Cat Control in N.Z. Dotterel Breeding Areas on Stewart Island

Version History

Version	Author	Date Written	Change/Reason for change
1	9(2)(g)(ii)	27 jul 2015	

Overview

Conservation outcome

To reverse the decline of the Stewart Island population of Southern New Zealand Dotterel

Scope

Feral cats are being targeted over 480 ha of dotterel breeding habitat. Control will occur from September to March

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

- 1080 0.1% ACP Feral cat bait, fish meal polymer pellet bait in Bait stations.

Outcome target

The outcome targets for the treatment area were:

- A target of 258 Southern New Zealand Dotterel by 2012 was set in the New Zealand Dotterel Recovery Plan 2001 - 2011. With yearly increases this is set at 280 for 2015

Result target

The result targets for the treatment area are:

- Effective Feral cat control within the dotterel breeding areas

Control Design

Control will use 1080 baits in bait stations, approximately 50m apart, over 480ha. Control will occur from September to March with baits changed fortnightly.

This control design has been in operation in the same areas for the same period each year since 1997. As a result of this treatment the NZ Dotterel population has risen from 62 individuals to261 in 2012. Since then the population has declined and research is trying to identify decline factors.

In the past rats have been controlled around the bait stations to prevent them removing the cat bait. No bait is suitable for use this year and therefore no toxins for rats will be used. Rat control may be undertaken with trapping if interference is noted

Site description

Treatment block	N.Z. Dotterel Breeding sites on Stewart Island	
Vegetation type	These areas are all "Alpine turf moor". Table Hill is an exposed mountain top at 716m within Rakiura National Park. Open tops are surrounded by “	
Bioclimatic zone	sub-alpine	
Climate characteristics:		
Rainfall	1600 mm	
Temperature:	Average Summer	16.0
	Average Winter	8.0
Snow level	0 m	
Altitude	464 - 716 m	
Community and Iwi interests	Tin Range tramping route and Rocky Mountain and Rakeahua tramping tracks.	
Historic sites	NIL	

Threats: Feral cats
No other management at the sites

Where?

Map

What?

Method

4.1 Treatment Block 1 Table Hill, Mt Rakeahua, Hills 511 & 464, Rocky Mt. in Rakiura National Park, Stewart Island. (methods the same for all blocks)

Pesticide Use	Target Pest
1080 0.1% fish meal polymer cat bait in bait stations.	Feral cats

Brand Name of pesticide	ACP 1080 cat bait
Lure/mask (& %)	NIL
Type of pre-feed (lure/dye)	NIL
Number of pre-feeds (if any)	N/A
Toxic bait-number fills	12
Describe pattern of bait stations (e.g. grid/contour/ spur-ridge)	Cordon along scrub edge above bush line
Bait station spacing	50m
Bait station type	Modified 4lt liver pails screwed to stakes 200mm above ground level.
Other details about this method	Baits are replaced fortnightly and the amount of bait take recorded.

Timing

September 2015 till March 2016

Method detail

Treatment Block N.Z. Dotterel Breeding sites on Stewart Island

Control method	Name	Target pest species
Pesticide - Bait Station	Pesticide - Bait Station in N.Z. Dotterel Breeding sites on Stewart Island-(1)	Cat

Trade name of pesticide	0.10% 1080 Feral Cat Bait
Name of pesticide	Sodium fluoroacetate
Type of bait	Fish/meat meal pellet
Toxic loading	1 g/kg
Bait quality sampling	Not Conducted

Bait Details

Pre-feed	Toxic

Bait type	-	Fish/meat meal pellet
Lure/ mask/ deterrent	-	None
Lure/ mask/ deterrent	0.00%	0.00%
Dye	-	Green
Individual Bait Weight	- g	2 g

Treatment details

	Pre-feed	Toxic
Dates		Fortnightly changes
No. of fills	0	10
How long to fill	0.00	1.00
Average fill frequency	0	10
Quantity when filled	0g	20g

Date Bait Removed	18/03/2016
End of Caution Period Date	18/07/2016
Pattern of bait stations	Perimeter Contour Other
Bait station type	modified 4 litre liver pail
Bait station spacing	0m between lines X 50m between bait stations
Total number of bait stations	359
Bait Station density	0.7479

Outcome and Result Monitoring

Outcome monitoring. Flock counts of dotterels conducted yearly and tally compared to previous years

Result Monitoring. No effective cat monitoring technique. No monitoring for rats as not looking to control, just reduce their numbers and therefore the amount of cat bait they are consuming.

How?

Consents required

1. Landowner or occupier consent	☐ **No**
2. Resource consent	☐ **No**
3. Public health permission	☐ **Permission**
4. DOC permission	☐ **Yes (operation involves pesticides)**
5. EPA permission	☐ **No**

CIMS Structure

N/A

Task list

Phase	*Target Date*	*Task*	*Delegated to:*	*Task specification*	*Date Completed*
	30 June 2015	Order 1080	9(2)(g)(ii)		*Mid jul*
Pre-operational	31 July 2015	Preparing doc consent, AEE and MOH applic, pesticide summary	9(2)(g)(ii)		*Late jul*
	31 August	Preparing for field season	9(2)(g)(ii)		
	11 Sept	Public notification in SL Times (29/8/2015) Send copy to MOH contact person	9(2)(g)(ii)		*27/8/2015*
		Advise MOH contact person of start date	9(2)(g)(ii)		*26/8/2015*
Operational		Managing field season	9(2)(g)(ii)		
	1 Sept	Carcass Monitoring	9(2)(g)(ii)		
	Ongoing	Warning Sign Register updated (Located in operational plan)	9(2)(g)(ii)		
	30 June	Complete bait disposal	9(2)(g)(ii)		
Post-operatio	30 April	Debrief Completed	9(2)(g)(ii)		
	30 April	Pestlink Report	9(2)(g)(ii)		
	3 months after 1080 removal	Warning Signs removed and MOH contact person notified	9(2)(g)(ii)		

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Deliverables

MOH Application 2562103

MOH Approval 2569630

DOC application and AEE DOCM 253712

DOC approval 2568328

Fact Sheet doc-2536684

Other information

2014/15 season report docdm 2345628
Dotterel Management docdm 1117452
Recovery Programme Analysis dodcm 2345639
Costings for Expansion doccm 2445188

Warning Sign Register

Location of Sign	Date Installed	Dates Checked	Comments	Date Removed
Table Hill North				
Table Hill South				
Rakeahua				
Rocky				
511				

Department of Conservation
Te Papa Atawhai

OPERATIONAL PLAN - 17/18 Southern New Zealand Dotterel recovery

September 2017 to March 2018

Version History

Version	Author	Date Written	Change/Reason for change
3	9(2)(g)(i)	9/08/17	Updated deliverables section
2		8/08/17	Updated with new information
1		28/07/17	Initial draft

Overview

Conservation outcome

- Sustain current population growth of the southern New Zealand dotterel (SNZD) to achieve a more secure population size of at least 300 individuals as soon as possible.

