

**Application Form for possum, rat
and stoat control in the Kepler
peninsula, Fiordland National Park**

May, 2019

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1. Introduction

1.1 Overview

It is proposed that the following pesticide uses will be applied:

- Pesticide Use [1] [Sodium fluoroacetate] [1.5g/kg] [RS5 cereal pellet] [aerial].
- Pesticide Use [116] [Pindone] [0.5g/kg] [cereal pellet] [bait stations]

Permission is sought for toxic application starting on or after 1 July 2019 and ending on or before 30 May 2020. Non-toxic prefeed will be applied no earlier than 20 June 2019.

1.2 Treatment area

Kepler 24,305 ha approx

1.3 Treatment block(s)

Aerial 24,105 Ground 200 ha approx

1.4 Geographical location

Fiordland National Park, encompassing mountains and valleys surrounded by Lake Manapouri and Lake Te Anau. The Te Anau township is less than 2km at the closest point to the treatment area, and Manapouri being approximately 7km to the closest part of the treatment area.

1.5 Adjacent land tenure and uses

Immediately adjacent land to the treatment area boundary is either public conservation land (national park or conservation stewardship land), or LINZ reserve in the case of the Waiau River.

1.6 Nearby residential areas or facilities

The treatment area is approximately 2km from the Te Anau township across Lake Te Anau. Te Anau had a population of 1911 in 2013 as recorded by the census conducted that year. There are two schools and four early childhood education centres located in Te Anau. It has a wide range of accommodation available with over 4000 bed available in the summer season. There are numerous business ventures operating to service the township and its visitors.

The treatment block includes portions of the Kepler Track which is one of New Zealand's great walks with over 15,000 visitors a year. This popular track is around 60 kilometres long and circular. Its use is seasonal with the alpine parts presenting significant avalanche risk and much reduced services in the winter months.

The following facilities are included in the treatment area:

- Dock Bay Picnic Area
- Brod Bay Campsite & Shelter
- Luxmore Hut
- Hanging Valley and Forest Burn Emergency Shelters
- Iris Burn Hut and Campsite
- Rocky Point Shelter
- Moturau Hut
- Shallow Bay Hut
- Hidden Lakes Track, Jetty and landing points

**1.7
Community
interests**

The Kepler Mountains which are part of Fiordland National Park include areas of high use. The local population regularly use the area between Rainbow Reach – Control Gates – and Brod Bay for regular recreational use. The Kepler Track is a Great Walk and has high use in the great walks season. It is easily accessed from the township of Te Anau.

The Kepler Challenge, a running event held annually on the Kepler track. It is scheduled to take place 7 December 2019.

Kids restore the Kepler is an approximately 3000 ha conservation project sponsored by Kids Restore New Zealand (Air New Zealand Environment Trust), The Fiordland Conservation Trust and The Department of Conservation. It provides an opportunity for youth to gain hands on experience with conservation. Most of the project is included in the operational area.

Recreational hunting is permitted in the park but not within 500 metres of the Kepler Track.

The Waiou River and Iris Burn are popular trout fishing water ways. Fishing season on these water ways begins 1 November. Lake Te Anau and Lake Manapouri are year round fisheries.

The Luxmore Caves are a popular destination located near Luxmore Hut.

EcoFX has sent information to the following concession holders:

Fiordland National Trust

Out of scope

Out of scope

Out of scope

Packrafting NZ

Out of scope

[Redacted]

Fiordland Jet
Flyfish the South
New Zealand Professional Fishing Guides
Fiordland Outdoors Co
Kepler Water Taxi
New Zealand Professional Fishing Guides
Real Journeys
Snowline Safaris Ltd
Te Tauri Trust (Tracknet)
The Alpine Group Ltd, Alpine Heli
Ultimate Hikes (Tourism Milford Limited)
Fiordland Outdoor Company Ltd

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Action Helicopters Limited
Back Country Helicopters Limited
Combined Helicopter Services Ltd
Fiordland Helicopters Ltd
Hawkeye Helicopters Limited
Heli My Way
Kane Helicopters Ltd
Milford Helicopters
Southern Lakes Helicopters Ltd
Station Air Ltd
Te Anau Helicopter Services Ltd
Wings and Water (Te Anau) Ltd

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Out of scope [Redacted]

Duncan Group (Dunedin Branch)

Fare Game Ltd

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Fiordland Enterprises Limited

Main Divide Meats

Mountain River Venison

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Out of scope

Ultimate Hikes (Tourism Milford Limited)

Out of scope

Out of scope

**1.8
Management
history**

In 2014 an aerial 1080 operation was run in the Iris Burn (11,000ha) in response to a beech mast and anticipated rodent plague. This operation was very successful, reducing rat numbers from 72% relative tracking index, to 0%. Rodent levels have remained low in the operation area since, but are expected to grow in response to significant seed production this year.

