Application Form for predator control in the Arthur Sinbad Cleddau

Tiakina Nga Manu Battle for our Birds Programme
1 May 2019 – 30 April 2020

Name of applicant: s 9(2)(a) [redacted]

Company/organisation: Contract Wild Animal Control New Zealand

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Prepared by:
s 9(2)(a) [redacted]
Contract Wild Animal Control New Zealand

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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 cereal pellet aerial
- Pesticide Use **#2** - sodium fluoroacetate 1.5g/kg cereal pellet hand-laid

Permission is sought for toxic application starting on or after 1 July 2019 and ending on or before 30 June 2020.

Non-toxic prefeed will be applied no earlier than 1 July 2019.

Primary method to be employed is aerial 1080 with hand laid 1080 to be used within ground-exclusions and buffer areas as required.

1.2 Treatment area

Arthur Sinbad Cleddau

Consent Application Area: 31,583 hectares

Aerial Treatment Area: 17,924 hectares

Potential Ground Treatment Area: 346 hectares

N.B. Aerial application and ground-exclusion hectares are to be confirmed once PHU and DOC final consent condition requirements are fully incorporated into operational mapping.

This is one of several key management sites within Fiordland National Park that have been prioritised for predator control in response to beech mast events and subsequent predator irruptions. Without intervention threatened species within these sites face local extinction.

The treatment area is a significant habitat for several declining and threatened species including whio, kea, Fiordland tokoeka, kāka, rockwren and grey duck. Other species of note in this area are fuchsia, mistletoe, rata, kamahi and totara.

The Cleddau Valley is part of the wider Northern Fiordland Whio Security Site identified by the Whio Recovery Plan 2009 – 19 (Glaser et. al. 2010)

	The lower Arthur Valley (Lake Ada and surrounds) also holds a population of the at risk-recovering pateke. Predator control to protect this population is critical at this site.
1.3 Treatment block(s)	Arthur Treatment Block: 11,432 hectares Cleddau Treatment Block: 5,284 hectares Sinbad Treatment Block: 1,207 hectares
1.4 Geographical location	Milford Sound Village – adjacent to the treatment area. Te Anau Township – 118kms south of the treatment area. The Cleddau portion of the operation encompasses the areas on either side of State Highway 94 leading into Milford Sound Township from the Homer Tunnel and Cleddau headwaters in the south. The operation extends beyond Milford Sound Township through the valley of the Bowen River to the north and also the Tutoko River valley. Immediately to the south of Milford Sound Township and the Cleddau River the operational area extends up to the 700m contour before following the valley floor adjacent to Highway 94. The operation also works along the Donne River in the north east and up to the Adelaide Saddle. The Arthur Sinbad portion of the operation leads south west from Milford Sound along the Arthur River. It encompasses the Joes River catchment on the southern side of the valley. To the north it takes in the Sinbad Gully adjoining Milford Sound to Staircase Creek in the south and all the catchments in between north of the Arthur River.
1.5 Adjacent land tenure and uses	• Part-only of Fiordland National Park; a National Park under section 4 of the National Parks Act 1980 • Coastal Marine Reserve Area • State Highway 94 (Southland District Council)

1.6 Nearby residential areas or facilities

The Milford Sound Village is located at the end of SH94 and approximately 1.5km outside of the treatment area.

1.7 Community interests

Commercial & Recreational Interests

- The Arthur Valley includes part of the Milford Track, a Great Walk track, with over 10,000 visitors per year.
- The Sinbad Gully is remote and gets very little public use.
- The Cleddau contains the only road access to Milford Sound, so is a high public use area.
- There is an airport situated at Milford Sound, which is used both commercially and privately.
- Commercial fishing vessels moor at Deepwater basin.
- There is helicopter access to this operational area, with a commercial helicopter company operating out of Milford Sound.
- Tourists visiting the area by aircraft, bus, campervan or car can undertake scenic flights or board a boat cruise at Freshwater Basin. Sea kayaking and diving are also popular.
- There is year-round access for anglers (trout) in the Cleddau and Arthur catchments.
- The area is also used by recreational climbers. There is a low-level of climbing within the operational area.
- Due to there being no resident deer population in the Cleddau valley, recreational hunting is not undertaken in this area.
- Recreational hunting is permitted but not within 500m of the Milford Track, as this includes most of the valley floor there very little hunting carried out in the Arthur Valley.
- Dogs are not permitted in the National Park.

Accessible Areas

- The operational area is comprised entirely of National Park. The public have access to the area under the National Parks Act (1980) and the Fiordland National Park Management Plan (2007).
- State Highway 94 from Te Anau to Milford Sound runs through the treatment area, but is excluded from any bait sowing. There are a number of public laybys situated along this stretch of road. The Milford Road (including 10m\

either side) is administered by the Southland District Council.
- There are two historic bridges within the operational area that have adjacent lay-bys. These are popular tourist stops along the Milford Road.
- The Milford Track runs the length of the Arthur Valley. This is a Great Walk, managed by the Department of Conservation.

Tracks and Walkways

- The Milford Foreshore Walk is used by visitors to the area. It is outside the treatment area (but inside the operational boundary).
- There is a lay-by and small walkway on the eastern side of the Homer Tunnel, used by visitors.
- The Tutoko Track begins at the main highway and follows the Tutoko River to the head of the Tutoko Valley.
- There is another walkway off the main highway - the Grave Talbot - that connects with the south-eastern section of the operational area, however it is highly unlikely anyone would be able to access the treatment area using this track.
- There are informal routes into crags popular with climbers – Babylon, Chasm, and Waterworks Crags.
- There is an informal access route into the Bowen Valley, used by locals.
- There is an informal horse track below the historical suspension bridge situated opposite the Donne River.
- There is a short Milford Sound Lookout Track used by visitors, in the Milford Sound township area.
- The Cleddau Valley has a route from the main highway up the Gulliver River (the Grave Talbot Walk). This route can be used by the public.
- There is a large layby at the Chasm, which is linked to a 400m walkway over the Cleddau River. The Chasm lay-by and walk-way are a high-use area over the Summer months, with a reduction in numbers over the main Winter months.
- The Milford Track runs the length of the Arthur Valley. It is a two day walk from Mintaro Hut (in the adjacent Clinton Valley) to Sandfly Point, at Milford Sound.

Iwi Interest - Cleddau

The Cleddau is within the Ngāi Tahu rohe.