Scope

- Multi species target predator control programme with a primary focus on feral cats and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 3-part area of key SNZD breeding habitat including:
    1. Tin Range (5382ha)
    2. Hill 511 (78ha)
    3. Rakeahua (56ha)
- This will be achieved through a combination of vertebrate toxins, kill trapping and targeted shooting.
- September 2017 to March 2018

Outcome target

- 2018 flock count indicates that southern New Zealand dotterel population size is 153 birds or greater.

Result targets

- There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat monitoring. We are aiming for zero detection through field observations of cat sign and cat detecting dog surveys. We will trial the use of fur tubes as a further detection tool.
- Resident spur-wing plover are removed from the management area so that no further sightings are made for remainder of season post-control.
- A network of raised cat kill traps are baited and set throughout the breeding season.
- All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

Control Design

The previously successful annual cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years, a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds. As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach.

Cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to core-breeding areas). Rats are specifically controlled around bait-station lines to reduce bait-interference and to possibly achieve secondary poisoning of cats, especially those which may be device-shy.

Cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 5382ha to buffer the Tin Range core breeding area.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Target pest	Control method(s)	Control location	Control timing	Result goal/comments
Cats	1. Feral cat 1080 fishmeal pellets in bait stations. 2. PAPP in bait-stations 3. Secondary brodifacoum poisoning via rats in bait stations 4. Kill/live trapping (and shooting if required)	• Tin Range • Mt Rakeahua • Hill 511	September 2017 – March 2018	Cats reduced to non-detectable levels in core breeding area on Tin Range (detected through cat sign/dog surveys/fur tubes)
Rats	1. Brodifacoum in bait stations	• Tin Range • Mt Rakeahua • Hill 511	September 2017 – March 2018	The aim is to reduce rat density prior to PAPP pre-feed and toxic runs to reduce bait-interference. Further aim is to provide toxic food-source to feral cats and achieve secondary poisoning.
Spur-wing plovers/Harriers	1. Shooting	• Core breeding areas	September 2017 – October 2017	Remove all resident pairs
White-tailed deer	1. Shooting	• Core breeding areas	September 2017 – March 2018	Opportunistic control of animals which are present in the core breeding areas. No result target set

Table 1. Summary of target pests, control actions and schedule.

1080, PAPP and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 5382ha grid (including the pre-existing cordon present on Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 134ha of breeding habitat on Mt Rakeahua and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. Brodifacoum
2. PAPP pre-feed (only once brodifacoum take is heavily reduced to indicate low rodent density)
3. PAPP toxin + 1080 fish polymer bait (applied in alternating bait stations)

The control work and result monitoring targets the dotterel breeding season (September – March) while outcome monitoring occurs during the following flocking season (April 2018).

Site description

Locations

This operational plan covers three main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua and Hill 511 (Figure 2).

Vegetation

Table Hill/Blaikies Hill (5382ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (78ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Fauna values within management area

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird - *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Predator pressures

- Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- Australasian harriers – occasionally seen in the operation area.
- Black backed gulls – colony present south of Hill 511.

Previous management

Relevant documentation from previous control work is indexed on the Southern New Zealand Dotterel home page (DOCDM-1117542). Previous Operational Plan for 16/17 SNZD response (DOC-2824345).

Predator control

A cordon of cat control using 1080 fishmeal polymer baits and waxed bromadiolone rodent blocks in bait-stations around core breeding areas on Table Hill (1993), Hill 511 and Mt Rakeahua, was established in 1997. No anti-coagulants were used in 2014 and brodifacoum replaced bromadiolone in the second half of the 15/16 breeding season.

This control was largely successful leading to the recovery of the SNZD population from 62 individuals in 1992 to 290 in 2009, however, the population underwent a 6-year decline between 2011 and 2016 (Figure 1). The application of a revised, expanded predator control programme took place in 2016/17. 2017 flock counts indicated that the decline trend had reversed with the index climbing 21% to an estimated population of 153 birds.

Nest Monitoring

Nest monitoring through grid searching and subsequent camera monitoring have increased our knowledge of the likely predator suite, disturbance and fertility issues impacting SNZD breeding success.

A 2013/2014 wildlife management student from Otago University undertook an investigation into the then apparent "population plateau". The study included 5 monitored nests, 2 of which were believed to be incubated by female-female pairs, 1 nest successful (100% hatch rate) and 2 unknown fates. Nest survey and monitoring in 2016/17 found 4 out of 14 nests hatched with 1 confirmed predation, 1 abandoned nest and 8 unknown fates.

Banding

A banding programme was lead by 9(2)(g)(ii) in the 1990s. Towards the end of the decade, most of the population had been banded. Over time the proportion of banded birds in the population declined through recruitment/replacement and the cessation of banding work.

Banding work restarted in 2013 and continued through until 2015, resulting in 13 individuals being banded. A dedicated temporary contract was initiated in the 2015/16 breeding season which saw a further 38 birds banded (including 5 pre-fledglings giving us birds of known age). A further 21 birds have been banded in 2016/17 taking the likely banded total to 72 or just under 50% of the current estimated population.

The banding has allowed us to start tracking the movements of birds and ascertain whether birds will pair with the same individuals. We're able to obtain better total population estimates as we can more sure that we're not double counting unidentifiable birds.

