# GUIDELINES ON

# CHOOSING THE CORRECT ERADICATION TECHNIQUE

## PURPOSE

- These Guidelines are to be used by Project Managers conducting rodent and/or cat eradication projects based on the PII Resource Kit for Rodent and Cat Eradication.
- The Guidelines cover advice on choosing which technique to use for the eradications.

## 1. RODENTS

- The primary method for eradicating rodents from islands is the use of anticoagulant toxin inside cereal-based baits, distributed across the entire island in a methodical and comprehensive manner. This method has been developed and refined over many years and in many different eradication projects. Do not consider or attempt any other method unless there is a very clear and justifiable reason why anticoagulant toxins cannot be used.
- The choice of distribution technique will depend on local circumstances and should be investigated through a feasibility study prior to operational planning.
- In principle the least risk (of failure) method in New Zealand is aerial baiting with brodifacoum cereal baits. If this is not feasible then hand broadcasting brodifacoum baits is the next option to investigate. If this is not feasible then bait stations using brodifacoum should be considered. If brodifacoum is not an option, cereal baits containing diphacinone could be considered a higher risk alternative - but only if used in bait stations.
- Moving from aerial to hand broadcasting increases the number of people involved (with a corresponding increase in risk of mistakes). It may also involve the cutting of tracks with associated cost and environmental damage.
- Moving from hand broadcasting to bait stations increases the length of the implementation phase of the project and introduces another variable (the bait station).
- Moving from second (brodifacoum) to first (diphacinone) generation anticoagulant toxin means rats will have to feed for several days on the bait to ensure a lethal dose.
- Eradication Methods – preferred options:
    - **Island is over 30ha (heavily forested) or over 100 hectares (open ground)** – aerial broadcast of a proven anticoagulant bait is recommended.
    - **Island is under 30ha (heavily forested) or under 300ha (open ground)** – hand-broadcast of a proven anticoagulant bait is an alternative to aerial baiting. With experience, larger islands can potentially be targeted using this method.

- Use of bait stations is a viable alternative to the above options for islands of up to 30ha (heavily forested) or 300 hectares (open ground), and in certain circumstances larger islands, where use of bait stations will reduce effects on key non-target species, but is considered to have more risk of failure.

[For details on the three different methods, see Guidelines on Baits and Baiting]

## 1.1 METHOD PROS AND CONS

| Method | Advantages | Disadvantages |
|---|---|---|
| **Aerial broadcast:**<br><br>[Application of cereal based pellets with a toxin (brodifacoum most often used and proven successful) from a helicopter] | • Can cover whole area in a short space of time.<br>• Proven to be a highly successful technique elsewhere, more reliable than hand-broadcast or bait stations.<br>• Achieves consistent bait spread and allows bait to get into difficult areas e.g. cliffs, swamps, dense forest.<br>• Often the only practical option for larger areas | • High cost particularly if no local helicopters available or not big enough to do job or has no suitable gear, or experienced pilots.<br>• A high reliability on outside expertise (pilots) and relies heavily on computer/GPS technology, which can fail<br>• Often results in community concerns about bait being dropped from the air - important to resolve<br>• Non target species present likely to be affected by direct consumption of bait. |
| **Hand Broadcast:**<br><br>[Hand-spreading of cereal based pellets or blocks with a toxin (brodifacoum most often used and proven successful)] | • Lower cost compared to aerial baiting, requires less specialist equipment & personnel, and has been used successfully elsewhere on islands up to 300ha.<br><br>• Coverage of island can usually be completed quickly compared with use of bait stations. | • Labour intensive, requires good training & operational management to achieve adequate & even bait spread.<br>• Non target species present likely to be affected by direct consumption of bait.<br>• Coverage of island can be hampered by large areas of cliff, thick forest or swamp, increasing risk of incomplete coverage |

| | | |
|---|---|---|
| **Bait stations:**<br><br>[Toxic bait is contained in custom made bait stations] | • Bait contained in station reduces non-target effects (but does not eliminate them).<br><br>• Generally the safest option if livestock is present<br><br>• Generally less community resistance to use of toxins by this method<br><br>• Can cover large islands if a reliable source of local labour is available.<br><br>• Generally uses less toxin per hectare than other methods | • Very labour-intensive, requires intensive grid & multiple refills to achieve eradication.<br>• Time-consuming – takes several weeks based on the island as opposed to (usually) a single day for aerial or hand-broadcast.<br>• Coverage of island can be hampered by large areas of cliff, thick forest or swamp, increasing risk of incomplete coverage.<br>• Non target predatory or scavenging species present likely to be affected by consumption of dead or dying rodents. |

## 1.1. COMPARISON BETWEEN BROUDIFACOUM AND DIPHACINONE

| **Broudifacoum** | **Diphacinone** |
|---|---|
| 2nd generation anti-coagulant more toxic than 1st generation anti-coagulants | 1st generation anti-coagulant less toxic than 2nd generation anti-coagulants |
| Preferred toxin to be used in aerial, hand broadcast and bait stations | Only recommended to be used in bait stations |
| One dosage often proves fatal. | To receive lethal dosage rodents need to repeatedly eat bait over several days |
| Greater risk of secondary poisoning of non-target species as 2nd generation anti-coagulants are not substantially metabolised and excreted before | Lesser risk of secondary poisoning of non-target species |

| | |
|---|---|
| death. | |

### 1.2. DISCUSSION ON OTHER POSSIBLE OPTIONS

- Note that trapping is **NOT** an effective eradication technique for rodents, unless the island is extremely small (suggested maximum <5 hectares). Even then, the use of the recommended toxins is preferred as a technique. Almost invariably a small percentage of rodents will escape or become wary of traps, and as eradications depend on 100% of rodents being targeted it is likely an attempt to eradicate using traps only will fail.