Papatipu rūnanga/rūnaka whanui are: Te Rūnaka Ōraka Aparima, Te Rūnanga Awarua, Waihōpai Rūnaka, Hokonui Rūnanga, Te Rūnanga o Makaawhio.

Māori history in Fiordland reaches back to its creation. This area was a regular seasonal home for southern Māori, and a place for the collection of pounamu and food. Māori are believed to have discovered Milford Sound more than 1,000 years ago, returning seasonally to the fiord to collect the precious pounamu. According to Māori legend, Milford Soundwas formed by Tu-te-raki-whanoa, an atua (godly figure) who was in charge of shaping the Fiordland coast. Chanting a powerful karakia (prayer), he hacked at the towering rock walls with his toki (adze) called Te Hamo and carved it from the earth.

The Māori name for Milford Sound, Piopiotahi, means "a single piopio". When Maui died trying to win immortality for his beloved people, a piopio (an extinct native bird) was said to have flown here in mourning.

Milford Sound continues today to provide spiritual connection and employment through, for example, the tourism and fishing industries. Ngāi Tahu whānui continue to maintain their traditional association with these places by visits and to gather kai and resources.

These areas are home to taonga species, wāhi tapu places and traditional pathways.

Iwi Interest – Arthur Sinbad

The Arthur Valley and Sinbad Gully sites are within the Ngāi Tahu rohe.

The Papatipu Rūnaka / hapū for these areas are Ōraka Aparima, Awarua, Waihōpai, Hokonui and Makaawhio.

The Fiordland place continues today to provide spiritual connection and employment through, for example, the tourism and fishing industries. Ngāi Tahu whānui continue to maintain their traditional association with these places by visits and to gather kai and resources.

These areas are home to taonga species, wāhi tapu places and traditional pathways.

Archaeological Sites - Cleddau

There is only one recorded archaeological site in the Cleddau/Tutoko catchment – the Cleddau Horse Bridge which was part of the Grave-Talbot Track. There are numerous features that are not recorded, relating to early road construction and other early tourism infrastructure including the Grave-Talbot Track. There is some potential for

unrecorded sites relating to both early Maori activity and early European tourism infrastructure development.

Archaeological Sites – Arthur Sinbad
The recorded archaeological sites in the Arthur / Sinbad catchment areas are all connected to early Maori activity except for one which is a feature of early Milford track infrastructure. These are compact, small sites and less numerous than could be expected given the importance of the Milford route in cultural traditions. In addition, there is tourism infrastructure on the Milford Track, some of which is historically important but not formally recorded. There is some potential for unrecorded sites and these are likely to be small, and to relate to early Maori activity. The Mackinnon Memorial on the pass is an actively conserved historic place, as is the brick chimney at Sandfly point (R. Egerton 2015).

1.8 Management history

Arthur

2011/2012	Possum	Trapping
2008/2009	Possum	Aerial 1080
2007/2008	Possum	Aerial 1080
1997/2019	Stoat	Trapping
1996/1997	Stoat	Trapping Trial

Sinbad

2011/2012	Possum	Trapping
2009/2019	Stoat	Trapping

Cleddau

2017/2018	Possum	Aerial 1080
2010/2019	Possum	Trapping
2000/2019	Stoat	Trapping
2007/2019	Rat	Trapping

2. Outcomes and targets

2.1 Conservation outcome(s)

The Department of Conservation will undertake this operation to protect the health and integrity of the forest communities, within this area of Fiordland National Park.

The conservation objectives of the operation are:

- To ensure the health and integrity of the Arthur Sinbad Cleddau ecosystem is secured and improved through controlling predators, and allowing successful breeding of native fauna in a beech mast event.

- Prevent local extinctions of species vulnerable to possum, rat and stoat predation e.g. kāka, kea, rock wren, kiwi, kākāriki, weka, pateke and whio.

Large-scale rat and possum control during beech mast years is critical to maintain the conservation gains achieved by the intensive management of animal pests within Fiordland management areas. It is considered that any benefits accrued from previous management will likely be negated by the effects of periodic irruption events if they are left unmanaged.

The Arthur Sinbad Cleddau treatment area contains numerous nationally threatened plant and invertebrate taxa that are either endemic to the area or highly range restricted. The vulnerability of these taxa to rat predation and/or possum predation/herbivory has been well documented and both the sustained control of possum populations at low densities and the alleviation of rat predation at rat irruptive phases is required to maintain or improve viable populations of these species.

2.2 Target(s)

The operational targets are:

- To reduce possum numbers within the treatment area to a residual trap catch index of 3 possums per 100 trap night or less (<3% RTC), immediately following the operation; and

- To reduce rat and stoat tracking rate to below 5% within one month after bait application.

The Department considers this necessary and feasible to improve forest health and protect threatened species.

In the South Island mistletoe has been recorded to comprise of up to 60% of possum diets (Sweetapple, Nugent, Whitford & Knightbridge, 2002). From this and other studies Sweetapple et al. (2002) concluded that a possum Residual Trap Catch (RTC) of less than 3-4% was needed to allow mistletoe recovery.

Rodent and stoat abundance varies wildly depending on the amount of food available. After a beech mast or heavy podocarp fruiting event rodent abundance can increase to plague proportions.

Stoat numbers then increase in response to the abundance of food (rodents) available. As the food decreases rats and then stoats turn to alternative sources of food (birds and invertebrates).

Possums and stoats are the main predators of kāka; stoats are the main predator of whio, pateke, kea and kiwi. Rats are significant predators of many smaller bird and invertebrate species; mohua are particularly susceptible during rat irruption events.

Further control is anticipated when monitoring indicates that possum numbers have rebuilt or predictive monitoring indicates that rodent and stoat irruptions are imminent.

3. Consultation and consents

3.1 Consultation

There is likely to be some interest from residents of the Milford Sound Village due to water being sourced from close to the treatment area.

The Department of Conservation have identified and initially approached key-stakeholders to consult on the proposed operation.

Information on this operation has been provided to all runanga who have been identified as having an interest in this area through the recent, formal Kaitiaki Roopu forum.

All communications undertaken during these consultation processes will be entered into the Communication Register specific to this operation. The Communications Register identifies all individuals and groups who have, or who will be, consulted with and notified as part of the planning, consenting and/or operational communication processes for this operation. An uncontrolled copy of this register is attached. It will be regularly updated and updated copies will be supplied to PHU upon request, or at the conclusion of the operation.

