact National Poisons Centre 0800 POISONS (Phone 0800 764 766).

Precautions: When handling open containers, mixing the concentrate or applying it to baits, wear full face and eye protection, a full length waterproof apron, overalls worn outside rubber boots, and impervious rubber or PVC gloves. Do not eat, drink or smoke when using the product or when handling open containers or baits. Wash protective clothing and equipment daily after work. Remove protective clothing and wash hands and exposed skin thoroughly before meals and after any contact. Thoroughly wash implements, mixing and spreading equipment, aircraft and other contaminated items before removing them from the operational area.

Storage: Store in original container, tightly closed, under lock and key and away from feed or foodstuffs. Keep out of reach of children. This product must always be under the control of an approved handler who holds a current test certificate endorsed for Class 6 and Class 9 substances.

Tracking: It is a legal requirement that this product is tracked using the unique pack identifiers for its full lifecycle, including date, location of its use or means of disposal.

Spillage: In the event of a spill, inform the Fire Service immediately, and then local health protection officers at your District Health Board or hospital. Isolate the spill area and exclude all bystanders. Use absorbent material to soak up the spilled concentrate. Recover the absorbent material when absorption is complete and place in suitable, marked containers for disposal. Take all practicable steps to manage any harmful effects of a spillage including preventing the concentrate from entering streams or waterways. Wash down the spill area with copious water only after all absorbent material has been removed. If necessary, place a barrier and warning signs around the spill area to prevent entry until the area is safe.
Shelf life: When stored appropriately, this product should show no significant degradation up to the expiry date shown on the container. Contact your supplier for further information about the use of any product after the expiry date.
Livestock: It is extremely important to prevent access to baits by domestic livestock and pets. Stock must be kept off the treatment area until baits have been washed out by rain, removed or destroyed. Dogs and cats are particularly at risk from eating poisoned animal carcasses and pet owners in the immediate vicinity must be notified of this risk. Collect poisoned animal carcasses where practicable for burning or burying below 500mm deep, or limit access to the treatment area until carcasses are unlikely to be eaten or to contain residues.
Transport information: UN 2902. Pesticides, liquid, toxic, nos. Packing Group I. Toxic 6.1A. Hazchem: 2XE
Conditions of sale: As no control can be exercised over the methods or conditions under which this product is used, no responsibility or claim, other than those required by statute, will be accepted for any damage or injury whatsoever arising from the storage, handling, application, use or disposal of this product.
Legal Obligations: This product must be sold only to or used by a person holding a Controlled Substances Licence issued by a test certifier who has been approved. If the product is applied to baits for aerial application, public notification is required. Additional permissions may be required depending on the method of use and location of use. Signs must be erected at every normal point of entry to the place where bait incorporating this substance is to be applied. Signs must remain in place until baits are retrieved or are no longer toxic, or until any other legal requirement affecting signage has been complied with. This product must only be used as specified in the label.

NET CONTENTS: 5 LITRES

DIRECTIONS FOR USE:

SHAKE WELL BEFORE USING
DILUTION OF CONCENTRATED SOLUTION

1:9 Dilution 1 part concentrate to 9 parts water containing dye and lure
2:8 Dilution 2 parts concentrate to 8 parts water containing dye and lure
4:6 Dilution 4 parts concentrate to 6 parts water containing dye and lure
5:5 Dilution 5 parts concentrate to 5 parts water containing dye and lure
7.5:2.5 Dilution 7.5 parts concentrate to 2.5 parts water containing dye and lure

CARROT BAIT

RABBIT 0.2 g/kg (0.02%) To one tonne of chopped carrots add 10 litres of 1:9 dilution
After a period of 3-4 days pre-feeding, apply bait at up to 40 kg per hectare for heavy infestations, up to 20 kg/ha for medium infestations and up to 10 kg for low to moderate infestations.

POSSUM 0.8 g/kg (0.08%) To one tonne of chopped carrots add 10 litres of 4:6 dilution
1.0 g/kg (0.1%) To one tonne of chopped carrots add 10 litres of 5:5 dilution
1.5 g/kg (0.15%) To one tonne of chopped carrots add 10 litres of 7.5:2.5 dilution
Apply bait in bait stations spaced 50 meters to 200 meters apart or broadcast baits by hand, mechanical spreader or by aircraft at rates up to 20 kg per hectare. Pre-feeding with non-toxic bait is recommended for best results.
Deer Repellent: When possum control is to be undertaken in areas where feral deer may be at risk from eating baits, EDR™ deer repellent, applied to the surface of prepared carrot baits at a rate of 12 kg per tonne in accordance with the manufacturer's label instructions, may be used to reduce or eliminate the uptake of baits by deer.

DEER 1.5 g/kg (0.15%) To one tonne of chopped carrots add 10 litres of 7.5:2.5 dilution
Apply bait in small heaps or lines over areas of preferred habitat or broadcast baits at up to 20 kg per hectare by aircraft, hand or mechanical spreader. Pre-feeding with non-toxic bait is recommended.

WALLABY 1.5 g/kg (0.15%) To one tonne of chopped carrots add 10 litres of 7.5:2.5 dilution
Use in bait stations spaced 50 meters to 200 meters apart or broadcast baits by hand, mechanical spreader or by aircraft at rates up to 20 kg per hectare. Pre-feeding with non-toxic bait is recommended.