- While fast-acting acute toxins such as cyanide and sodium fluoroacetate (1080) have been used successfully to achieve the eradication of some invasive mammals from islands, the use of these acute toxins carries a substantial risk of failure and they have not proven to be reliably effective for eradication of rodents. The onset of sickness behaviour associated with poisoning symptoms from acute toxins is quite rapid, so any animal which ingests only enough bait to receive a sub-lethal dose before the onset of symptoms associate their sickness with eating the bait. Such animals, when they recover, are more cautious about novel foods and avoid taking any further baits.

## 2. CATS

- Unlike rodent eradications, in cat eradications it is unlikely that all individuals will succumb to a single toxin or any other single control method. The strategy for eradication of cats therefore is considerably more complex than for rodents, and requires a careful planning of sequence of methods that takes into account many other factors, including: other species being targeted (if any); the size, vegetation and terrain of the island; the size, density and general ecology of the cat population; limitations on methods imposed by local laws or vulnerable non-target species; and other issues such as any prior control efforts. For this reason it is very important to obtain specialist input and advice from experienced cat eradication specialists and feral cat ecologists.

- The strategy ideally should be to work progressively from passive, low disturbance techniques such as poisoning, to more direct methods such as dogging and shooting. This is critical - an initial technique that catches fewer cats but does not educate any survivor to avoid humans or physical devices is preferable to one that catches more cats but leaves the few survivors educated and wary.

- The operation will normally comprise two distinct phases – the relatively quick 'knockdown' phase (to remove the bulk of the population as quickly and effectively as possible) and the more persistent 'follow-up' phase, to remove any survivors. This is followed by prolonged monitoring to confirm success.

### 2.1KNOCKDOWN PHASE

- The aim of the knockdown technique should be to target all individuals, and the strategy should be planned on this basis. Not all individuals will succumb to the method but all should at least be exposed to it, i.e. coverage of the technique should encompass all of the treatment area. The aim is to remove the vast majority by this method (at least 90% of all individuals is a suggested minimum goal– the greater the % knockdown the easier and more cost effective the follow-up work is likely to be). The faster the knockdown can affect the greatest proportion of the population without individual cats becoming wary of the technique, the better the results are likely to be.

- Use a technique that will remove a large proportion of the cats, while keeping at least one very good technique for later use in the 'follow-up' phase. The best option will depend on local circumstance, so seek advice. Recommended options include use of a cat-specific toxic bait, or use of baited leg-hold traps, or (less preferable) is the use of cage-traps or kill-traps.

### 2.2 FOLLOW-UP PHASE

- Follow-up techniques should be implemented as soon as practical after effects of the knockdown technique have fully manifested. For brodifacoum operations against rodents (and pindone operations against rabbits) this is likely to be 3-4 weeks after the first baiting. For most other options follow-up can be instigated almost immediately.

- The remaining cats will be those that for whatever reason have not succumbed to the initial 'knockdown' method. They are likely to be more cautious and wary, so a planned sequence of additional techniques should be employed, ensuring that not all are used at once, and that at least one highly effective technique is reserved for 'emergency' use only.

- Recommended options for follow-up methods include leg-hold traps (both baited cubby sets and unbaited walk-through sets), hunting by spotlight, use of trained dogs, kill traps and live-capture traps. See Guidelines on Cat Eradication and Monitoring Techniques for details on suitable options.

## 3. MULTIPLE SPECIES

- Target the rodents first using the recommended anticoagulant baits (bait rates do not need to be adjusted for the cats). Cats are vulnerable to secondary poisoning as a result of brodifacoum baiting against rodents, and usually the cat population will be significantly knocked down by secondary poisoning by this method (note that results have varied widely (< 50% kill - 100% kill) in past operations. However, some survivors must be expected and follow-up techniques must be planned for in a strategic sequence.

- Cats are possibly also vulnerable, but probably to a lesser extent to secondary poisoning in pindone or 1080 operations against rabbits.

- Thus, brodifacoum baiting targeted at rodents (and to a less proven extent, pindone or 1080 operations against rabbits) will act as a knockdown for cats, but this must be followed up with methods outlined below in 'follow-up'. If cats are present and are to be targeted in a multi-species eradication, the standard bait rates to target the rodents or rabbits do not need to be altered.

- Follow-up methods should use a planned sequence of other eradication methods, as outlined in Section 2 above.