The Iris Burn operation was driven by the need to protect a diminishing Long-tailed bat population in the Iris Burn, which monitoring and past experience in other locations indicated that an untreated rodent irruption may result in the local extinction of the population. The Iris Burn operation area also contains relatively good populations of threatened native fauna including Kaka, Kea, Whio, Falcon, and Kiwi – and good populations of more common avian fauna such as kakariki, robin, rifleman, tomtits, and bellbirds. It is likely that Rock wren exist in suitable habitat in the treatment area, but no

reliable surveys have taken place to date.

A decision was made to expand the operation area from the Iris burn to encompass the whole Kepler peninsula, as it was acknowledged that is likely that Long tailed bats persist wider than the Iris Burn, and that solitary roosts and foraging areas would be larger than the previous control area. Kaka, Kea, Kiwi, and Falcon also persist in a greater Kepler area and would benefit from a larger area being treated. It is also acknowledged that being such an accessible site, doing work in the 'front faces' of the Kepler would bring considerable advocacy benefits to the area as the community could witness the benefits of using aerial 1080 in mast years. This work would be complimentary, if not essential, to the work FCT are doing if tangible benefits of biodiversity work are to be quantifiable.

The expansion of the treatment area is also aimed towards slowing decline of Fiordland Tokoeka and growing their numbers over time through predator control. There are significant benefits to advocacy in doing this work in such an accessible area to the public.

2016 most of the contract area was aerially treated with 1080 in response to a predicted significant mast event. This operation was successful and rat indices within the treatment area dropped from 17% to 1.7%.

Stoat trapping started in the Kepler in 2000/01, initiated by The Department of Conservation to protect Mohua (*Mohoua ochrocephala*) in the Iris Burn Valley. In 2006 the stoat trapping was extended to cover most of the length of the Kepler Track, and these traps continue to be serviced by volunteers on behalf of the Kepler Challenge Organising Committee. An additional 472 stoat traps were installed in 2012 across Harts Hill covering 3000 ha as part of the Kids Restore the Kepler project.

Rats have been controlled on the eastern side of Harts Hill using a grid of bait stations and A24 traps. This was installed in November 2014 and expanded in May 2015.

2. Outcomes and targets

2.1 Conservation outcome(s)

Many of New Zealand's iconic species are in various states of decline. A significant contributor to this decline is the presence of introduced invasive predators in our national parks and wilderness areas. Predator control can reduce this decline. This is especially important during a beech mast event. As rodents populations will quickly grow in the presence of abundance food sources. Seed production for 2019 is predicted to be the heaviest in decades. The predictable negative impacts that coincide with a ballooning rodent population can be reduced with control timed to knock the population down to low numbers before the seed matures.

The conservation outcome targets for the operation are:

- The current range of long-tailed bats is maintained or expanded, and bat numbers are stable or increasing as indicated by an increase in trend in adult female survival and Iris Burn population size.
- Whio numbers in the Iris Burn are stable or increasing.

2.2 Target(s)

Rat tracking index of 5% or less a month after treatment.

3. Consultation and consents

3.1 Consultation

High level consultation for 2019 Tiakina Nga Manu Battle for our birds programme has been undertaken by the Department of Conservation and is summarised in the spread sheet: Comms Plan BfoB 2019_all and multiple sites - DOC-5731655.

At the site specific level the Department developed the comms plan summarised in the spread sheet: Kepler BFOB 2019_Individual Communications Plan - Handed over to EcoFX 9.4.19. This plan will be followed and the updates will be summarised in the spread sheet: EcoFX_Comms Log Kepler Aerial 2019.

3.2 Consents

The following documents are attached as Appendix 4:

- Public health permission (including application form) or proof of public health application ¹ [*delete the options which do not apply*]
 - Copies of landowner/occupier consents (if obtained in writing)
 - Other (specify):
 - Other (specify):
-

¹ The complete public health permission (including application form) must be sighted before DOC permission will be granted.