OAT BAIT

RABBIT 0.4 g/kg (0.04%) To one tonne of boiled oats add 10 litres of 2:8 dilution
Sow oats in lines at a rate of 20-25 kg per km using a vehicle fitted with a scratch plough to turn soil and attract rabbits. Alternatively, spot lay small piles of oats on turned sods (approx 200 g per spot) around warrens, near buck heaps or adjacent to cover. Aerial broadcast at rates of up to 30-40 kg per hectare where very high rabbit densities occur. Pre-feeding with non-toxic oats is recommended for best results.

APPLE BAIT

POSSUM 0.8 g/kg (0.08%) To one tonne of cut apple add 10 litres of 4:6 dilution
1.5 g/kg (0.15%) To one tonne of cut apple add 10 litres of 7.5:2.5 dilution
Use only in bait stations spaced 50 meters to 200 meters apart. Pre-feeding with non-toxic cut apple bait for 4-5 days before laying toxic will improve the uptake of toxic bait.

Registered pursuant to the ACVM Act 1997, No. V2189
See http://www.nzfsa.govt.nz/acvm for conditions of registration.

Registered to and Manufactured by Animal Control Products Ltd
408 Heads Road, Wanganui, New Zealand, Ph 64 6 344 5302 and
10 Hayes Street, Waimate, New Zealand, Ph 64 3 689 8367
For safety data sheet go to http://www.pestoff.co.nz/msdpage.htm

4G/X24/S/04
NZ/ACP Ltd

APPENDIX 4. Stock Solution SDS[9]

1080 SOLUTION

ANIMAL CONTROL PRODUCTS LTD

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
Product Name:	1080 Solution
Synonyms:	Stock solution, 20%
Supplier:	Animal Control Products Ltd
Street address:	Physical address: 408 Heads Road, Whanganui 4501, New Zealand.
Postal address:	Postal address: Private Bag 3018, Whanganui 4540, New Zealand.
Telephone:	64 (0) 6 344 5302
Facsimile:	64 (0) 6 344 2260
After hours telephone numbers:	0274798 318 or 0274798 319
ACCIDENTAL HUMAN POISONING **National Poisons Centre:** **Emergency phone number for spills, transport emergencies and risk mitigation:**	Dial 111 and be ready to provide information from the product label to medical personnel. Free phone 0800 764 766 Dial 111

2. COMPOSITION / INFORMATION ON INGREDIENTS	
Product Name:	1080 Solution
Synonyms:	Stock solution, 20%
Active Ingredient:	Sodium fluoroacetate 20% concentrate w/w
Other Ingredients:	Water, blackish-purple dye
Molecular Weight of Active:	100.02
Molecular Formula of Active:	F C H_2 CO_2 Na
Recommended Use:	For mixing with food baits for vertebrate pest control as prescribed by label directions.
Appearance:	Black or purple low viscosity solution.

3. HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE: This product contains a DEADLY POISON.

HSNO Approval Code: HSR002427

HAZARD CLASSES:	6.1A, 6.3B, 6.4A, 6.8A, 6.9A, 9.1A, 9.3A, 9.4B
HAZARD IDENTIFIERS:	**Priority Identifiers** - Danger. Deadly Poison. Keep out of reach of children. Ecotoxic.

[9] Source http://www.pestoff.co.nz/datasheets August 2011

	Secondary Identifiers - Acutely toxic. May be fatal if swallowed, inhaled or absorbed through the skin. Repeated oral exposure may cause reproductive or developmental damage. When handling open containers or baits, wear protective equipment as indicated below. Toxic to terrestrial vertebrates. Take measures to reduce the risk of non-target animals being exposed to the toxin either through eating baits or by scavenging the carcasses of poisoned animals. Harmful to aquatic organisms. Manage bait application rates carefully and comply with any restrictions imposed on placing baits over or near waterways. Avoid pollution of any water supply with baits or used container.
DANGEROUS GOODS CLASS:	6.1A - **Packing Group 1**
GENERAL REQUIREMENTS:	Deadly Poison. Subject to tracking requirements for individual packs. Available for purchase and use only by holders of Controlled Substances Licenses. This substance must be under the control of an Approved Handler for Class 6 and Class 9 Hazardous substances at all times unless being transported by a transport operator with a Dangerous Goods License endorsement.

SYMPTOMS OF POISONING:

Early Symptoms: Nausea, vomiting, tingling and numbness in face and hands, stomach pains, apprehension and anxiety.

Later Symptoms: Muscular twitching, blurred vision, mental confusion.

Severe Symptoms: Coma, convulsions.

4. FIRST AID MEASURES

Ingestion: **Seek immediate medical assistance in all cases where poisoning is suspected.** While the National Poisons Centre recommends against inducing vomiting in most poisoning cases, should this material be swallowed, every effort should be made to remove the solution from the mouth and stomach immediately by any available means. Give the patient two glasses of water and induce further vomiting – if necessary, by placing a finger down the throat. Giving the patient ½ glass of whiskey with a tablespoon of sugar added may be of benefit after vomiting has occurred.

Eye Contact: Wash eyes with copious amounts of water.

Skin Contact: Wash exposed area twice with soap and water, flushing well.

Contaminated Clothing: Remove contaminated clothing and wash before re-use. Wear rubber gloves, overalls and secure footwear when handling 1080 . Clothing and gloves must be decontaminated by washing in hot soapy water. Ensure that all solution and contaminated equipment and clothing is secured before removing from the work site.

Do NOT induce vomiting or give anything by mouth if patient is unconscious or convulsing.