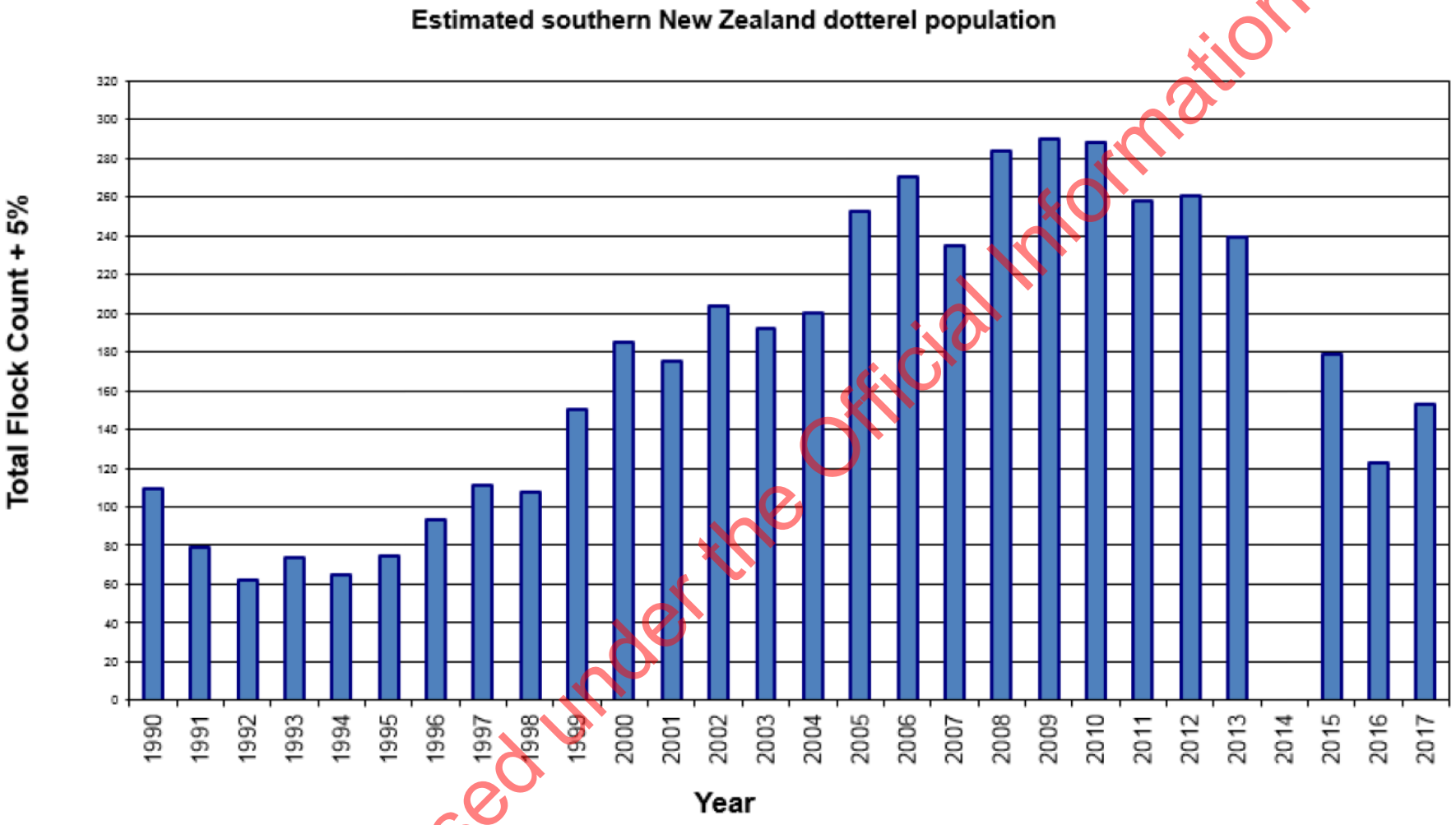

Figure 1. Estimated total SNZD population through annual flock counts +5%. Counts are completed at Mason Bay, Awarua, The Neck and Cook Arm (Port Pegasus) [DOCDM-292288]

Where?

Maps – see following pages.

- Map 1 – All layers.
- Map 2 – No topographic underlay for clarity.
- Map 3 – Raised feral cat kill traps (Tin Range core breeding area zoom). Bait stations not shown as they obscure display of the kill traps.

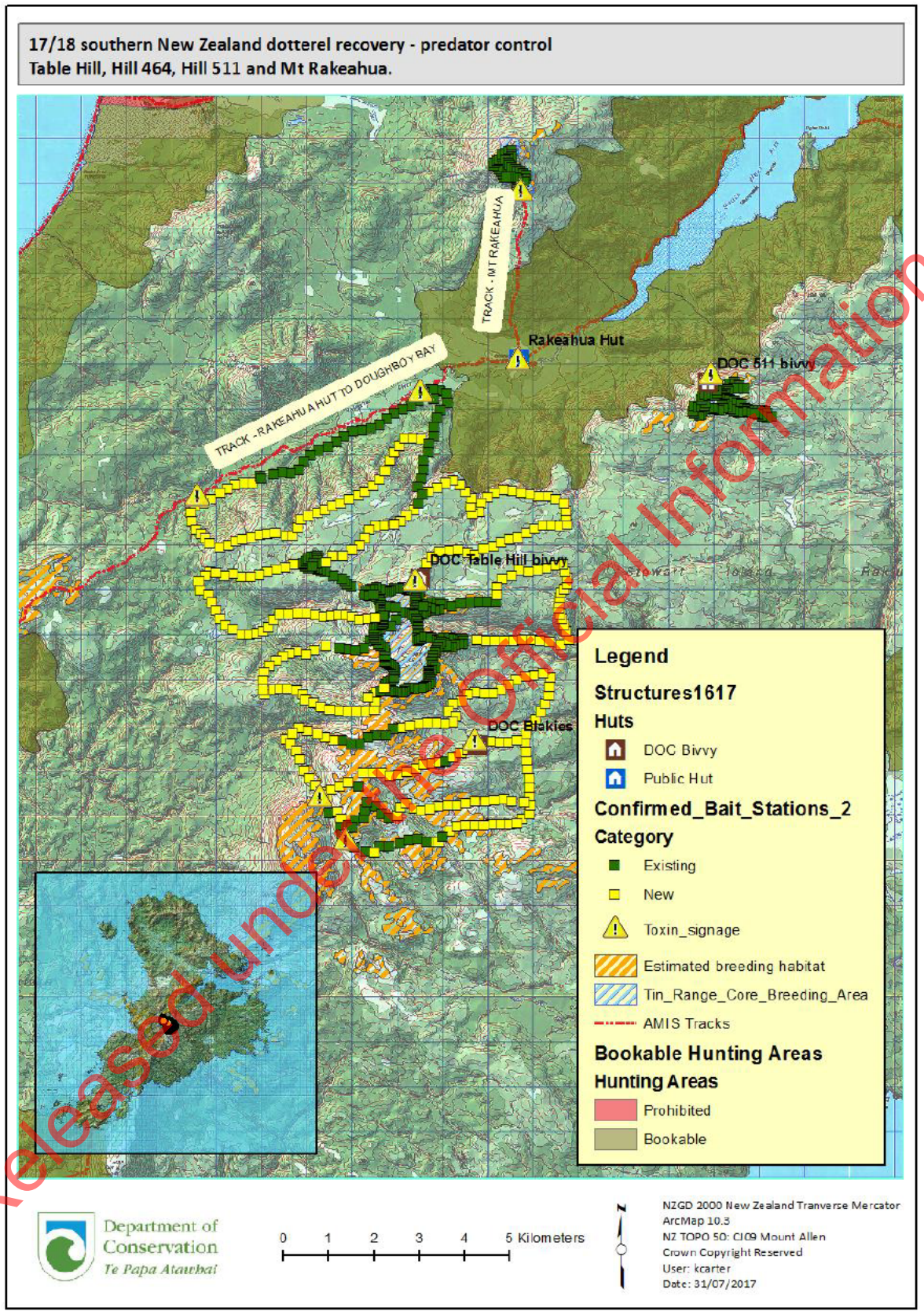

Figure 2. Three operational sub-units comprise the 16/17 control focus. Hunting areas are overlaid. Ranger bivvys and the placement of toxin warning signage are indicated.