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): Key Fact Sheet
- ☑ Other (specify): Communications Register

N.B. All documents related to this PHU consent application will be secured and maintained by the Department of Conservation in their docDM document management system. Copies of any and all documentation will be forwarded to the appropriate PHU upon request.

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

4. Methods

4.1 Treatment Blocks All

Arthur
Sinbad
Cleddau

Pesticides – Aerial

Pesticide Use #1	Target Pest
Sodium fluoroacetate 0.15% cereal pellet, aerial	Rat Possum

Brand Name of pesticide	1080
Pre-Feed Lure/dye	6gm 16mm RS5 Single Cinnamon Undyed
Toxic Lure/mask (& %)	0.15% 6gm 16mm RS5 Double cinnamon Dyed green
Number of Pre-Feeds	One
Sowing Rates Pre-Feed	1.5kg/ha
Sowing Rates Toxic	1.5kg/ha
Other details about this method	None

Pesticides – Aerial Exclusions (which require ground control)

Pesticide Use #2	**Target Pest**
Sodium fluoroacetate 0.15% cereal pellet, ground	Rat Possum
Brand Name of pesticide	1080
Pre-Feed Lure/dye	6gm 16mm RS5 Single Cinnamon Undyed
Toxic Lure/mask (& %)	0.15% 6gm 16mm RS5 Double cinnamon Dyed green
Number of Pre-Feeds	One
Sowing Rates Pre-Feed	1.5kg/ha
Sowing Rates Toxic	1.5kg/ha
Other details about this method	None

4.2 Justification for proposed method (Arthur)

SIPRAG (South Island Predator Response Action Group) have stated that aerial 1080 is the preferred method for rat and possum control at Battle for our Bird sites.

This is based on several factors, including:

- cost effectiveness,
- non-target impacts, and
- persistence of some other toxins in the environment.

Large-scale rat and possum control during beech mast years is critical to maintain the conservation gains achieved by the intensive management of animal pests within the Fiordland management area.

This site is encompassed by mountain ranges on all sides, the topographic boundaries provide additional protection to the treatment area post-operation.

The Arthur Sinbad Cleddau treatment area contains numerous nationally threatened plant and invertebrate taxa that are either endemic to the area or highly range restricted.

The vulnerability of these taxa to rat predation and/or possum predation/herbivory has been well documented and both the sustained control of possum populations at low densities and the alleviation of rat predation at rat irruptive phases is required to maintain or improve viable populations of these species.

Additionally, there will be significant benefits to forest health due to the zero density of ungulates in this area.

5. Further information

Details of contractor or principle

Contract Manager

Company/organisation:	Department of Conservation
Contact person:	Site Lead: s 9(2)(a) [redacted]
Contact number:	Fiordland District (03) 249 0200 s 9(2)(a) [redacted]

Project Manager

Company/organisation:	Contract Wild Animal Control New Zealand
Contact person:	s 9(2)(a) [redacted]
Contact number:	s 9(2)(a) [redacted] s 9(2)(a) [redacted]

Bait Sowing

Company/organisation:	s 6(d) [redacted]
Contact person:	s 9(2)(a) [redacted]
Contact number:	s 9(2)(a) [redacted] s 6(d) [redacted]

Further information

The 'Battle for our Birds' programme is a national predator-control campaign led by the Department of Conservation in response to widespread and heavy beech masting, which is expected to produce an irruption of predators such as rodents and mustelids which threaten our endangered species.

Native birds and particularly hole-nesting birds are susceptible to predation by arboreal ship rats (*Rattus rattus*) and our native species have evolved few predator-avoidance behaviours. For instance, mohua (*Mohoua ochrocephala*) is a small, hole-nesting passerine that was once present in most forest habitats over much of South Island and Stewart Island, but began to decline noticeably around the 1890s and is now present in only 25% of its former range (O'Donnell 1996).

Declines and local extinctions in mohua populations during winters coincident with high rat densities have been reported in New Zealand from Eglinton Valley, Fiordland (Dilks *et al.* 2003); Mt Stokes, Marlborough; Catlins State Forest Park, Otago; and the Dart Valley (McQueen & Lawrence 2008). Mohua start nesting in spring (October) (Elliott 1996) and are unlikely to be nesting from June to September. However, mohua, and other birds and bats taking refuge at night in confined spaces such as holes in tree trunks, are vulnerable to predation by rats, especially during rat plagues.

In upland beech forest ship rats are a periodic threat to forest birds following beech mast events while in lowland coastal forest they are a constant threat. Most threat occurs over the breeding season when eggs, chicks and incubating birds are at risk on the nest (Innes *et al.* 2010). However, roosting birds and bats are also at risk outside the breeding season (Elliott *et al.* 1996; O'Donnell *et al.* 2002; Pryde *et al* 2005; O'Donnell *et al* 2011).

Fast knockdown, predator control methods are seen as key to the protection of these species in the face of a plague. Using aerially applied toxin that is fast acting and only requires one application is the preferred method. Sodium fluoroacetate (1080) is the only toxin that meets these criteria and is registered for aerial use on mainland New Zealand.

The Arthur and Cleddau Rivers hold populations of the nationally vulnerable Whio as well as populations of Long-tailed bat (and possibly short-tailed bat), NZ bush falcon, kereru and yellow crowned parakeet.

Appendix 1: DOC Performance Standards

♦ 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

Location of operation
Arthur Sinbad Cleddau

CSL REQUIRED

Caution Period
The estimated caution period for this operation is *[assessor to complete]* 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*

1. For operations targeting rats, prefeed with this pesticide use.
2. The DOC Code of practice for aerial 1080 in kea habitat DOC-2612859 must be followed.
3. 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.
4. 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).
5. For operations targeting possums, baits will have a mean size in excess of 6g and 95% of baits should weigh more than 4g.
6. The baits must be dyed green or blue.
7. 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 you judge that there is no longer a risk to stock.
8. 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.
9. 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)

10. Bait sowing rate must be no greater than 5kg/ha for 6gm baits (or equivalent bait density per hectare for other bait sizes).
11. Designate a "Safety Officer" on loading site who audits and ensures adherence to safety standards.
12. Use bait sowing buckets with retractable legs.
13. *[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

1. *[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

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

Pesticide Use #2	Sodium fluoroacetate 1.5g/kg Cereal pellet Handlaying (0.15% 1080 pellet)	Target Pests: Possums, Rats

Location of operation
Arthur Sinbad Cleddau

CSL REQUIRED

Caution Period
The estimated caution period for this operation is *[assessor to complete]* 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*

1. For operations targeting rats, prefeed with this pesticide use.
2. For operations targeting possums, baits will have a mean size in excess of 6g and 95% of baits should weigh more than 4g.
3. The baits must be dyed green or blue.
4. 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)

5. The DOC Code of practice for aerial 1080 in kea habitat DOC-2612859 must be followed.
6. *[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 (delete those that you won't be applying to your operation)

1. Monitoring: For operations targeting possums, follow best practice for pre and post control result monitoring to estimate percentage kill and report results in operational report.
2. Monitoring: Monitor for native non-target animals in operational area, send samples for residue testing and report search effort and 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 – Possum Control – Handlaying 1080 Cereal Pellets docdm-29797.