PROMPT TREATMENT IS ESSENTIAL. CALL FOR MEDICAL ATTENTION IMMEDIATELY.

5. FIRE FIGHTING MEASURES

1080 solution produces no toxic emissions as either vapours, gases or odours. Hazards arise through contact with the skin, eyes or by ingestion.

6. ACCIDENTAL RELEASE MEASURES

In the event of major spills, inform the Fire Service immediately via the 111 emergency phone service, and then local health protection officers at your District Health Board or hospital. Isolate and cordon off spillage. If possible, recover any spilled solution by using an absorbent material such as dry sawdust. Collect absorbent material and place in appropriately labeled containers. Dispose of absorbent material by incinerating or by burying in a landfill approved for hazardous substances. Wash down the spill area with copious water. Take all practicable steps to manage any harmful effects of a spillage including preventing prepared baits from entering streams or waterways. Scoop spilled baits into secure containers and dispose of spoiled bait as directed below. Use a broom to collect fine material and wash down the spill area with copious water only after all spilled bait has been removed. Give consideration to possible hazards arising from washing down and ensure people, pets, livestock, wildlife and fish will not be exposed to the dilute toxic run-off.

7. HANDLING AND STORAGE

When handling open containers or preparing baits, wear overalls worn outside rubber boots, a perspex face screen and impervious rubber or PVC gloves. Do not eat, drink or smoke when using the product or handling open containers. Wash protective clothing and equipment daily after work. Remove protective clothing and wash hands and exposed skin thoroughly before meals and after any contact.

Store in original container, tightly closed, under lock and key and away from feed or foodstuffs. Keep out of reach of children. This product must always be under the control of an approved handler who holds a current test certificate endorsed for Class 6 and Class 9 substances.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits: Ministry of Health exposure limit set February 2002 is 0.015 micrograms of 1080 per ml in urine.

Tolerable Exposure Limits (TEL): EPA has prescribed the TEL_{water} for sodium fluoroacetate, expressed as the amount of sodium fluoroacetate per volume of water as 0.0035 milligrams per litre of water (0.00000035%).

Engineering Measures: Decontaminants are water (dilution), heat > 120˚C (denaturing) and microbial decomposition (degradation).

Personal Protection Equipment: Operators using or handling the product in open containers must wear gloves, overalls, PVC apron, Perspex face mask and waterproof boots. Do not smoke, drink or eat while handling the product. Wash hands, face and any exposed areas after use. Wash protective equipment immediately after use or otherwise isolate and containerise for return to a washing facility.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form / Colour / Odour: 1080 solution is a non-viscous blackish-purple solution.

Solubility in Water (g/L)	Very water soluble
Decomposition Point (ºC)	The active ingredient 1080 decomposes at 200 degrees Celsius and becomes unstable at 110 degrees Celsius.

10. STABILITY AND REACTIVITY

1080 solution is stable and non-reactive under normal storage and use conditions.

11. TOXICOLOGICAL INFORMATION

Exposure must be kept to absolute minimum. Sodium fluoroacetate may be absorbed through the eyes, broken skin or via the mouth.

TOXICITY DATA FOR THE ACTIVE INGREDIENT - VARIOUS SPECIES*

White laboratory rat (oral) LD_{50}	0.2 mg/kg B/W (Body Weight)
Brush-tailed possum (oral) LD_{50}	0.3 – 1.0 mg/kg B/W
Dog (oral) LD_{50}	0.1 – 0.35 mg/kg B/W
Cat (oral) LD_{50}	0.35 mg/kg B/W
Bennett's wallaby (oral) LD_{50}	0.2 mg/kg B/W
Mule deer (oral) LD_{50}	1.0 mg/kg B/W
Mouse (oral) LD_{50}	5.0 – 19.3 mg/kg B/W
Human (oral) LD_{50} (estimated)	0.7 – 2.1 mg/kg B/W

***** Data from US Department of the Interior, Biological Report No. 27 (1995); Ronald Eisler *"Sodium monofluoroacetate (1080) Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review"*

12. ECOLOGICAL INFORMATION

Use only for the purpose indicated and in the manner prescribed by the label. Sodium fluoroacetate may be present for many months in the carcasses of poisoned animals; thus presenting a secondary poisoning danger to carnivorous birds and mammals. Take steps to mitigate any potential non-target exposure by wildlife or domestic animals. Studies have shown that 1080 concentrations will decline within rotting carcasses through the microbial degradation of 1080.

1080 wastes are ecotoxic. Improper disposal of excess pesticide is unlawful. If wastes can not be disposed of by use according to label instructions, contact local Regional Council or a hazardous waste advisor for guidance.

13. DISPOSAL CONSIDERATIONS

Product: The best means of disposal is to use the substance for the purpose intended. The active ingredient sodium fluoroacetate is degraded through microbial activity and will decompose at temperatures above 200 degrees Celsius. It dilutes readily in water. Product which cannot be used should be disposed of by incineration after being applied to an absorbent, flammable material such as woodchips; or by treatment through a chemical treatment facility or sewage oxidation facility where this is allowed by local by-laws and regulations.

Container disposal: Triple rinse empty containers, then puncture them before burying in a suitable location at a landfill at a depth of at least 60 cm. Do not use the empty container for any other purpose.