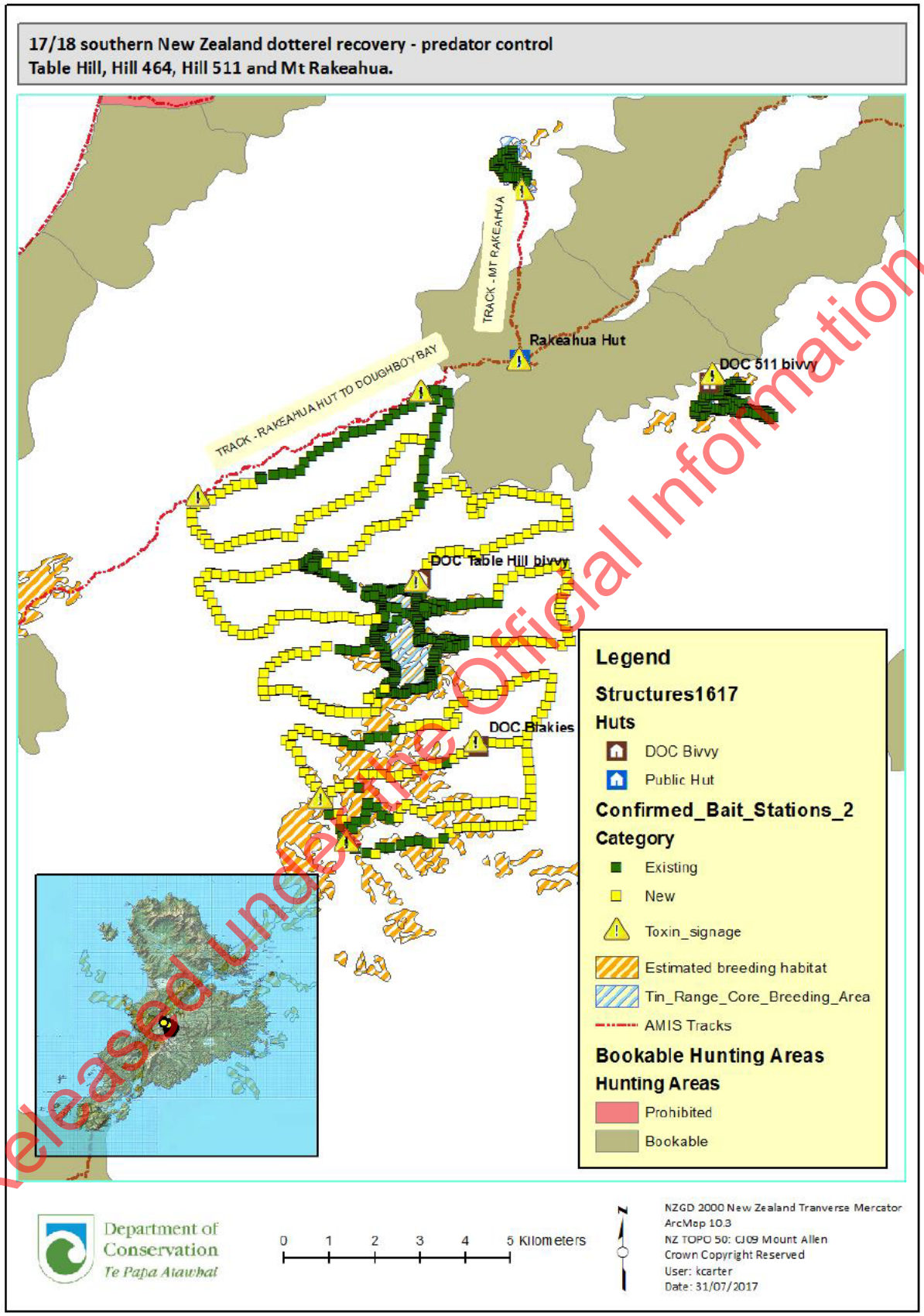

Figure 3. Topographic underlay removed for clarity. All layers shown including bait stations, control tracks core breeding areas and remainder of dotterel breeding habitat

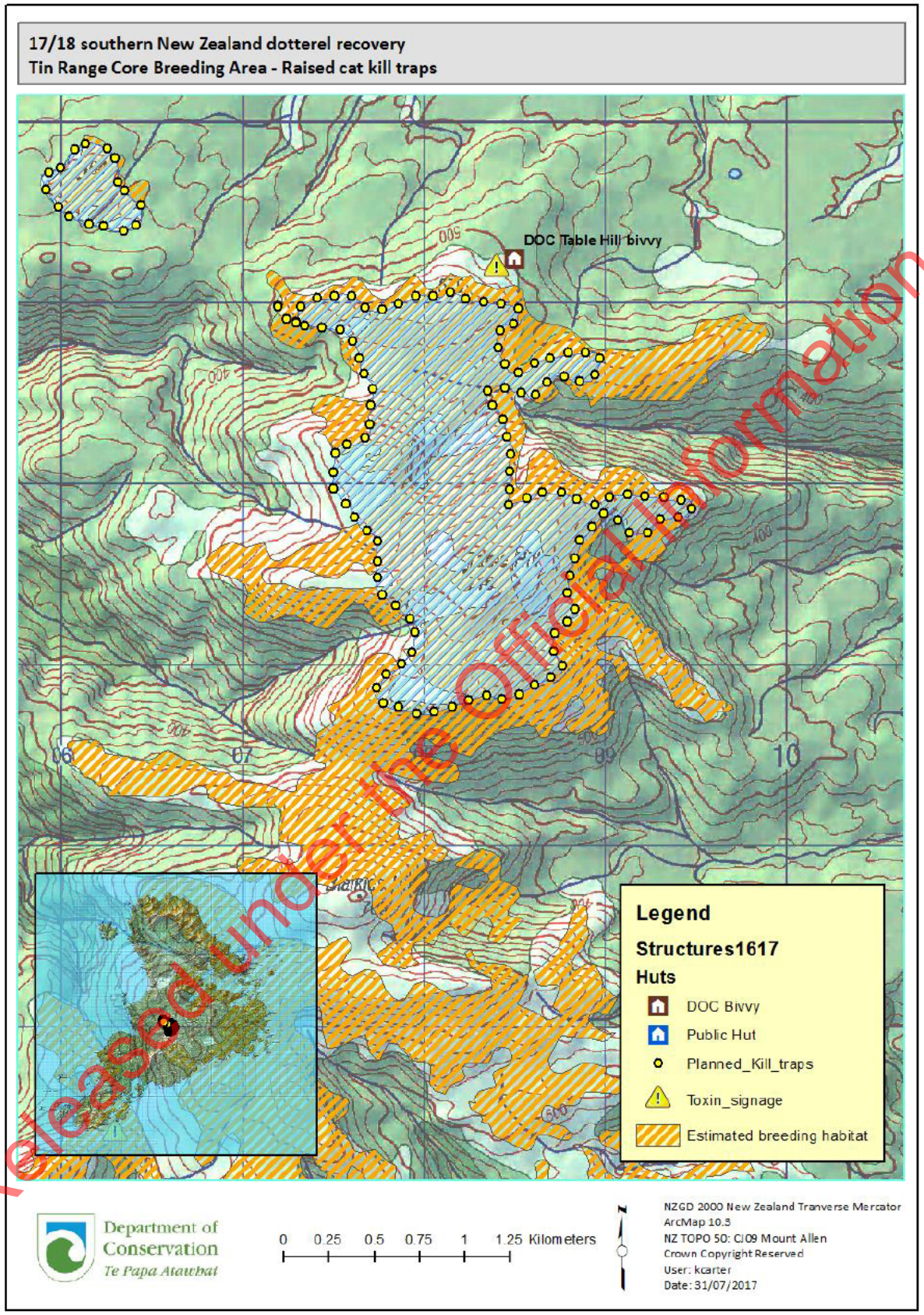

Figure 4. Bait station network removed to clearly show raised cat kill trap locations in the Tin Range core breeding area.