4. Methods

4.1 Treatment block 1 (Aerial Control)

Pesticides—airial

Describe the pesticide use, covering the following points:

Pesticide use [1] [Sodium fluoroacetate][1.5g/kg] [Cereal pellet][aerial]	Target pest [Possums and Rats]
Brand name of pesticide	0.15% 1080 Pellets (6g RS5)
Lure/mask (& %)	Cinnamon 0.3%, dyed green
Type of pre-feed (lure/dye)	6g RS5 1.5% Cinnamon lured
Number of pre-feeds (if any)	One
Sowing rates for pre-feed and toxic bait	1.5 kg/ha
Other details about this method [Any other information not covered above to provide a full picture of the method.]	

Pesticides—bait station

Describe the pesticide use, covering the following points:

Pesticide use [116] [Pindone][0.5g/kg] [bait type][bait station]	Target pest [Rats]
Brand name of pesticide	Pindone pellets
Lure/mask (& %)	Cinnamon, dyed green
Type of pre-feed (lure/dye)	NA
Number of pre-feeds (if any)	NA
Prefeed quantity when filled	NA
Toxic bait-number fills	1- 4 as required
Toxic bait quantity when filled	300 - 400 grams
Describe pattern of bait stations (e.g., grid/contour/ spur-ridge)	Within aerial exclusion zone
Bait station spacing	100 metres
Bait station type	Philproof mini

Other details about this method

[Any other information not covered above to provide a full picture of the method]

**4.2
Justification
for proposed
method Aerial
treatment block**

Aerially broadcast 1080 is the chosen control method as it is currently the only tool that is able to achieve high operation efficacy in rat and possum kills across a landscape scale, at a reasonable cost. It is also the most effective and efficient method of rat and possum control over difficult and remote terrain (for a summary of operational efficacy of aerially broadcast 1080, see Fairweather *et al.*, 2013).

Timing of aerial 1080 treatment targeting rats can depend on multiple factors, including forest/habitat type, food availability/seed fall, and the times of heightened vulnerability to predation of the species being protected.

This strategy has been used in this block successfully in the past.

This operation will comply with the updated Method Best Practise for BFOB aerial 1080 baiting (DOC-2749355) and current Code of Practise for aerial 1080 in kea habitat (DOC-2612859)

**4.3
Treatment
Block 2 Ground
control**

These areas are being treated using this method because aerially applying bait in some areas is not appropriate. Along the Kepler Track is such an area. Rather than leaving a gap in the treatment which will have a negative impact on operational efficacy bait stations will be used to deliver Pindone.

This area is suited to this strategy because there are bait stations already in situ. Pindone has been used successfully to control Rats in other operations and can be used without pre-feeding.

**4.4
Justification
for proposed
method All
blocks**

The main justification for the proposed strategy is economic. With a widespread major mast event predicted native biodiversity will suffer if predator populations are allowed to grow in the absence of control.

5. Further information

Details of contractor or principle

If the operation will be contracted to another company, or if this application is being made on behalf of a principle organisation please provide the following details:

Company/organisation:	EcoFX
Contact person:	§ 9(2)(a)
Contact number:	+64 7 873 8130

Further information

Provide any other information or comments you would like to have considered.

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Appendix 1: DOC Performance Standards

Insert the appropriate sheet of Department of Conservation (DOC) Performance Standards for each pesticide use proposed for the operation. Complete all areas shaded grey on the sheet. This includes retaining the additional performance standards and information needs in the grey boxes that you propose for the operation.

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◆ INCLUDE ONE SHEET PER PESTICIDE USE ◆ COMPLETE SHADED AREAS ◆

Pesticide Use #1	Sodium fluoroacetate 1.5g/kg Cereal pellet Aerial (0.15% 1080 Pellet)	Target Pests: Possums, Rats
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Location of operation
Kepler 24,700 ha Appox



Caution Period
The estimated caution period for this operation is <i>[assessor to complete]</i> months after last date of bait application and is subject to compulsory bait and carcass monitoring. This estimated caution period cannot be reduced to less than 4 months, and must be extended if the endpoints for monitoring have not been met at the end of the period.