14. TRANSPORT INFORMATION

Proper Shipping Name:	Pesticide, liquid, toxic, n.o.s. [contains Sodium fluoroacetate]
U.N. NO:	2902
Class:	6.1
Packing Group:	I

Maximum transport quantity as tools of trade:	5 litres

Packaging Approval : (5 litre Jerry Can) UN 4G/X24/S/04/NZ/ACP Ltd

15. REGULATORY INFORMATION

Deadly poison:. Available only to holders of Controlled Substances Licenses or persons licensed to transport dangerous goods. Label directions are mandatory. Registered Pesticides:

1080 SOLUTION – V002189. HSNO Approval HSR002427

Packaging approvals: The packaging for these products has been tested and complies with the UN convention for transportation of dangerous goods and with the EPA HSNO controls and variations stipulated under the 1080 re-assessment decision arising from application HRE05002 and released on 10 August 2007.

16. OTHER INFORMATION

SPECIAL PRECAUTIONS & OTHER COMMENTS:

It is strongly recommended that approved handlers carry an operable telephone, radio telephone or other means of obtaining urgent medical assistance as a precaution when using 1080 poison. Test communication systems and coverage before commencing operations.

May be fatal if swallowed. Wear waterproof gloves when using 1080. Wash hands after handling baits or animals that have been contaminated with 1080. Do not use poisoned or contaminated animals for food or feed.

This product is toxic to wildlife. Birds and mammals feeding on carcasses of contaminated animals may be fatally poisoned. Take measures to minimise the chance of the solution or baits accidentally entering any body of water. Apply the product only as specified by label directions.

Where practicable, the exposed bodies of all poisoned animals should be collected and destroyed by complete burning or deep burial at a landfill approved for hazardous wastes. Dehydrated carcasses may remain dangerous to dogs or cats for an indefinite period. A single mouse poisoned by 1080 may contain enough poison to kill an adult dog.

CONSULT NEAREST POISON CONTROL CENTER FOR CURRENT INFORMATION.

All information contained in this Data Sheet is as accurate and up-to-date as possible. Since Animal Control Products Ltd cannot anticipate or control the conditions under which this information may be used, each user should review the information in the specific context of the intended application.

SDS Revised by: WJ Simmons
Revision date: 6 May 2011

APPENDIX 5. 0.15% 1080 Pellet Label[10]

DANGER:DEADLY POISON

KEEP OUT OF REACH OF CHILDREN. ECOTOXIC

HSNO CLASSES: 6.1B, 6.8A, 9.1D, 9.3A

0.15% 1080 PELLETS

Bait in pellet form for poisoning of possums and rodents
Contains 1.5g/kg sodium fluoroacetate in the form of a bait

PRECAUTIONS

Acutely toxic. May be fatal if swallowed, inhaled or absorbed through the skin. Repeated oral exposure may cause reproductive or developmental damage. When handling open containers or baits, wear protective equipment as shown in precautions box below.
Very toxic to terrestrial vertebrates. Take measures to reduce the risk of non-target animals being exposed to the toxin either through eating baits or by scavenging the carcasses of poisoned animals.
Harmful to aquatic organisms. Manage bait application rates carefully and comply with any restrictions imposed on placing baits over or near waterways. Avoid pollution of any water supply with pellets or used container.
Storage: Store in original container, tightly closed, under lock and key and away from feed or foodstuffs. Keep out of reach of children. This product must always be under the control of an approved handler who holds a current test certificate endorsed for Class 6 and Class 9 substances. Do not store in direct or diffused sunlight. Avoid cyclic heating and cooling.
Handling: When handling open containers or laying baits, wear overalls worn outside rubber boots, and impervious rubber or PVC gloves. When loading aircraft or working in windy conditions, wear goggles and a dust mask as protection against dust entering the eyes or mouth. Do not eat, drink or smoke when using the product or handling open containers. Wash protective clothing and equipment daily after work. Remove protective clothing and wash hands and exposed skin thoroughly before meals and after any contact. Thoroughly wash implements, spreading equipment, aircraft and bait stations before removing them from the operational area.

EMERGENCY MANAGEMENT

Symptoms of Poisoning: Early Symptoms: Nausea, vomiting, tingling and numbness in face and hands, stomach pains, apprehension and anxiety. Later Symptoms: Muscular twitching, blurred vision, mental confusion. Severe Symptoms: Coma, convulsions
First Aid: Act immediately if poisoning is suspected. DO NOT induce vomiting. Call a doctor or emergency physician at your nearest hospital immediately. For further advice contact National Poisons Centre 0800 POISONS (Phone 0800 764 766).
Spillage: In the event of major spills, inform the Fire Service immediately, and then local health protection officers at your District Health Board or hospital. Isolate the spill area and exclude all bystanders. Take all practicable steps to manage any harmful effects of a spillage including preventing baits from entering streams or waterways. Scoop spilled baits into secure containers. Recover any undamaged bait for later use by placing in appropriately labelled containers and dispose of spoiled bait as directed below. Use a broom to collect fine material and wash down the spill area with copious volumes of water only after all spilled bait has been removed.
Disposal: The active ingredient, sodium fluoroacetate, is degraded through microbial activity and will decompose at temperatures above 200 degrees Celsius. It dilutes readily in water. Product which is surplus or spoiled should be disposed of by burying with other organic material on the active tip face of an appropriately managed landfill or buried within the biologically active layer of soil elsewhere within a secure area. Ensure that a good covering of earth is applied over the bait immediately to prevent access by scavenging birds. Avoid deep disposal or burying where groundwater contamination may occur. Alternatively, burn unwanted bait material in a suitably constructed and appropriately located incinerator and bury any residues as above. Treating the baits through a sewage oxidation facility or other chemical treatment facility is also an acceptable means of disposing of unwanted bait material where this is allowed by local by-laws and regulations. Burn empty bags or bury in a suitable location at a landfill at a depth of at least 60 cm. Do not use the empty container for any other purpose.