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

_____.

[Name] Operations Manager

Appendix 2: Maps

Both of the following must be supplied:

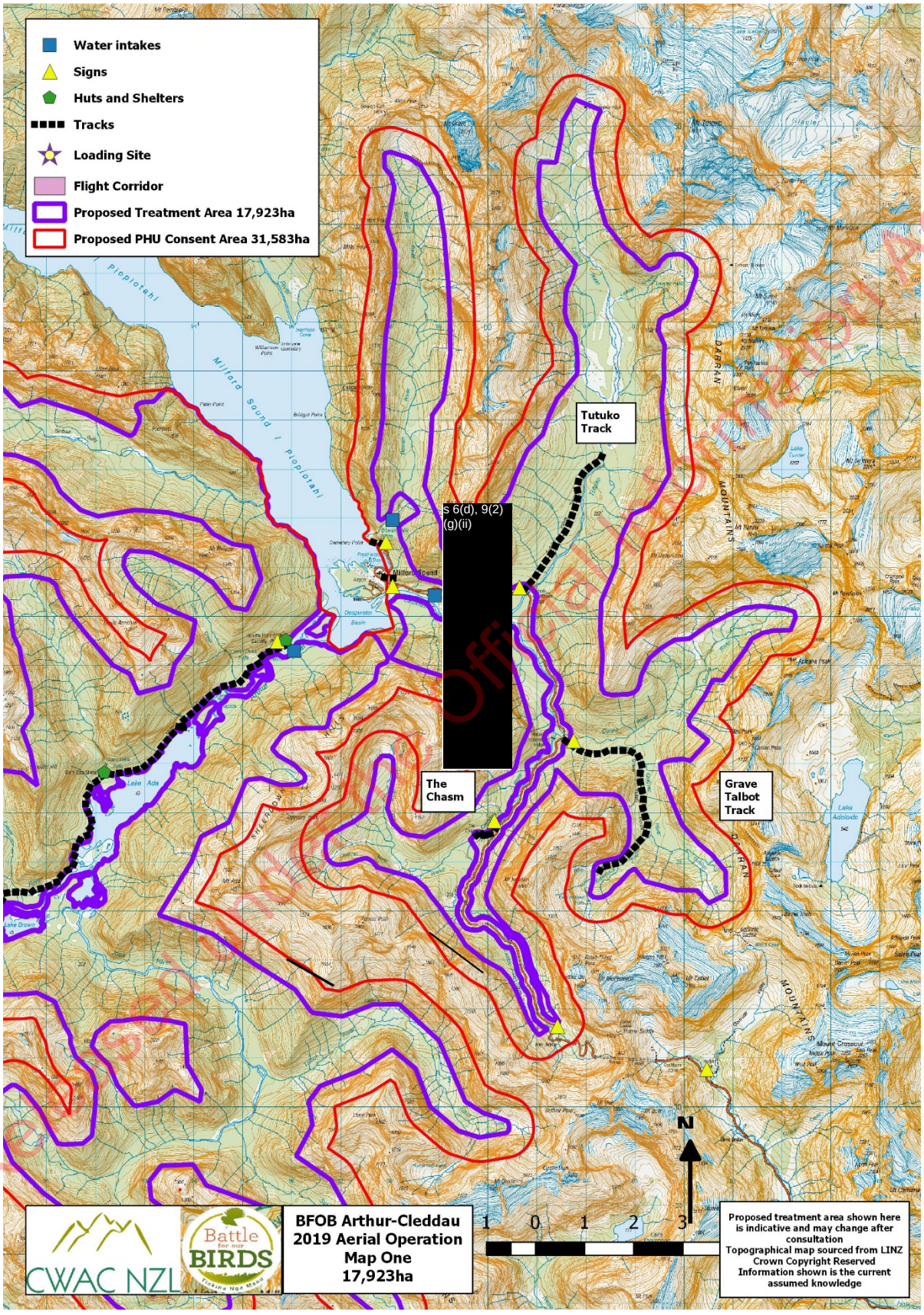
1. DOC permission map(s) as one or more image files (.JPG format preferred)
2. DOC Pesticide Summary shapefiles (**not required for DOC pest operations**)