Performance Standards

Compulsory for **all** operations

- For operations targeting rats, prefeed with this pesticide use.
- The DOC Code of practice for aerial 1080 in kea habitat [DOC-2612859](#) must be followed.
- Flight paths to and from the bait loading zones by aircraft equipped with loaded or uncleaned bait sowing equipment must avoid: stocked paddocks, residential dwellings, and any other 'no fly zones' specified by consent providers.
- An aircraft must not, when flying to or from the treatment area, fly over a public drinking water supply or waterway that is less than 100 metres upstream of a point of extraction from a water source for a drinking water supply (not being a water supply exclusively for stock).
- For operations targeting possums, baits will have a mean size in excess of 6g and 95% of baits should weigh more than 4g.
- The baits must be dyed green or blue.
- The boundaries of the bait preparation and loading site are marked and loading site signs [docdm-181171](#) erected. At the end of every day of the operation (including the final day), the loading site and any storage area must be fenced so that people do not inadvertently enter the site and stock cannot gain access to the area. The fence and signs remain in place until the area is decontaminated.
- If there is any likelihood that farm stock has been exposed to 1080, the owner must be advised as soon as possible, and stock removed from the area.
- The product must only be used as specified on the manufacturer's product label.

Compulsory for this operation *(delete those that you won't be applying to your operation)*

- Bait sowing rate must be no greater than 5kg/ha for 6gm baits (or equivalent bait density per hectare for other bait sizes).
- Designate a "Safety Officer" on loading site who audits and ensures adherence to safety standards.
- Use bait sowing buckets with retractable legs.
- [Add further standards as required. These could include local performance standards as well as any recommendations from [Current Agreed Best Practice](#) that you want to apply to your operation. Attach conditions from other consents as separate pages.]*

Information Needs

Compulsory for **all** operations

Nil

Compulsory for this operation

- [Add as required.]*

Operational Planning & Design Considerations

- Apply bait in coldest months of year.
- For operations targeting possums, do not repeat aerial operations within 4 years using the same

bait.

- Current Agreed Best Practice – Possum Control – Aerial Application of 1080 Cereal Pellets [docdm-341728](#)
- Current Agreed Best Practice – Rat Control – Aerial Application of 1080 Cereal Bait [docdm-29375](#)

My approval dated *[date]* is subject to these performance standards being met. Compliance monitoring may occur.

[Name] Director, Operations

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◆ INCLUDE ONE SHEET PER PESTICIDE USE ◆ COMPLETE SHADED AREAS ◆

Pesticide Use #116	Pindone 0.5g/kg Cereal pellet Bait stations (Pindone Pellets)	Target Pests: Rats
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Location of operation
<i>Brod Bay to Queens Reach 200 hs approx</i>

Caution Period
The estimated caution period for this operation is <i>[assessor to complete]</i> months after bait removal and is subject to compulsory carcass monitoring. This estimated caution period cannot be reduced to less than 2 months, and must be extended if the endpoints for monitoring have not been met at the end of the period.

Performance Standards

*Compulsory for **all** operations*

1. Only use at sites where either possums are at very low abundance or being controlled simultaneously; or excluded from bait stations.
2. A continuous supply of bait must be available to all rats for the duration of the operation (a minimum of 5 consecutive days).
3. The baits must be dyed green or blue.
4. Bait stations will be removed or made pesticide-free at the completion of the operation.
5. The product must only be used as specified on the manufacturer's product label.

Compulsory for this operation (delete those that you won't be applying to your operation)

6. Do not use where pigs are present/reduce pig numbers prior to operation; or
7. Place bait out of reach of pigs to prevent primary poisoning, and reduce possum numbers (or exclude possums from bait stations) to help reduce the risk of secondary poisoning of pigs.
8. Bait station design must prevent access to baits by inquisitive birds (e.g. kea, weka and kaka).
9. *[Add further standards as required. These could include local performance standards as well as any recommendations from [Current Agreed Best Practice](#) that you want to apply to your operation. Attach conditions from other consents as separate pages.]*

Information Needs

*Compulsory for **all** operations*

1. Monitoring: Residue test shot samples of feral animals in operational areas, especially pigs and report results in operational report. The Vertebrate Pesticides Residue Database SOP [docdm-33461](#) applies.

Compulsory for this operation (delete those that you won't be applying to your operation)

2. Monitoring: Monitor pindone residues in carcasses of animals killed. Cage several carcasses and periodically send samples with time since poisoning for residue testing and report results in operational report. The Vertebrate Pesticides Residue Database SOP [docdm-33461](#) applies.
3. *[Add as required.]*

Operational Planning & Design Considerations

- Current Agreed Best Practice – Rat Control – 1st Generation Anti-Coagulants in Bait Stations [docdm-29378](#).