DIRECTIONS FOR USE

Ground based treatment: Pellets may be applied in weather proof bait stations, by using a mechanical spreader or by hand broadcasting. A period of pre-feeding with non-toxic baits prior to applying toxic baits, is recommended for best results.
Aircraft: Apply bait by aircraft using suitable bait spreading equipment. For best results, pre-feed the area to be treated with non-toxic baits at least 2 weeks prior to application of the toxic baits. Bait application rates will vary according to possum or rodent density and habitat type but bait application rates of 3kg – 5kg per hectare will achieve effective control in most cases.
Weather conditions: If weather proof bait stations are not being used, this product should not be laid unless fine weather is expected for 72 hours after bait application.
Deer Repellent: When possum control is to be undertaken in areas where feral deer may be at risk from eating baits, GEDR™ deer repellent, applied to the surface of pellet baits at a rate of 12 kg per tonne in accordance with the manufacturer's label instructions, may be used to reduce or eliminate the uptake of baits by deer.

LEGAL OBLIGATIONS

Sale and use: This product must be sold only to or used by a person holding a Controlled Substances Licence issued by a test certifier who has been approved. If the product is applied aerially, public notification is required. Additional permissions may be required depending on the method of use and location of use. This product must only be used as specified in the label.
Signage: Signs must be erected at every normal point of entry to the place where the substance is to be applied. Signs must remain in place until baits are retrieved or are no longer toxic, or until any other legal requirement affecting signage has been complied with.
Tracking: It is a legal requirement that this product is tracked using the unique pack identifiers for its full lifecycle, including date, location of its use or means of disposal.

[10] Source: http://www.pestoff.co.nz/Labels/LabelV2848.pdf August 2011

GENERAL INFORMATION

Shelf life: The shelf life of this product may vary according to the suitability of storage conditions. As a guide, it is recommended that the product be used within 3 months of date of manufacture as studies have shown that the palatability of bait may progressively decline after that time. Any product held after the expiry date shown on the bag should be disposed of according to label directions.

Livestock: It is extremely important to prevent access to baits by domestic livestock and pets. Stock must be kept off the treatment area until baits have been washed out by rain, removed or destroyed. Dogs and cats are particularly at risk from eating poisoned possum and rodent carcasses and pet owners in the immediate vicinity must be notified of this risk. Collect poisoned animal carcasses where practicable for burning or burying at least 600 mm below ground, otherwise limit access to the treatment area until poisoned animal carcasses are unlikely to be eaten or to contain residues.

Conditions of sale: As no control can be exercised over the methods or conditions under which this product is used, no responsibility or claim, other than those required by statute, will be accepted for any damage or injury whatsoever arising from the storage, handling, application, use or disposal of this product.

Transport information: Proper shipping name: PESTICIDES, SOLID, TOXIC, N.O.S.; UN 2588, Packing Group II, Toxic 6.1B, Hazchem 2X

WJS : APR 2010

Registered to and Manufactured by:
Animal Control Products Ltd, 408 Heads Road, Whanganui, New Zealand Ph 64 (0)6 344 5302
For safety data sheet go to http://www.pestoff.co.nz/msdpage.htm

Registered pursuant to the ACVM Act 1997, No. V002848. See http://www.nzfsa.govt.nz/acvm for conditions of registration

NET CONTENTS

RS5 ☐	250kg		300kg		350kg		
	400kg		450kg		500kg		
No.7 ☐	550kg		600kg		650kg		

Pack No.: _____

PRF No./Manuf. date:

Lure/Size:

Expiry Date: _____

TRACK

ACP PROTECTING NEW ZEALANDS ENVIRONMENT AND TRADE

51H/Z/0405

UN 1174/652

IN A TRANSPORT EMERGENCY DIAL 111 FOR POLICE OR FIRE

APPENDIX 6. Pellet Bait SDS[11]

1080 PELLETS

ANIMAL CONTROL PRODUCTS LTD

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	(a) 0.04% 1080 PELLETS (b) 0.08% 1080 RODENT PELLETS (c) 0.08% 1080 PELLETS (d) 0.10% 1080 FERAL CAT BAIT (e) 0.15% 1080 PELLETS (f) 0.2% 1080 PELLETS
Synonyms:	1080 pellets
Supplier:	Animal Control Products Ltd
Street address:	Physical address: 408 Heads Road, Whanganui 4501, New Zealand.
Postal address:	Postal address: Private Bag 3018, Whanganui 4540, New Zealand.
Telephone:	64 (0) 6 344 5302
Facsimile:	64 (0) 6 344 2260
After hours telephone numbers:	0274798 318 or 0274798 319
ACCIDENTAL HUMAN POISONING **National Poisons Centre:** **Emergency phone number for spills, transport emergencies and risk mitigation:**	Dial 111 and be ready to provide information from the product label to medical personnel. Free phone 0800 764 766 Dial 111

2. COMPOSITION / INFORMATION ON INGREDIENTS

Product Name:	**(a) .04% 1080 PELLETS** **(b) 0.08% 1080 RODENT PELLETS** **(c) 0.08% 1080 PELLETS** **(d) 0.10% 1080 FERAL CAT BAIT** **(e) 0.15% 1080 PELLETS** **(f) .2% 1080 PELLETS**
Synonyms:	1080 pellets
Active Ingredient:	Sodium fluoroacetate 0.04% - 0.2%
Other Ingredients:	(a, b, c, e, f) Cereals, sugars and binders (d) Fishmeal, fish oil and binders
Molecular Weight of Active:	100.02
Molecular Formula of Active:	F C H_2 CO_2 Na
Recommended Use:	Pelletised bait for the control of rabbits, possums, rodents, wallabies or feral cats.
Appearance:	Cylindrical green pellets.