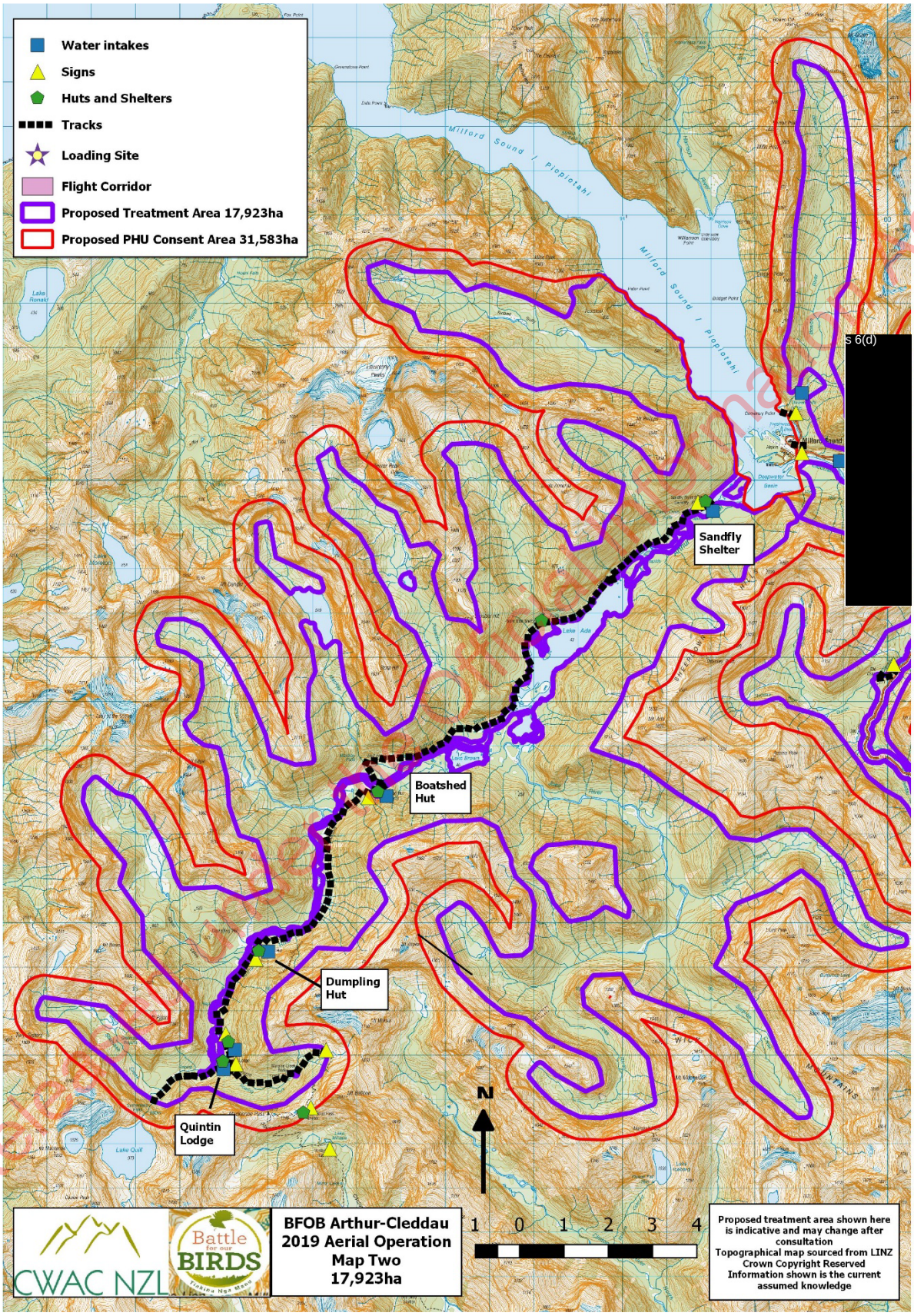
Your DOC permission map(s) must show the following as a minimum:

- 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.




Water intakes
Signs
Huts and Shelters
Tracks
Loading Site
Flight Corridor
Proposed Treatment Area 17,923ha
Proposed PHU Consent Area 31,583ha
Milford Sound / Piopiotahi
s 6(d)
Sandfly Shelter
Boatshed Hut
Dumpling Hut
Quintin Lodge
N
1 0 1 2 3 4
CWAC NZL
Battle for our BIRDS
BFOB Arthur-Cleddau
2019 Aerial Operation
Map Two
17,923ha
Proposed treatment area shown here is indicative and may change after consultation
Topographical map sourced from LINZ
Crown Copyright Reserved
Information shown is the current assumed knowledge

Appendix 3: Communication Record

The Department of Conservation has an ongoing consultation and notification process in place.

The 'Arthur Sinbad Cleddau Communications Plan' is held by the Department of Conservation, in its electronic DOCDM system.

This is a live document that will be updated by Contract Wild Animal Control New Zealand at regular intervals throughout the operational period.

It will be available through the DOCDM system: FNP-19-BFOB All Sites.

Appendix 4: Consents

The operational area includes:

- Part-only of Fiordland National Park; a National Park under section 4 of the National Parks Act 1980
- Coastal Marine Reserve Area
- State Highway 94 (Southland District Council)

1) RMA notification will occur as per NES (RMA Section 360).

2) PHU consent has been applied for. A copy of the application form is attached to this application as a separate document.

3) Consultation and written consent from Southland District Council will be obtained.

4) Landowner/occupier permissions will be recorded in the Consultation record.

5) Declined land owner/occupier permissions will also be recorded in the Consultation record.

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

Plant Species:

Common Name	Scientific Name	Threat Category
Scarlet mistletoe	*Peraxilla colensoi*	Declining
Red mistletoe	*Peraxilla tetrapetala*	Declining
Yellow mistletoe	*Alepis flavida*	Declining

Bird Species:

Common Name	Scientific Name	Threat Category
Black- billed gull	*Laurus bulleri*	Nationally critical
Fiordland crested penguin *tawaki*	*Eudyptes pachyrhynchus*	Nationally endangered
Kea	*Nestor notabilis*	Nationally endangered
Rock Wren	*Xenicus gilviventris*	Nationally endangered
Northern Fiordland kiwi / tokoeka	*Apteryx australis*	Nationally Vulnerable
Blue Duck / whio	*Hymenolaimus malacorhynchos*	Nationally vulnerable
Red-billed gull	*Larus novaehollandiae scopulinus*	Nationally vulnerable
Yellowhead / mohua	*Mohoua ochrocephala*	Nationally vulnerable
South Island kāka	*Nestor meridionalis meridionalis*	Nationally vulnerable
New Zealand pipit / pihoihoi	*Anthus novaeseelandiae novaeseelandia*	At risk
Long-tailed cuckoo / koekoea	*Eudynamys taitensis*	Naturally uncommon
Western weka	*Gallirallus australis australis*	At risk
Pateke/Brown Teal	*Anas chlorotis*	At Risk-Recovering

Other native bird species likely to be present in and around the treatment area which are not threatened include:

Common Name	**Scientific Name**
South Island rifleman	*Acanthisitta chloris chloris*
Bellbird / *kōparapara*	*Anthornis melanura melanura*
Australasian harrier / *kāhu*	*Circus approximans*
Yellow crowned parakeet/ kākāriki	*Cyanoramphus auriceps*
Brown creeper/*pipipi*	*Finschia novaeseelandiae*
Grey warbler/ *rironiro*	*Gergone igata*
Morepork/*ruru koukou*	*Ninox novaeseelandiae*
Paradise Shelduck/ *putangitangi*	*Tadorna variegata*
Pigeon/*kereru*	*Hemiphaga novaeseelandiae*
Shining cuckoo,/*pipiwharauroa*	*Chalcites lucidus*
Silvereye /*tauhou*	*Zosterops lateralis*
South Island fantail/ *piwakawaka*	*Rhipidura fuliginosa fuliginosa*
South Island robin/*toutouwai*	*Petroica australis australis*
South Island tomtit/*miromiro*	*Petroica macrocephala macrocephala*
Tui	*Prosthemadera novaeseelandiae*