What?

Method

Feral cats

1. PAPP poisoning in bait-stations (Pesticide Use – 124).
2. 1080 fish polymer in bait-stations (Pesticide Use – 38).
3. Kill trapping using raised Timms traps & Belisle X220 traps in chimney trap-covers in the Tin Range core breeding area.
4. Possible ground-set leg hold and/or live cage trapping if cat sign detected in Tin Range core breeding area.

Rats

1. Brodifacoum blocks in bait stations (Pesticide Use – 57) on cat control lines to reduce bait interference and to secondarily poison cats.
    a. *NB: This does not aim to effectively control rats to low levels over a wider area.*

Spur-winged plover/white-tailed deer/Australasian harrier

1. Targeted shooting to remove resident animals from core breeding areas.

Justification for proposed methods (*AEE extract*)
A range of control tools targeting several agents of decline are required given that we don't have a robust understanding of which agents of decline have been driving the SNZD population decline.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 20 years which has potentially led to the creation of a toxin-shy population.

The revised methods have introduced new control tools which have established control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

PAPP is a relatively new toxin tool to target feral cats and the only primary toxic alternative to the existing 1080 fishmeal polymer pellets.

The introduction of kill trapping for feral cats will increase the likelihood of killing cats which are toxin shy and thereby, otherwise uncontrollable.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

Localised rat suppression is required to prevent bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rats. 1080 was initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we continue to support a strong recommendation from Science and Policy to make use of a Brodifacoum for this purpose.

While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, this will be the second year it has been applied to the majority of the management area. Using 1080 will not allow us to adequately control Norway rats and we would expect high levels of interference with both pre-feed and toxic PAPP thereby removing our ability to control feral cats with that method.

Live cage trapping and soft-jaw leg holds targeting feral cats will only be used in emergency situations where cats are found to have avoided the wider network of toxin and kill trapping control and are present within the Tin Range core breeding area.

Assessment of risks to non-target species (*AEE extract*)

Non-target species

Possible non-target species include:

- Stewart Island brown kiwi (Nationally Endangered) – *Apteryx australis lawryi* [Present throughout the management area]
  - Contingency ground-set leg hold traps
  - PAPP toxin

Effect of operation on native species

PAPP, Pestoff rodent blocks and 0.10% 1080 fishmeal polymer pellets

The use of 1080 fishmeal polymer pellets has not resulted in any known native by-kill in the previous 20 years of operation.

Overseas studies indicate that avian taxa are less susceptible to PAPP than mammalian carnivores though it is unclear what risk is posed to kiwi. It is possible that kiwi may be susceptible non-targets given that they may be inclined to consume mince in accessible bait-stations.

LD50 trials were undertaken on Chatham Island weka and an average LD50 was deemed to be 568mg/kg for birds ranging between 640g and 1.2kg in weight (Eason *et al.* 2010). This equates to 3 toxic baits. Kiwi are considerably heavier than weka, with males weighing 2.4kg on average and females 3.1kg. Even though kiwi haven't been tested specifically, we can assume with some confidence that the LD50 for kiwi will be accordingly greater than observed for weka. As such a kiwi will probably need to walk over a kilometre of bait-station line, eating 5 or more toxic baits in a matter of hours to receive a lethal dose. We consider this to be very unlikely.

There are questions regarding the susceptibility of reptiles given that poisoned goanna were found in Australian studies however, these are unlikely to be highly representative of reptiles in this area given a significant size difference.

Sub-lethal doses

PAPP's mode of action is through the oxidisation of haemoglobin which inhibits the ability of blood to transport oxygen to tissues and organs, resulting in unconsciousness followed by heart failure. There is limited available data on non-target sub-lethal effects, however, sub-lethal doses have been noted to pass quickly through organisms' digestive tracts (approximately 24 hours).

If possums have access to anti-coagulant toxic baits, they may receive a sub-lethal dose given their strong natural resistance to that toxin type. We plan to use secured ground-set tubing with captive baits which will prevent possum access.

The use of the more persistent anti-coagulant toxin types is controlled by a DOC policy (DOCDM-97398) which has been designed to limit the risk of bioaccumulation through toxin vectors to humans. We have controlled this through using a bait-station that is not accessible to possums and placing these in an area free of pigs (the whole of Rakiura). The bait-station will also exclude deer.

Ground-set, soft jaw leg hold traps (contingency)

While it is possible that a very few kiwi may be caught in ground set leg-hold traps targeting cats, should they be used, this is considered to be low risk to the resident population due to the unlikelihood of kiwi exposure to these traps.

Raised kill traps (Timms)

Raised kill traps are unlikely to affect any native species due to being placed 700mm above ground level. This will likely reduce the efficacy of the control method but will also reduce the impacts on ground dwelling native birds.

Chimney entrance trap stations (Belisle x220)

These kill traps are effectively ground set in a wooden tunnel station that is only accessible from a vertical chimney entrance. It is very unlikely that non-target species will enter this tunnel and so we consider the non-target effects minimal.

Native species benefits

The primary species benefit sought is the reduction of predation pressure on vulnerable nesting southern New Zealand dotterel, hatched chicks and juveniles. Previous cat control activities have been shown to be highly effective, with an increase in population size from 62 individuals in 1992 to 290 in 2009, prior to the subsequent failure.

The control of feral cats will heavily reduce the strongest predation pressure effects on and thereby likely benefit kiwi, kaka, harlequin geckos, small-eared skinks, fern bird and banded dotterel. Reptiles and juvenile native birds are also likely to benefit from the localised reduction in rat density (though this is not a target of the operation, merely a possible incidental effect).

There is no species monitoring data (other than the SNZD population) to support the above supposition, however, previous iterations of this project involved localised control in a cordon rather than a grid. The revised plan's increase in scale and coverage is more likely to deliver the secondary species benefits mentioned.