My approval dated <i>[date]</i> is subject to these performance standards being met. Compliance monitoring may occur.
_____ <i>[Name]</i> Operations Manager

Appendix 2: Maps

Both of the following must be supplied:

1. DOC permission map(s) as one or more image files (.JPG format preferred)
2. DOC Pesticide Summary shapefiles (**not required for DOC pest operations**)

Your DOC permission map(s) must show the following as a minimum:

- The external boundary of the treatment area or those treatment blocks included in this operation
- Legal boundaries of land managed by DOC
- Name of treatment area
- Land tenure and adjacent owners, including leased land
- Any areas excluded from the treatment area (such as around public water supplies, pā sites)
- Location of any warning signs and public information signs
- Location of normal points of entry where warning signs must be a minimum size of A3
- Bodies of water (include rivers, streams, lakes, reservoirs, wetlands, coastal marine areas)
- Recreational facilities (tracks, huts, road ends, roads, picnic sites)
- Date map prepared

NOTE: 1:50,000 is the preferred scale. Use more than one map if the amount of detail becomes to visually cluttered to be clearly understood.

The DOC Pesticide Summary shapefile(s) will be published on the DOC Pesticide Summary website, initially as a proposed operation. It must be obvious which control methods are proposed for each treatment block. The shape files must also show all boundaries relating to the operation (treatment area/block, exclusion zones, no fly zone etc.) and warning sign locations. DOC pest operations are already captured in the Pesticide application so do not need to supply shapefiles with the application for DOC permission.

Appendix 3: Communication Record

This records every individual or group who has been consulted about the proposed operation. If using the DOC Communication Plan/Record template, insert the Communication Record you created. The required contents are the following pages:

- Introduction
- Consultation on options (if applicable)
- Consultation on effects (if applicable)
- Toolbox

If using another format, information must include:

- The decision on consultation
- Who was consulted
- Actual dates when consultation was undertaken
- Outcomes of consultation, including any complaints and how they were addressed
- Any landowner/occupier consent conditions
- References to which resources were used for each target audience

Appendix 4: Consents

Insert copies of all consents you specified in Section 3.2.
Landowner/occupier consents are recorded in the Consultation record whether or not written consent is obtained.

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Appendix 5: Assessment of environmental effects

Complete this section if an Assessment of Environmental Effects (AEE) is required by the DOC manager approving the permission. An AEE that has been prepared on the DOC RMA AEE template (docdm-96227) for a resource consent application can be attached instead if it covers all the pesticides uses in this application.

Effects on non-target native species

Target benefit species

This operation has been commissioned in response to beech mast event. Such event in the absence of control work will lead to significant growth in rodent populations and their associated predators. This will intern lead to loss of resources and increased predation of native flora and fauna. As a result many native species will benefit from this work.

Blue Duck /whio	<i>Hymenolaimus malacorhynchos</i>	Nationally vulnerable
South Island Long-tailed bat/pekapeka	<i>Chalinolobus tuberculatus</i>	Nationally critical

Non-target species

Species	Scientific Name	Threat Classification
Bush Falcon/kārearea	<i>Falco novaeseelandiae</i>	Nationally vulnerable
Kea	<i>Nestor notabilis</i>	Naturally endangered
Fiordland kiwi / tokoeka	<i>Aptryx australis</i>	Nationally Vulnerable
Yellowhead /mohua	<i>Mohoua ochrocephala</i>	Nationally vulnerable
South Island kaka	<i>Nestor meridionalis meridionalis</i>	Nationally vulnerable
New Zealand pipit /	<i>Anthus novaeseelandiae</i>	At risk

pihoihoi Long-tailed cuckoo / koekoea South Island fernbird/mātātā	<i>novaeseelandia</i> <i>Eudynamys</i> <i>taitensis</i> <i>Bowdleria</i> <i>punctata punctata</i>	Naturally uncommon Declining
South Island robin/ <i>kakaruai</i>	<i>Petrica asutralis</i> <i>australis</i>	Not Threatened
Morepork/ <i>ruru</i>	<i>Ninox</i> <i>novaeseelandiae</i>	Not threatened

Effect of operation on native species

Studies carried out on native and non-native species suggests 1080 is likely to be toxic to most native animals. There is wide variation in sensitivity between taxonomic groups. Mammals are more sensitive than birds and invertebrates on a weight for weight basis. The small size of many native species relative to the target pests means that toxic baits used for pest control are capable of causing harm to almost any animal that eats the bait.