Invertebrate Species:

Common Name	**Scientific Name**	**Threat Category**
Bear weevils	*Rhyncodes ursus*	
Carabid beetles	(*Mecadema chiltoni*, *M laeviceps* and *Megadromus bullatus*)	Nationally critical
Clapping cicada	*Amphipsalta clapitans*	
Ghost moths	*Aoraia spp*	
Helms stag beetles	*Geodorcus helmsi*	
Huhu	*Prionoplus reticularis*	
Rhytididae giant landsnails	*Powelliphanta spp and Wainuia* spp	Nationally critical
Tree Weta	*Hemideina spp*	
Purple earthworm	*Perieodrilus ricardi*	
Peripatus	*Ooperipatellus viridimaculatus*	
*Large leaf-veined slugs	*Amphikonophora sp.*	
*Giant haverstman	*Opiliones sp.*	
*Flightless speargrass weevil	*Lyperobius sp.*	

*Painted ground weta	*Hemiandrus nitaweta*
*Giant ground weta	*Hemiandrus superb*

*Only found in Sinbad Gully

Aquatic Species Likely to be Present:

Common name	Scientific name	Threat category
Common bully	*Gobiomorphus cotidianus*	Not threatened
Giant kokopu	*Galaxis argenteus*	Declining
Inanga	*Galaxias maculatus*	Declining
Koaro	*Galaxias brevipinnis*	Declining
Lamprey	*Geotria australis*	Sparse
Longfin eel	*Anguilla dieffenbachia*	Declining
Redfin bully	*Gobiomorphus huttoni*	Declining

Reptile Species Likely to be Present:

Common name	Scientific name	Threat category
Cascade gecko	*Mokopiriraku* 'Cascades'	At risk
Common skink	*Oligosoma polychrome*	Not Threatened
Cryptic skink	*Oligosoma inconspicuum*	Declining
Sinbad skink	*Oligosoma pikitanga*	Nationally endangered
Southern alps gecko	*Woodworthia* 'Southern Alps'	Not Threatened
Southern forest gecko	*Mokopiriraku* 'southern forest'	Nationally endangered
Barrier skink	*Oligosoma iudgeii*	Nationally endangered

Non-target species

As above

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. Therefore, the level of exposure to the bait becomes important in determining the effects on non-target native species in the field.

There are records of a range of native bird species found dead after aerial poisoning operations and many of these individuals have contained residues of 1080. However, when records are discounted: from operations which did not meet current bait quality standards (eg using unscreened, un-dyed carrot bait with berry fruit lures) or from those animals which did not have detectable 1080 residues, the Department of Conservation, Vertebrate Pesticide Residue

Database 1994-2013 contains only 35 individuals representing 10 native species across all bait types used in aerial poisoning. No conclusions about population effects can be drawn from this information but it is useful to focus further studies.

There have been numerous studies examining the effects of aerial poisoning on native non-target populations over the last 20 years. 21 species of native birds, particularly threatened species, have been monitored. None of the studies have identified population level mortality which threatened the viability of the species, although the only reliably calculated mortality rates are for kokako, kiwi, kāka, whio and fernbirds. The upper 95% mortality rates for kokako, kiwi, kāka, whio are all less than 3.5%. The mean mortality rate for fernbirds is 9.4%.

Limited monitoring of short tailed bats and native frogs has not indicated detectable mortality due to aerial 1080 poisoning.

Invertebrate populations have been monitored in nine aerial poisoning operations and none have shown significant population effects on any species studied, nor is there evidence to suggest poisoned invertebrates are a significant factor in secondary poisoning of other animals. Long term monitoring of native land snails indicates substantial benefits to threatened populations in sites treated with aerial poisoning.

The risks 1080 operations pose to aquatic species is considered very low. Fish are very tolerant to 1080. Additionally, 1080 contamination of water is rarely found during 1080 operations and is at an extremely low level when it has occurred. No mortality of longfin eels, köaro or upland bullies was observed during experiments where high densities of cereal 1080 pellets were placed in water just upstream of them. Eels and koura have survived experimental feeding of cereal 1080 pellets, and eels have survived feeding on possum tissue containing 1080. There have also been no detectable effects on aquatic invertebrate communities in field studies when 1080 baits were placed at high densities in streams.

Risks to threatened bird species present in the treatment areas (see section 3.3) are discussed below:

A total of 42 weka (Gallirallus australis) have been exposed to this method and bait type over 4 operations and 1 has died from poisoning.

A total of 23 radio tagged morepork (Ninox novaeseelandiae) has been exposed to this method and bait type over 5 operations and none have died from poisoning (Greene et al. 2013). Call count monitoring at Waipoua did not indicate significant 1080 related mortality (Pierce & Montgomery, 1992 cited in Broome, Fairweather & Fisher, 2009).

A total of 59 fernbirds (Bowdleria punctata) have been exposed to this method and bait type over 3 operations and 7 have disappeared after poisoning.

A total of 21 colour banded and 5 unbanded South Island robins (Petroica australis) were monitored during 2 aerial 1080 pellet operations, all survived.

Transect counts of SI tomtits, grey warbler, SI robins and riflemen were conducted before and after the 2010 Waitutu aerial 1080 operation (1 kg ha^{-1} prefeed followed by 2 kg ha^{-1} 0.15% 1080 pellets). The transects were located at five sites, three within the operational area and two in a non-treatment area. While the numbers of tomtits and grey warblers detected on the transects changed following the application of the 1080, the scale and direction of the changes (decreases for tomtits and increases for grey warbler) was similar at all five sites. The pre- and post-control counts of riflemen and SI robins were similar between the operational area and non-treatment sites. The authors therefore concluded there was no evidence for population level impacts from 1080 on any of these species (Greene et al. 2013)

Blue duck/whio (Hymenolaimus malacorhynchos) are unlikely to eat cereal pellet baits and their aquatic invertebrate prey are unlikely to be contaminated by 1080. However, studies have been done to determine their survival following aerial 1080 operations. There was no reduction in visual counts of blue duck in the Otira valley after application of 0.15% 1080 Pellets at 6 kg/ha in 1989 (Spurr & Powlesland, 1997 cited in Broome, Fairweather & Fisher 2009). Additionally, all 19 radio-tagged blue ducks in Waihaha survived for at least four weeks following aerial application of carrot bait (0.08%) at 15 kg/ha (Greene, 1998 cited in Broome, Fairweather & Fisher 2009).