Timing

Cyclical task schedule			
Month	**Predator Control**	**Other Actions**	**Monitoring**
August 2017		Cat dog survey Track cutting/bait station installation	Nesting effort, cameras
September 2017	Cats, SWP, Harrier, Deer	Track cutting/bait station installation	Nesting effort, cameras, banding.
October 2017	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
November 2017	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
December 2017	Cats, SWP, Harrier, Deer	Cat dog survey	Nesting effort, cameras, banding.
January 2018	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
February 2018	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
March 2018		Post pesticide operation actions. Bivvy clean up, signage checks, toxin disposal.	
April 2018			Flock counts, banding
May 2018			Banding
June 2018			Banding
July 2018			

4 weekly rolling baiting rounds

- Week 1 – Brodifacoum blocks (check and replace if required)
- Week 2 – Brodifacoum blocks (check and replace if required)
- Week 3 - PAPP pre-feed (if brodifacoum take is minimal)
- Week 4 - PAPP toxic + 1080 fish polymer bait (targeting cats)

Method detail

Applicable Best Practice:

- Kill trapping for feral cat control - DOCDM-29437
- Leg-hold trapping for feral cat control – DOCDM-29439 (contingency only)
- Brodifacoum blocks targeting rats (PU 57) - DOCDM-29380 (not aiming for rat suppression/control over wide area)
- Ground shooting of deer – DOCDM-642613
- Despatching animals caught in live capture traps – DOCDM-806487 (cat contingency)

Control methods without associated Best Practice

- PAPP targeting feral cats (PU124)
- 1080 fish polymer targeting feral cats (PU38)
- Spur-winged plover/Australasian harrier shooting

Standard Operating Procedures

- Safe Handling of Pesticides – DOCDM -22730

Pre-implementation logistics

Field accommodation

Delivery schedules are likely to focus on rangers spending longer periods based in the backcountry. This has necessitated additional bivvy and temporary field accommodation to be constructed within the management area. This was completed in the previous field season and so is now readily available to rangers.

Table Hill and Blaikies Hill have been chosen for their relatively sheltered positioning as well as being conveniently spaced for delivery (track cutting, bait station servicing and banding/monitoring) team needs. The public Rakeahua hut is also available for field operations and will be used for track cutting teams initially and then later for servicing the Rakeahua and Hill 511 bait stations.

Additional weather proof storage pods supplement available vestibule space in the bivvies which are required for additional gear associated with delivery.

Bait storage

A field freezer and generator will need to be flown to each of the bivvy sites to store mince for PAPP toxic and pre-feed delivery. Toxins will be stored in lockable, flyable aluminium containers which will be present at each of the bivvies.

Pre-season flights

Helicopter flights will be scheduled to fly up bait storage and associated gear as well as trapping and bait station construction supplies prior to field delivery.

Bait stations operations

On-going establishment

Continue to develop a grid with approximately 1km track spacing along which bait stations are placed at 200m intervals. The area includes a 2km buffer beyond the Tin Range core breeding area (Fig 2) which is based on Harper's research on feral cats having average home range diameters of this metric (Harper, 2004).

This requires approximately 55km of tracks to be cut with about 330 new bait stations to be established in addition to the existing 423. Bait station designs will follow the previously used Stewart Island feral cat station style as this has proven effective in past operations while brodifacoum will be placed in 500mm nova-coil tunnels pegged to the ground.

Track cutting and bait station installation is scheduled for September and October 2017. Remaining track cutting will be offered as a single Type C contract tender under the Supplier and Procurement Management SOP via the GETS process. Bait station installation will be completed by a mix of temporary project rangers and permanent rangers from the local DOC office.

Servicing/baiting

Baiting of the existing bait station network (423 stations) will begin in September to target a pre-breeding knock down of predators using the 4-week rolling programme as follows:

- Week 1 – Brodifacoum blocks (check and replace if required) (targeting rats and potentially cats secondarily)
- Week 2 – Brodifacoum blocks (check and replace if required) (targeting rats and potentially cats secondarily)
- Week 3 - PAPP pre-feed (once brodifacoum take is reduced indicating low rodent density)
- Week 4 - PAPP toxic + 1080 fish polymer bait (targeting cats)

The additional 330 bait stations will be incorporated as they become operative on completion of the establishment phase.

The first stage of baiting will be completed by existing staff with the second stage of baiting work being supplemented by the addition of approximately 3 new temporary rangers. Baiting work will continue on the above schedule until the end of the breeding season (approximately March 2018).

Trapping & feral cat shooting (spotlighting)

Limited kill trapping was partially implemented in 2015 near Table Hill, focussing on edges and tracks as it is generally accepted that these areas act as pathways along which predators travel. This has been expanded on in the 16/17 season with further deployment of 96 x 700mm raised Timms traps. These will be checked and re-baited weekly.

The Timms traps will be supplemented by approximately 30 Belisle X220 traps in a wooden chimney design as per Feral Cat Kill Trapping System 1 and interspersed amongst raised Timms traps.

If any cat sign is confirmed, either during a cat detecting dog survey or cat sign noted by field rangers, in or near the Tin Range core breeding area (Fig 2), this will be immediately followed up with targeted soft jaw leg-hold trapping and spotlighting for cats (shooting) within the detection vicinity.

Targeted shooting

White-tailed deer, spur-winged plover and Australasian harrier present within the Core Breeding Areas will be shot by qualified rangers early in the field season (early September) in anticipation of the start of the breeding season.

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Pestlink data tables

Pesticides

	PAPP	1080 fishmeal polymer	Brodifacoum blocks	Comments
Target pest	Feral cats	Feral cats	Rat reduction, possible secondary poisoning of feral cats	Rat and possum suppression not specifically targeted. See above.
Pesticide trade name	PredaStop for cats	0.10% 1080 feral cat bait	Pestoff Rodent Blocks	
Pesticide Name	Para-aminopropiophenone	Sodium fluoroacetate	Brodifacoum	
Toxic loading	41%	0.10%	0.02g/kg	
Bait type	Paste	Pellet	Block	
Lure/mask and %	Mince ball	Fishmeal	Chocolate	
Dye	Green	Green	Blue	
Type of pre-feed (lure/lure %/dye)	Non-toxic mince ball dyed green	NA	NA	
Individual bait weight (g)	15	1.5	20	
Bait sampling?	No	No	No	
Pre-feed dates	Week 3 (Sep 17 – Mar 18)	NA	NA	
Number of pre-feeds	6	NA	NA	
Pre-feed quantity	15g/station	NA	NA	
Toxic bait dates	Week 4 (Sep 17 – Mar 18)	Week 4 (Sep 17 – Mar 18)	Week 1 & 2 (Sep 17 – Mar 18)	
Number of toxic fills	6	6	6-12 planned	Baiting intensity will depend on how quickly baits are completely removed from bait stations.
Toxic bait frequency	Monthly	Monthly	Fortnightly - Monthly	
Toxic bait quantity	200mg toxic paste in 15g mince ball	15g toxic bait	20g toxic bait	
Pre-feed to toxic interval	Approx 1 week	NA	NA	
Date bait removed	Week 1 (Sep 17 – Mar 18)	Week 1 (Sep 17 – Mar 18)	Final date – 02 March 2018	
End of caution period date	April 2018 (1 month after last toxic application)	August 2018 (5 months after last toxic application)	02 March 2020 (3 years after last toxic application)	
Bait station pattern	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	
Bait station type	Stewart Island cat bait station	Stewart Island cat bait station	Tubing secured to ground with pegs	DOCDM-856047 (SI cat bait station)
Bait station spacing	50m core-breeding area 200m x 1km buffer area	50m core-breeding area 200m x 1km buffer area	50m core-breeding area 200m x 1km buffer area	Only targeting rat reduction around bait stations
Total number of bait stations	740	740	740	
Bait station density	Average – 0.13/ha	Average – 0.13/ha	Average – 0.13/ha	