Non-target effects of 1080 in the New Zealand ecosystem have been studied extensively over the last 20 years. Monitoring shows most native species are not at significant risk from 1080 operations. On-going refinements in the use of 1080 have seen the amount of toxin used per hectare cut by up to 80% over the past twenty years (DOC – 1080 Facts). Some native bird species – in particular kea, weka, tomtits and robins - are known to be susceptible to eating baits and individual birds can die as a result. However, as techniques used in the application and manufacture of bait have improved, the incidents of recorded bird deaths have dropped significantly. Studies also show that the benefits of protecting breeding birds and their nests from predators like rats, stoats and possums strongly outweigh the low rate of mortality recorded for these species.

Fish are not thought to be at risk from 1080 poisoning as they appear very tolerant of 1080 with eels surviving experimental feeding of both toxic baits and poisoned possum flesh.

New Zealand lizards feed mostly on insects and theoretically might be at risk of secondary poisoning. Spurr (1993) found Australian experiments strongly suggest that, given their high tolerance, lizards would not be able to consume enough 1080 in

insects or other animals to receive a lethal dose.

Current studies indicate increasing bat populations in both varieties in areas with reduced mammalian pest numbers. Short tailed and long tailed bats were monitored following several aerial 1080 operations (Eglinton valley, Kepler Mountains'), with no adverse effects detected. Populations continued an upward trend.

Pindone

Marked differences in species susceptibility to pindone have been reported. As pindone is a first generation anticoagulant, either a very large single dose or repeated smaller doses are generally required to induce death.

Birds

A number of different birds have been found dead following the aerial distribution of baits containing pindone for rabbit control. Three black-backed gulls and three Australian harriers have been found dead and tested positive for pindone residues following aerial broadcast of RS5 pellets containing pindone for rabbit control in the Mackenzie basin area.

The potential risk to birds of this operation is considered significantly lower as baits will be loaded into bait stations and not broadcast. Some bait may be spilt near stations by rodents or possums, and therefore spilt baits may pose a risk to birds such as robins or kea in the immediate vicinity of the station.

There may be a risk to birds of prey such as ruru, falcons, or harrier hawks succumbing to secondary poisoning after consuming poisoned prey. The low persistence of pindone compared to other anticoagulant rodenticides such as brodifacoum suggests that secondary poisoning risks are lower, although still present.

Ruru/morepork were monitored in the Eglinton Valley between September 2009 and April 2010 which coincided with the period of the 09/10 pindone baiting operation. Twenty-three morepork were fitted with transmitters in Aug-September 2009. Of these there were seven dropped and three failed transmitters; nine of the remaining 13 morepork were alive in April 2010. None of the four birds that died had pindone residues or evidence of anticoagulant poisoning- one was hit by a car, one became hooked up by its harness, one died of cancer, and the cause of death of the fourth bird is unknown as the body was irretrievable from a deep tree cavity (M Pryde pers. comm.).

Bats

Short-tailed bats were monitored through the 2009/10 pindone

& Feratox bait station operation in the Eglinton Valley to determine if the baiting had any detrimental effects. Survivorship of PIT tagged bats was high throughout the monitoring period, with 319 of 322 (99%) recorded in the pre-monitoring period (August) known to be alive in October 2009, and 312 of 322 (97%) known to still be alive in January 2010 (O'Donnell, Edmonds & Hoare, 2011). The low number of rats in the forest due to the successful baiting regime is likely to have contributed to the high bat survival rate recorded by this study. Bats are considered at low risk of poisoning by consuming cereal pellets. Beath et al (2004) investigated the attractiveness of a range of common pest control baits and lures to wild caught short-tailed bats. They concluded that the trial showed that short-tailed bats will sample baits in captivity, however the risk of poisoning may be relatively low in the wild as previous field trials have shown no evidence that short-tailed bats will approach baits under wild conditions.