A total of 60 radio tagged kāka (Nestor meridionalis) have been exposed to this method and bait type over 4 operations and none have died from poisoning. Additionally, 38 radio tagged birds have been exposed to 0.08% carrot baits over 2 operations and none have died from poisoning (Greene et al. 1998; Powlesland et al. 2003).

Kereru (NZ pigeon/kūkupa) (Hemiphaga novaeseelandiae) have not been monitored individually when exposed to this method and bait type. However none of six birds ate non-toxic cereal pellets offered in a trial on Kapiti island (Spurr & Powlesland, 1997). Monitoring of kereru during 5 aerial 1080 operations using cereal pellets did not detect population changes using the five minute count method (Spurr & Powlesland 1997). Additionally, all 15 radio tagged birds exposed to an aerial 1080 operation using carrot bait survived (Powlesland et al. 2003).

Kārearea (NZ falcon) (Falco novaeseelandiae) have not been monitored individually when exposed to this method and bait type. However falcon territories have remained occupied, presumably by the resident birds, during four aerial 1080 operations using cereal pellets (Pureora 1984, Mapara 1990-92) and one using carrot bait (Waihaha 1994) (Spurr & Powlesland, 1997). The total number of falcon involved in this monitoring is about 13, although the Mapara birds (3 pair) were exposed in three consecutive years (Calder & Deuss, 1985: Bradfield, 1993 cited in Broome, Fairweather & Fisher, 2009); Greene et al. 1998).

Kākāriki (parakeet) (Cyanoramphus spp.) nests have been monitored during two aerial cereal 1080 operations. Fifteen nests were monitored during the October 2007 Hurunui Valley operation and a further seven nests were monitored during a 1080 operation in the Dart Valley. Dead chicks in a failed nest in the Hurunui Valley operation contained 1080 residues and the female was not seen after the nest failed. All the monitored nests in the Dart Valley operation were successful, however two unmonitored kākāriki were found dead with 1080 residues in their tissues. The combined estimate of mortality of nesting parakeets from these operations was 2.27% (0.1-12 % 95% CI) (Rhodes, Elliot & Kemp, 2008 cited in Broome, Fairweather & Fisher, 2009). The authors concluded that while some kākāriki were killed during the 1080 operations, given the rate of nest predation observed in areas where no predator control was carried out, the net benefit from the 1080 operations was positive. No detectable impact could be determined through five minute bird count monitoring after four aerial 1080 operations using carrot or cereal pellet baits (Spurr & Powlesland et al. 1997). Additionally following an intensively monitored aerial 1080 operation in Waihaha in 1994 using carrot bait, (Greene et al. 1998) observed "...kākāriki remained common within the study area...".

Kāhu (Australasian harrier) (Circus approximans) have not been monitored individually when exposed to this method and bait type. However no detectable impact could be determined through five minute bird count monitoring before and after an aerial 1080 operation using cereal pellets on Rangitoto Island and "the small resident population was still seen...throughout the year following the poisoning" (Miller & Anderson, 1992). Additionally, (Pierce & Maloney, 1989 cited in Broome, Fairweather & Fisher, 2009) found no evidence of dead harriers after aerial 1080 poisoning of rabbits in the McKenzie basin.

A total of 145 radio tagged kea (Nestor notabilis) have been exposed to this method and bait type over 10 operations and 20 have died from poisoning. Additionally, 2 radio tagged birds have been exposed to 0.08% carrot baits over 1 operation and none have died from poisoning (Kemp & van Klink, 2008 cited in Broome, Fairweather & Fisher 2009).

Options to manage risk and/or levels of exposure:

Adopting accepted operational practices reduces the risk for birds. Techniques developed in recent years are important components of the operation.

- For 1080 dull green dyed bait has been shown to be the least attractive colour to birds.
- Cinnamon–lured baits instead of fruit lures help to repel most birds.
- Ensuring bait meets all quality specifications is considered the best way to avoid adversely affecting birds.

In March 2010, the DOC Pesticide Advisory Group reviewed the research results to date to recommend new compulsory performance standards. DOC staff and AHB representatives have been consulted on the operational implications of the new standards. These standards are being reviewed again taking into account the learning's from the 2014 Battle for our Birds 1080 operations. The up-dated DOC Code of Practice for aerial 1080 in kea habitat and the latest version of the DOC Performance Standards for this pesticide use will be followed. This operation will adhere to these standards to ensure that the risk to kea is minimized to the extent that current research indicates.

Lesser short-tailed bats (*Mystacina tuberculata*) feed on arthropod taxa known to consume 1080 baits. Thus, they may be vulnerable to secondary poisoning after control operations using aerially broadcast 1080 baits and residues in this prey can in theory be enough to kill a bat. Lloyd (1994) offered non-toxic cereal pellets containing a fluorescent marker to captive bats and hand broadcast baits throughout an area known to be inhabited by bats and concluded *"…short-tailed bats are unlikely to eat carrot or grain-based baits…"*.

In a study in Rangataua Forest where 0.15% 1080 pellets were aerially broadcast (3 – 5 kg /ha) over *"…almost the entire winter range…"* of the study animals, a total of 269 short-tailed bats were caught at their roost following poisoning and held for 48 hours to determine mortality or signs of poisoning. All animals survived and showed no signs of 1080 poisoning (Lloyd & McQueen 2002).

An aerial 1080 operation was conducted over 10,300ha in the Eglinton Valley on the 12th December 2014 as a response to a rat plague event. This provided an opportunity to measure the effects of an aerial 1080 operation on a well-marked lesser short-tailed bat population. The highest ever count of short-tailed bats in the Eglinton Valley was recorded on video after the 1080 drop. In addition, at least 98.6% of the individually recorded short-tailed bats recorded immediately prior to deployment of the 1080 in

December were still alive. Modelling of the population showed that any decline of survival was due to immigration or emigration of predominantly males rather than deaths (Edmonds & Pryde 2015).

The effect of the aerial 1080 operation on common invertebrates within the area will be minor.

Invertebrate populations have been monitored in several aerial 1080 poisoning operations and none have shown significant population effects on any species studied, nor is there evidence to suggest poisoned invertebrates are a significant factor in secondary poisoning of other animals. Long term monitoring of native land snails indicates substantial benefits to threatened populations in sites treated with aerial poisoning due to reduced predator populations.