Trapping

	Kill traps	Soft-jaw legholds (contingency)	Live cage trap (contingency)	Comments
Target pest	Feral cats	Feral cats	Feral cats	
Trap style (kill/leghold/cage)	Kill	Leghold	Cage	
Trap type	Timms & Belisle x220	Soft-jaw leg-hold	Live cage trap	
Lure(s)	Fresh meat/fish	Fresh meat/fish	Fresh meat/fish	
Trapping start date	4 September 2018	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	See above contingency scenario description
Trapping completion date	3 March 2018	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	See above contingency scenario description
Number and frequency of lure renewals	1 renewal weekly (25 total)	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	
Total number of traps	126 approx	As required, targeted, <20	As required, targeted, <20	
Pattern of trap lines	Cordon surrounding Tin Range core breeding area	Targeted to cat detection area	Targeted to cat detection area	
Trap spacing	100m	100m	100m	
Frequency of trap checking	Weekly	Daily	Daily	
Trap placement	Along cordon following scrub-open edge	Along bush edges and natural runways	Along bush edges and natural runways	
Type of trap set	Raised-set (Timms)/chimney tunnel (Belisle x220)	Ground-set	Ground-set	
Trap covers	N/A	N/A	N/A	
Trap height	700mm (approved)	0	0	Approved by Kiwi Recovery Group given that possum leg holds are set at 700mm anyway.
Total trap effort (trap-nights)	182 days x 126 traps = 22,931 trap-nights	Unknown	Unknown	
Trap set density per ha	2.1	Unknown	Unknown	

Outcome and Result Monitoring

Outcome monitoring

Measuring a response in the dotterel population is critical to allow validation and refinement of management.

1. Our primary method of monitoring will be the banding of adults and fledging chicks at the nesting grounds to allow re-sightings at the flock sites.
    a. Handled birds will have their basic morphometries measured and receive a visual health check. Disease sampling may be undertaken with swabs and/or bloods (dependent on qualified personnel).
2. Nest searching and repeat observations plus motion-activated camera trap monitoring of nests to confirm nest fate and provide productivity estimates.
3. Annual flock counts to be completed during the highest tides in April 2018. This will form our overall on-going population trend estimate as per previous years.

Should the population experience a further reduction, information received from the monitoring programme will become crucial in directing future management.

Result monitoring

1. Cat dogs will be run before and midway through nesting season to measure cat presence within the nesting and buffer areas.
2. Field rangers will be tasked with searching for (incidental sightings and trail cameras) and recording cat sign during their other tasks.
3. Kill and live (contingency) trap results will be recorded.
4. Fur tunnels will be used to target ascertaining cat presence.
5. Shooting records of deer, spur-winged plover and harriers will be maintained.

How?

Consents required

1. Landowner or occupier consent	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission	☒ **Yes (operation involves pesticides)**
4. DOC permission	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

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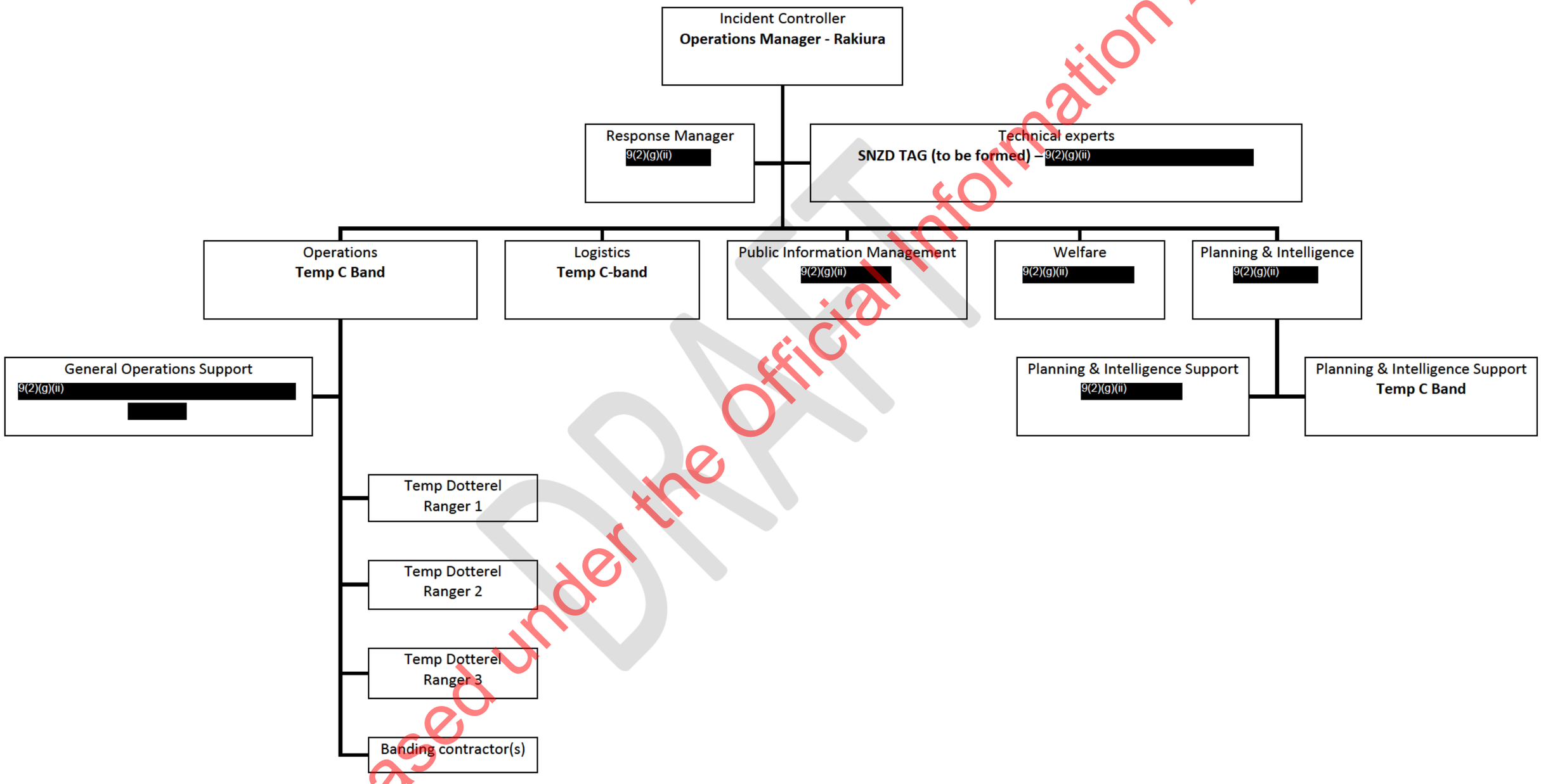
CIMS structure



Task list

A compliance register is being used for this operation and tasking lists are contained in DOC-3135153.