Lloyd & McQueen (2002) caught 269 short-tailed bats during 11 nights following an aerial 1080 poisoning operation in Rangataua Forest. None of the bats died or displayed any signs of poisoning during the two weeks they were held for. Non-toxic field trials have also been carried out using baits containing a fluorescent tracer dye in Codfish Island by Lloyd (1994). Pellets were distributed over 200 ha, and 76 bats were caught after the operation and no trace of the biomarker was found on the bats or their droppings. Following this, an aerial operation was carried out using cereal pellets containing the second generation anticoagulant brodifacoum to eradicate rats. This operation had no apparent effect on short-tailed bats, with bats being monitored after the drop showing no signs of being poisoned (Sedgeley & Anderson 1994). Further trial undertaken at Wellington Zoo showed no evidence of captive bats consuming cereal baits or carrot (Lloyd 1994). From these trials Lloyd concluded that "short-tailed bats populations are unlikely to suffer from direct poisoning by consuming baits."

Performance standards and information needs

EcoFX will follow DOC's "Method Best Practice for Battle for our Birds Aerial 1080 baiting" and code of practice on aerial 1080 in Kea habitat and all standard performance standards will be followed in the execution of this contract.

All baits will be dyed green as research suggests green is less attractive to birds.

All baits will be cinnamon lured (at listed concentration) as required by code of practice.

Pindone will be being used in a low density possum area.

Pindone will be put out in bait stations which will be detoxed at the completion of the operation.

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Effects on non-target domestic and feral animals

Non-target species

Dogs (*Canis lupis familiaris*)
Red deer (*Cervus elaphus*)
Chamois (*Rupicara rupicara*)

Effects of operation on

Dogs are highly vulnerable to 1080 both from scavenging poisoned carcasses and consuming baits. The consultation and

domestic and feral animals

notification process, along with signage at points of public access, will inform neighbours and users of the forest of the presence of bait. Dogs are not permitted in this national park.

The toxicity of pindone to different species is highly variable, and animals are generally more susceptible to repeat doses of pindone than a larger single dose. Rabbits are particularly susceptible to pindone, and pindone has been used extensively for rabbit control with both cereal and carrot baits.

Pindone exhibits some insecticidal properties and is expected to be toxic to bees.

There is a potential risk to domestic dogs either consuming split bait or scavenging possum or rat carcasses. Only permitted dogs will have access within the National Park.

Performance standards and information needs

EcoFX visits and discusses proposed operations with effected land owners and any landowners with strong reservations about supporting the operation will be consulted with in depth to discuss the benefits of the operation. All landowners are signed up for treatment before application on their property.

High definition aerial photography, NZTM topographical data, and GPS captured data are used with conjunction with in house GIS to develop the aerial treatment boundaries. The resulting boundary will be loaded onto the navigation system of aircraft undertaking bait application to provide real-time DGPS tracking of where aircraft are within the treatment blocks.

All aerial boundaries will be checked by the Operational Controller prior to sowing of bait by helicopter.

Pindone will be used in bait stations and these will be detoxed at the completion of the operation.

Further information

Further information

Provide any other information or comments you would like to have considered.

References

The following published references were used in developing this AEE:

- [Broome K.G., Fairweather A.A.C, & Fisher P.] [2010]: [1080] Pesticide Information Review. Version [1.6]. Unpublished report docdm-[25427], Department of Conservation, Hamilton NZ. [18-22].
- Robertson H, Dowding J, Elliott G, Hitchmough R, Miskelly C, O'Donnell C, Powlesland R, Sagar P, Scofield P, Taylor G 2013. *New Zealand Threat Classification Series 4*. 22 p. Conservation status of New Zealand birds, 2012.
- Fairweather, A.A.C.; Broome, K.G. 2018: Sodium Fluoroacetate Pesticide Information Review. Version 2018/6. Unpublished report docdm-25427, Department of Conservation, Hamilton,
- Fairweather, A.A.C.; Broome, K.G. 2018: Sodium Fluoroacetate Pesticide Information Review. Version 2018/6. Unpublished report docdm-25427, Department of Conservation, Hamilton,
- s 9(2)(a), 2017, Assessment of Environmental Effects for rat control in the Kepler Mountains, Fiordland National Park. Unpublished Report Te Anau Area docdm-95676.
- Kepler Ops Plan_BFOB 2019 - DOC-5665358.

Appendix 6:

If you need to add further appendices please copy and paste the entire heading above and then change the appendix number and title. This will ensure that the formatting is retained and the text will be transferred to the Table of Contents.

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