[11] http://www.pestoff.co.nz/images/stories/sds/sds1080pellets.pdf August 2011

3. HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE: This product contains a DEADLY POISON.

HSNO Approval Codes: HSR002422 (0.04%-0.08%), HSR002423 (0.1%), HSR002424 (0.15%-0.2%)

HAZARD CLASSES:	**0.04% & 0.08% 1080 pellets:** 6.1C, 9.3B **0.1% 1080 pellets:** 6.1C, 6.8A, 9.1D, 9.3B **0.15% - 0.2% 1080 pellets:** 6.1B, 6.8A, 9.1D, 9.3A
HAZARD IDENTIFIERS:	**Priority Identifiers -** Danger. Deadly Poison. Keep out of reach of children. Ecotoxic. **Secondary Identifiers -** Acutely toxic. May be fatal if swallowed, inhaled or absorbed through the skin. Repeated oral exposure may cause reproductive or developmental damage. When handling open containers or baits, wear protective equipment as indicated below. Toxic to terrestrial vertebrates. Take measures to reduce the risk of non-target animals being exposed to the toxin either through eating baits or by scavenging the carcasses of poisoned animals. Harmful to aquatic organisms. Manage bait application rates carefully and comply with any restrictions imposed on placing baits over or near waterways. Avoid pollution of any water supply with pellets or used container.
DANGEROUS GOODS CLASS:	**0.04% - 0.1%** 6.1C (Packing Group 3) **0.15% - 0.2%** 6.1B (Packing Group 2)
GENERAL REQUIREMENTS:	Deadly Poison. Subject to tracking requirements for individual packs. Available for purchase and use only by holders of Controlled Substances Licenses. This substance must be under the control of an Approved Handler for Class 6 and Class 9 Hazardous substances at all times unless being transported by a transport operator with a Dangerous Goods License endorsement.

SYMPTOMS OF POISONING:

Early Symptoms: Nausea, vomiting, tingling and numbness in face and hands, stomach pains, apprehension and anxiety.

Later Symptoms: Muscular twitching, blurred vision, mental confusion.

Severe Symptoms: Coma, convulsions.

4. FIRST AID MEASURES

Ingestion: **Seek immediate medical assistance in all cases where poisoning is suspected.** National Poisons Centre recommends against inducing vomiting in most cases but in particular, never use any chemical means of inducing vomiting. In areas remote from medical assistance, there may be benefit in inducing vomiting by placing a finger down the throat. Giving the patient ½ glass of whiskey with a tablespoon of sugar added may be of possible benefit if carried out immediately after poisoning has occurred.

Eye Contact: Wash eyes with copious amounts of water.

Skin Contact: Wash exposed area twice with soap and water.

Contaminated Clothing: Remove contaminated clothing and wash before re-use. Wear rubber gloves, overalls and secure footwear when handling 1080 pellets. Check pockets of protective clothing for dust, fragments and pellets. Do not eat, drink or smoke. Clothing and gloves must be decontaminated by washing in hot soapy water. Ensure pellets are not trampled off site.

Do NOT induce vomiting or give anything by mouth if patient is unconscious or convulsing.

PROMPT TREATMENT IS ESSENTIAL. CALL FOR MEDICAL ATTENTION IMMEDIATELY.

5. FIRE FIGHTING MEASURES

Low flammability risk. 1080 pellets have no toxic emissions as either vapours, gases or odours. In pellet form, hazards arise through prolonged direct contact with skin, or by ingestion.

6. ACCIDENTAL RELEASE MEASURES

In the event of major spills, inform the Fire Service immediately via the 111 emergency phone service, and then local health protection officers at your District Health Board or hospital.

Isolate the spill area and exclude all bystanders. Take all practicable steps to manage any harmful effects of a spillage including preventing baits from entering streams or waterways. Scoop spilled baits into secure containers. Recover any undamaged bait for later use by placing in appropriately labeled containers and dispose of spoiled bait as directed below. Use a broom to collect fine material and wash down the spill area with copious water only after all spilled bait has been removed. Give consideration to possible hazards arising from washing down and ensure people, pets, livestock, wildlife and fish will not be exposed to the dilute toxic run-off.

7. HANDLING AND STORAGE

When handling open containers or baits, wear overalls worn outside rubber boots, and impervious rubber or PVC gloves. When loading aircraft or working in windy conditions, wear goggles and a dust mask as protection against dust entering the eyes or mouth. Do not eat, drink or smoke when using the product or handling open containers. Wash protective clothing and equipment daily after work. Remove protective clothing and wash hands and exposed skin thoroughly before meals and after any contact.

Store in original container, tightly closed, under lock and key and away from feed or foodstuffs. Keep out of reach of children. This product must always be under the control of an approved handler who holds a current test certificate endorsed for Class 6 and Class 9 substances.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits: Ministry of Health exposure limit set February 2002 is 0.015 micrograms of 1080 per ml in urine.