An extensive study of forest invertebrates on 1080 baits (Sherley, et al, 1999) found that at any time only a small proportion of baits had invertebrates on them, and the few individuals per bait represented a small section of the fauna present in the litter. The number of invertebrates recorded on baits in treatment grids declined when 0.15% 1080 pellets were laid at 18 kg/ha, but started to return to original levels (relative to control grids) within 6 days of removal of the toxic baits. This sowing rate is approximately nine times that proposed to be used in the Cleddau treatment area. The reduction in invertebrate numbers did not extend further than 20cm around any bait.

Another study (Spurr & Berben, 2004 cited in Broome, Fairweather & Fisher, 2009) hand laid 0.15% 1080 cereal pellets at 5 kg/ha to simulate aerial poisoning in Tararua Forest Park in 1999 and monitored the occupancy of artificial refuges by tree weta (*Hemideina crassidens*) and cave weta (*Isoplectron sp.*). No significant impact of bait application was found for these species nor was there any effect observed on numbers of slugs, spiders and cockroaches which also commonly used the same refuges.

No impact was detected on populations of weta in Waipoua Forest and all cockroaches, centipedes, millipedes, kauri snails and all but one beetle survived in enclosures with 0.08% 1080 pellets (Pierce & Montgomery et al. 1992).

Spurr (1994b cited in Broome, Fairweather & Fisher, 2009) found no impacts on populations of amphipods, ants, beetles, collembolans, millipedes, mites, slugs, snails, spiders and cave weta at Puketi Forest or Titirangi Scenic Reserve where 0.08% 1080 pellets were aerially applied at 5 kg/ha.

In Mapara where 0.08% 1080 pellets were aerially applied in three consecutive years (1990-92), a comparison of invertebrate fauna

showed a greater number of predatory insects in the treatment site, characteristic of a healthy forest, and more fungal eating insects in the non-treatment site, characteristic of unhealthy forest (Bradfield, 1993 cited in Broome, Fairweather & Fisher, 2009).

Lizards and frogs were not monitored in any 1080 poisoning operations prior to 1994; however, none have been reported killed by 1080. Captive McCann's skinks (*Oligosoma maccanni*) ate non-toxic cereal pellets (RS5 and Agtech), especially when the baits were wet, but the level of consumption (0.01-0.02g) was probably insufficient for the animals to have received a lethal dose had the baits been toxic (Freeman, 1997).

Significant adverse effects on fish and other aquatic fauna do not occur based on the following data:

- Water contamination is rarely found and extremely low level when it has occurred,
- In a study conducted by NIWA (Suren & Lambert, 2006) no mortality of fish due to 1080 leaching from baits was observed,
- Eels have survived experimental feeding of cereal pellets and possum tissue containing 1080 (Suren & Lambert, 2004).

No adverse effects on marine mammals have occurred to the applicant's knowledge.

Performance standards and information needs

Ensuring 1080 bait meets all quality specifications is considered the best way to avoid adversely affecting birds and other native species.

1. 1080 baits will be lured with cinnamon.

2. If 20mm baits are being used - 1080 baits will have a mean size in excess of 12g or more and and 95% of baits will weigh more than 9g.

   If 16mm baits are being used - 1080 baits will have a mean size in excess of 6g or more and and 95% of baits will weigh more than 2.5g.

3. 1080 bait quality will be checked to ensure bait size complies with standards.

4. 1080 baits will be dyed green to deter birds.

5. 1080 baits will be sown at an effective average sowing rate of 1.5 kg/ha but not greater than 3 kg/ha.

6. RS5 baits will be used.
7. DOC kea code of practice will be followed.

Effects on non-target domestic and feral animals

Non-target species

Introduced Bird & Aquatic Species:

Common Name	Scientific Name
Blackbird	*Turdus merula*
Canada goose	*Branta canadensis*
Chaffinch	*Fringilla coelebs*
Goldfinch	*Carduelis carduelis*
Greenfinch	*Carduelis chloris*
Hedge sparrow/ dunnock	*Prunella modularis*
House sparrow	*Passer domesticus*
Mallard duck	*Anas platyrhynchos platyrhynchos*
Redpoll	*Carduelis flammea*
Skylark	*Alauda arvensis*
Song thrush	*Turdus philomelos*
Starling	*Sturnus vulgaris*
Yellowhammer	*Emberiza citronella*
Brown Trout	*Salmo trutta*

Introduced Feral Species:

Common Name	Scientific Name	Extent
Chamois	*Rupicapra rupicapra*	Localised
Red deer	*Cervus elaphus scoticus*	Widespread
Stoat	*Mustela ermine*	Common
Weasel	*Mustela nivalis vulgaris*	Widespread
Hare	*Lepus europaeus occidentalis*	Common
Mouse	*Mus musculus*	Common
Rabbit	*Oryctolagus cuniculus*	Localised
Norway rat	*Rattus norvegicus*	Widespread
Ship rat	*Rattus rattus*	Widespread

Effects of operation on

There is no domestic livestock within or adjacent to the treatment area.

domestic and feral animals	**Dogs:** Dogs are highly susceptible to 1080 and must not be exposed to the opportunity to directly eat toxic baits or scavenge from poisoned possum carcasses. Carcasses can remain toxic after 1080 poisoning until completely decomposed which can take between 1-12 months, depending on weather conditions and micro-site factors. Under the National Parks Act 1980 (Part VA) dogs are not permitted in a national park without a permit. In line with the Fiordland National Park by–laws and management plan, no permit will be issued for any part of the treatment area. All dogs illegally brought into the Fiordland control areas by the visiting public are at risk from the operation.
Performance standards and information needs	8. Signs will be erected at normal public entry points to the treatment area and maintained until the caution period has expired. Signs at public entry points will clearly state "poison baits or carcasses are deadly to dogs". 9. No permits to take dogs into the treatment areas will be issued until the operational all-clear is given i.e. caution period has ended and warning signs have been removed by DOC staff.

Further information

Further information	There are RMA AEE saved to the DOCDM for these sites: Arthur Sinbad – DOCDM 2619093 Cleddau – DOCDM – 2719459 There will also be a DOC BfoB Operational Plan available, incomplete at the time of submission.

References

The following published references were used in developing this AEE:

Broome, K. G., Fairweather, A. A. C., & Fisher, P. (2009, May). Sodium fluoroacetate: A review of current knowledge. Hamilton, New Zealand: Department of Conservation.