Tolerable Exposure Limits (TEL): EPA has prescribed the TEL_{water} for sodium fluoroacetate, expressed as the amount of sodium fluoroacetate per volume of water as 0.0035 milligrams per litre of water (0.00000035%).

Engineering Measures: Decontaminants are water (dilution), heat > 120˚C (denaturing) and microbial decomposition (degradation).

Personal Protection Equipment: Operators using or handling the product in open containers must wear gloves, overalls and waterproof boots. Do not smoke, drink or eat while handling the product. Wash hands, face and any exposed areas after use. Wash protective equipment

immediately after use or otherwise isolate and containerise for return to a washing facility. When working around aircraft, wear a suitable dust mask to prevent inhalation of airborne particles.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form / Colour / Odour: 1080 pellets in have a cylindrical form, are dyed green and may have an odour of cinnamon, fruit flavouring or fish.

Solubility in Water (g/L)	Pellets will eventually lose their form and disintegrate if immersed in water for several hours or more.
Decomposition Point (ºC)	The active ingredient 1080 decomposes at 200 degrees Celsius and becomes unstable at 110 degrees Celsius.

10. STABILITY AND REACTIVITY

1080 pellets are stable and non-reactive under normal storage and use conditions.

11. TOXICOLOGICAL INFORMATION

Exposure must be kept to absolute minimum. Sodium fluoroacetate may be absorbed through the eyes, broken skin or via the mouth.

TOXICITY DATA FOR THE ACTIVE INGREDIENT - VARIOUS SPECIES*

White laboratory rat (oral) LD_{50}	0.2 mg/kg B/W (Body Weight)
Brush-tailed possum (oral) LD_{50}	0.3 – 1.0 mg/kg B/W
Dog (oral) LD_{50}	0.1 – 0.35 mg/kg B/W
Cat (oral) LD_{50}	0.35 mg/kg B/W
Bennett's wallaby (oral) LD_{50}	0.2 mg/kg B/W
Mule deer (oral) LD_{50}	1.0 mg/kg B/W
Mouse (oral) LD_{50}	5.0 – 19.3 mg/kg B/W
Human (oral) LD_{50} (estimated)	0.7 – 2.1 mg/kg B/W

* Data from US Department of the Interior, Biological Report No. 27 (1995); Ronald Eisler *"Sodium monofluoroacetate (1080) Hazards to Fish, Wildlife, and Invertebrates: A Synoptic Review"*

12. ECOLOGICAL INFORMATION

Use the pellets only for the purpose indicated and in the manner prescribed by the label. Sodium fluoroacetate may be present for many months in the carcasses of poisoned animals; thus presenting a secondary poisoning danger to carnivorous birds and mammals. Take steps to mitigate any potential non-target exposure by wildlife or domestic animals. Studies have shown that 1080 concentrations will decline within rotting carcasses through the microbial degradation of 1080.

1080 wastes are ecotoxic. Improper disposal of excess pesticide is unlawful. If wastes can not be disposed of by use according to label instructions, contact local Regional Council or a hazardous waste advisor for guidance.

13. DISPOSAL CONSIDERATIONS

The active ingredient sodium fluoroacetate is degraded through microbial activity and will decompose at temperatures above 200 degrees Celsius. It dilutes readily in water. Product which is surplus or spoiled should be disposed of by burying with other organic material on the active tip face of an appropriately managed landfill or buried within the biologically active layer of soil

elsewhere within a secure area. Ensure that a good covering of earth is applied over the bait immediately to prevent access by scavenging birds. Avoid deep disposal or burying where groundwater contamination may occur. Alternatively, burn unwanted bait material in a suitably constructed and appropriately located incinerator and bury any residues as above. Treating the baits through a sewage oxidation facility or other chemical treatment facility is also an acceptable means of disposing of unwanted bait material where this is allowed by local by-laws and regulations.

Burn empty bags or bury in a suitable location at a landfill at a depth of at least 60 cm. Do not use the empty container for any other purpose.

14. TRANSPORT INFORMATION

Proper Shipping Name:	Pesticide, solid, toxic, n.o.s. [contains Sodium fluoroacetate]
U.N. NO:	2588
Class:	6.1
Packing Group:	III (0.04% - 0.1%) and II (0.15% - 0.2%)

Maximum transport quantity as tools of trade:	0.04% - 0.1% = 250 kilograms 0.15% - 0.2% = 50 kilograms (Placarding and DG documents not required but this Safety Data Sheet must be carried.)

15. REGULATORY INFORMATION

Deadly poison:. Available only to holders of Controlled Substances Licenses or persons licensed to transport dangerous goods. Label directions are mandatory. Registered Pesticides:

(a) .04% 1080 PELLETS –V003785. HSNO Approval HSR002422
(b) 0.08% 1080 RODENT PELLETS - V009015. HSNO Approval HSR002422
(c) 0.08% 1080 PELLETS – V002829. HSNO Approval HSR002422
(d) 0.10% 1080 FERAL CAT BAIT – V004107. HSNO Approval HSR002423
(e) 0.15% 1080 PELLETS – V002848. HSNO Approval HSR002424
(f) .2% 1080 PELLETS – V002538. HSNO Approval HSR002424

Packaging approvals: The packaging for these products has been tested and complies with the UN convention for transportation of dangerous goods and with the EPA HSNO controls and variations stipulated under the 1080 re-assessment decision arising from application HRE05002 and released on 10 August 2007.

16. OTHER INFORMATION

SPECIAL PRECAUTIONS & OTHER COMMENTS:

It is strongly recommended that approved handlers carry an operable telephone, radio telephone or other means of obtaining urgent medical assistance as a precaution when using 1080 poison. Test communication systems and coverage before commencing operations.

May be fatal if swallowed. Wear waterproof gloves when using 1080. Wash hands after handling pellets or animals that have been contaminated with 1080. Do not use poisoned or contaminated animals for food or feed.

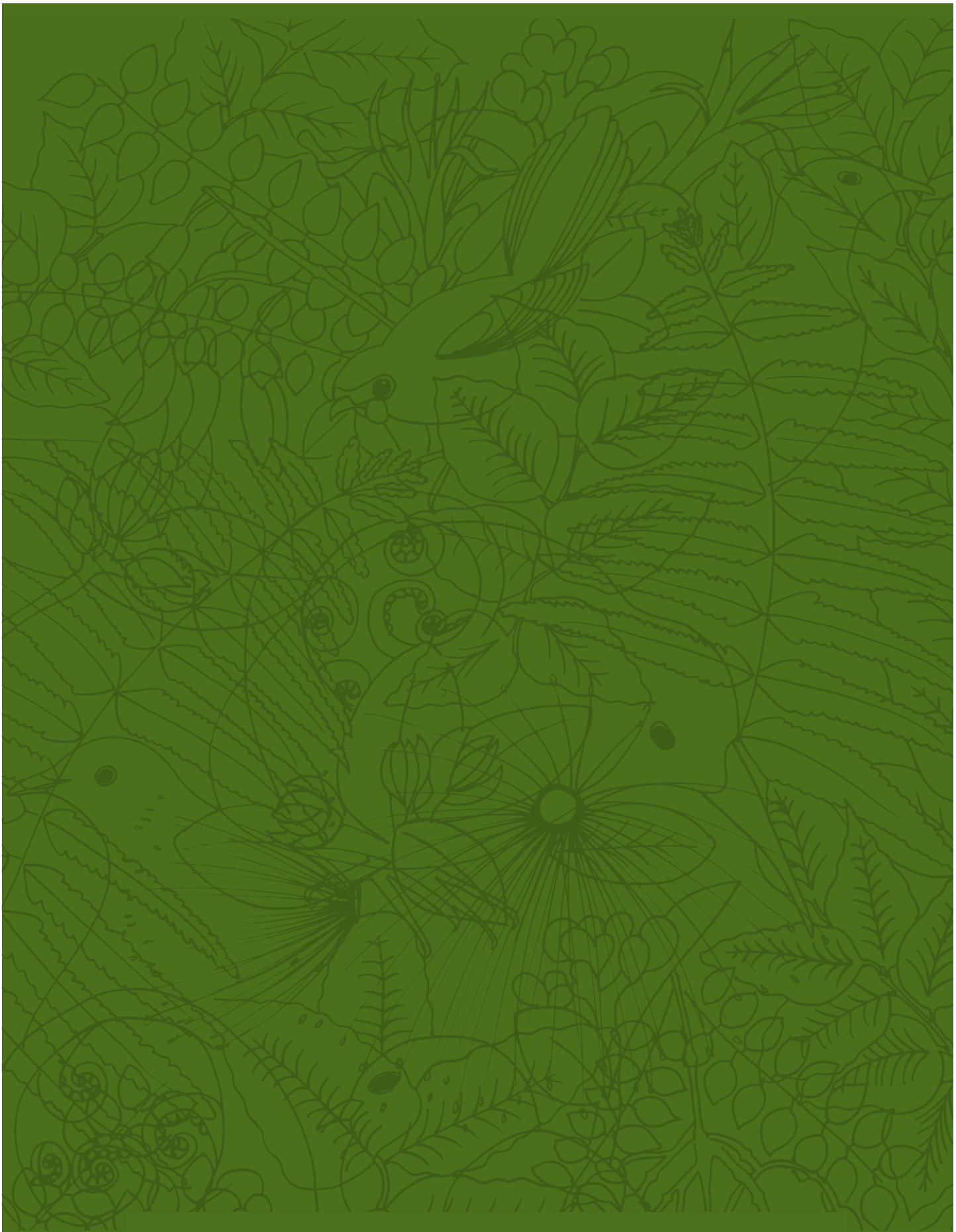
This product is toxic to wildlife. Birds and mammals feeding on carcasses of contaminated animals may be fatally poisoned. Take measures to minimise the chance of baits accidentally entering any body of water. Apply the product only as specified by label directions.

Where practicable, the exposed bodies of all poisoned animals should be collected and destroyed by complete burning or deep burial at a landfill approved for hazardous wastes. Dehydrated carcasses may remain dangerous to dogs or cats for an indefinite period. A single mouse poisoned by 1080 may contain enough poison to kill an adult dog.

CONSULT NEAREST POISON CONTROL CENTER FOR CURRENT INFORMATION.

All information contained in this Data Sheet is as accurate and up-to-date as possible. Since Animal Control Products Ltd cannot anticipate or control the conditions under which this information may be used, each user should review the information in the specific context of the intended application.

Revised by: WJ Simmons
Date of Revision: 6 May 2011



PRODUCED BY

Bionet.NZ

National Pest Control Agencies