Deliverables

Title	Link
Communication plan	DOC-3135342
DOC pesticides application and AEE	DOC-3135196
Consents	(Confirmation that resource consent not required) DOC-2837856
	(DOC permission)
	Public Health/Medical Officer of Health DOC-3136396 (Application) (Signed MOH permission)
Safety plan	DOC-3136345
Safety briefing	
Emergency response plan for transport	DOC-3136309
Emergency response plan for storage	Not required
Tender documents	To be confirmed
Contracts	To be confirmed
Checklist for info required for operational report	
Warning sign register	Pesticides GIS App
Updated budget forecasting & tracking sheet	DOC-2837018
Compliance register & tasking lists	DOC-3135153
Consultation – Key Facts Sheet	DOC-3137484

Relevant documents

Title	Link
16/17 Response Plan (BFOB funding bid supplementary material)	DOC-2759653
16/17 Battle For Our Birds funding application summary	DOC-2790749
17/18 Battle For Our Birds funding application summary	DOC-3072324
15/16 SNZD cat control Operational Plan	DOC-2536930
16/17 SNZD response pest control records	DOC-2901677
16/17 SNZD response Operational Plan	DOC-2824345
16/17 Track cutting and bait-station calculations	DOC-2839070
SNZD banding and monitoring database	DOC-2641608
Peer review of operational plan	To be completed
Anti-coagulant use rationale	DOC-2851151
Director's exemption to use second generation anti-coagulant	DOC-3136192

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Acknowledgements

A very sincere thanks to the following people for their considerable support in both the initial concept design, subsequent detailed planning and field logistical consideration of the urgent 16/17 southern New Zealand dotterel response which has formed the basis of "17/18 SNZD recovery" project:

- 9(2)(g)(ii)
- 9(2)(g)(ii)

OPERATIONAL PLAN - 17/18 Southern New Zealand Dotterel recovery

September 2017 to March 2018

Version History

Version	Author	Date Written	Change/Reason for change
1	9(2)(g)(ii)	28/07/17	Initial draft

Overview

Conservation outcome

- Sustain current population growth of the southern New Zealand dotterel (SNZD) to achieve a more secure population size of at least 300 individuals as soon as possible.

Scope

- Multi species target predator control programme with a primary focus on feral cats and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 3-part area of key SNZD breeding habitat including:
    1. Tin Range (5382ha)
    2. Hill 511 (78ha)
    3. Rakeahua (56ha)
- This will be achieved through a combination of vertebrate toxins, kill trapping and targeted shooting.
- September 2017 to March 2018

Outcome target

- 2018 flock count indicates that southern New Zealand dotterel population size is 153 birds or greater.

Result targets

- There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat monitoring. We are aiming for zero detection through field observations of cat sign and cat detecting dog surveys. We will trial the use of fur tubes as a further detection tool.
- Resident spur-wing plover are removed from the management area so that no further sightings are made for remainder of season post-control.
- A network of raised cat kill traps are baited and set throughout the breeding season.
- All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

Control Design

The previously successful annual cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years, a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds. As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach.

Cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to core-breeding areas). Rats are specifically controlled around bait-station lines to reduce bait-interference and to possibly achieve secondary poisoning of cats, especially those which may be device-shy.

Cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 5382ha to buffer the Tin Range core breeding area.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Target pest	Control method(s)	Control location	Control timing	Result goal/comments
Cats	1. Feral cat 1080 fishmeal pellets in bait stations. 2. PAPP in bait-stations 3. Secondary brodifacoum poisoning via rats in bait stations 4. Kill/live trapping (and shooting if required)	• Tin Range • Mt Rakeahua • Hill 511	September 2017 – March 2018	Cats reduced to non-detectable levels in core breeding area on Tin Range (detected through cat sign/dog surveys/fur tubes)
Rats	1. Brodifacoum in bait stations	• Tin Range • Mt Rakeahua • Hill 511	September 2017 – March 2018	The aim is to reduce rat density prior to PAPP pre-feed and toxic runs to reduce bait-interference. Further aim is to provide toxic food-source to feral cats and achieve secondary poisoning.
Spur-wing plovers/Harriers	1. Shooting	• Core breeding areas	September 2017 – October 2017	Remove all resident pairs
White-tailed deer	1. Shooting	• Core breeding areas	September 2017 – March 2018	Opportunistic control of animals which are present in the core breeding areas. No result target set

Table 1. Summary of target pests, control actions and schedule.

1080, PAPP and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 5382ha grid (including the pre-existing cordon present on Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 134ha of breeding habitat on Mt Rakeahua and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. Brodifacoum
2. PAPP pre-feed (only once brodifacoum take is heavily reduced to indicate low rodent density)
3. PAPP toxin + 1080 fish polymer bait (applied in alternating bait stations)

The control work and result monitoring targets the dotterel breeding season (September – March) while outcome monitoring occurs during the following flocking season (April 2018).

Site description

Locations

This operational plan covers three main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua and Hill 511 (Figure 2).

Vegetation

Table Hill/Blaikies Hill (5382ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (78ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Fauna values within management area

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird - *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Predator pressures

- Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- Australasian harriers – occasionally seen in the operation area.
- Black backed gulls – colony present south of Hill 511.

Previous management

Relevant documentation from previous control work is indexed on the Southern New Zealand Dotterel home page (DOCDM-1117542). Previous Operational Plan for 16/17 SNZD response (DOC-2824345).

Predator control

A cordon of cat control using 1080 fishmeal polymer baits and waxed bromadiolone rodent blocks in bait-stations around core breeding areas on Table Hill (1993), Hill 511 and Mt Rakeahua, was established in 1997. No anti-coagulants were used in 2014 and brodifacoum replaced bromadiolone in the second half of the 15/16 breeding season.

This control was largely successful leading to the recovery of the SNZD population from 62 individuals in 1992 to 290 in 2009, however, the population underwent a 6-year decline between 2011 and 2016 (Figure 1). The application of a revised, expanded predator control programme took place in 2016/17. 2017 flock counts indicated that the decline trend had reversed with the index climbing 21% to an estimated population of 153 birds.

Nest Monitoring

Nest monitoring through grid searching and subsequent camera monitoring have increased our knowledge of the likely predator suite, disturbance and fertility issues impacting SNZD breeding success.

A 2013/2014 wildlife management student from Otago University undertook an investigation into the then apparent "population plateau". The study included 5 monitored nests, 2 of which were believed to be incubated by female-female pairs, 1 nest successful (100% hatch rate) and 2 unknown fates. Nest survey and monitoring in 2016/17 found 4 out of 14 nests hatched with 1 confirmed predation, 1 abandoned nest and 8 unknown fates.

Banding

A banding programme was led by 9(2)(g)(ii) in the 1990s. Towards the end of the decade, most of the population had been banded. Over time the proportion of banded birds in the population declined through recruitment/replacement and the cessation of banding work.

Banding work restarted in 2013 and continued through until 2015, resulting in 13 individuals being banded. A dedicated temporary contract was initiated in the 2015/16 breeding season which saw a further 38 birds banded (including 5 pre-fledglings giving us birds of known age). A further 21 birds have been banded in 2016/17 taking the likely banded total to 72 or just under 50% of the current estimated population.

The banding has allowed us to start tracking the movements of birds and ascertain whether birds will pair with the same individuals. We're able to obtain better total population estimates as we can more sure that we're not double counting unidentifiable birds.

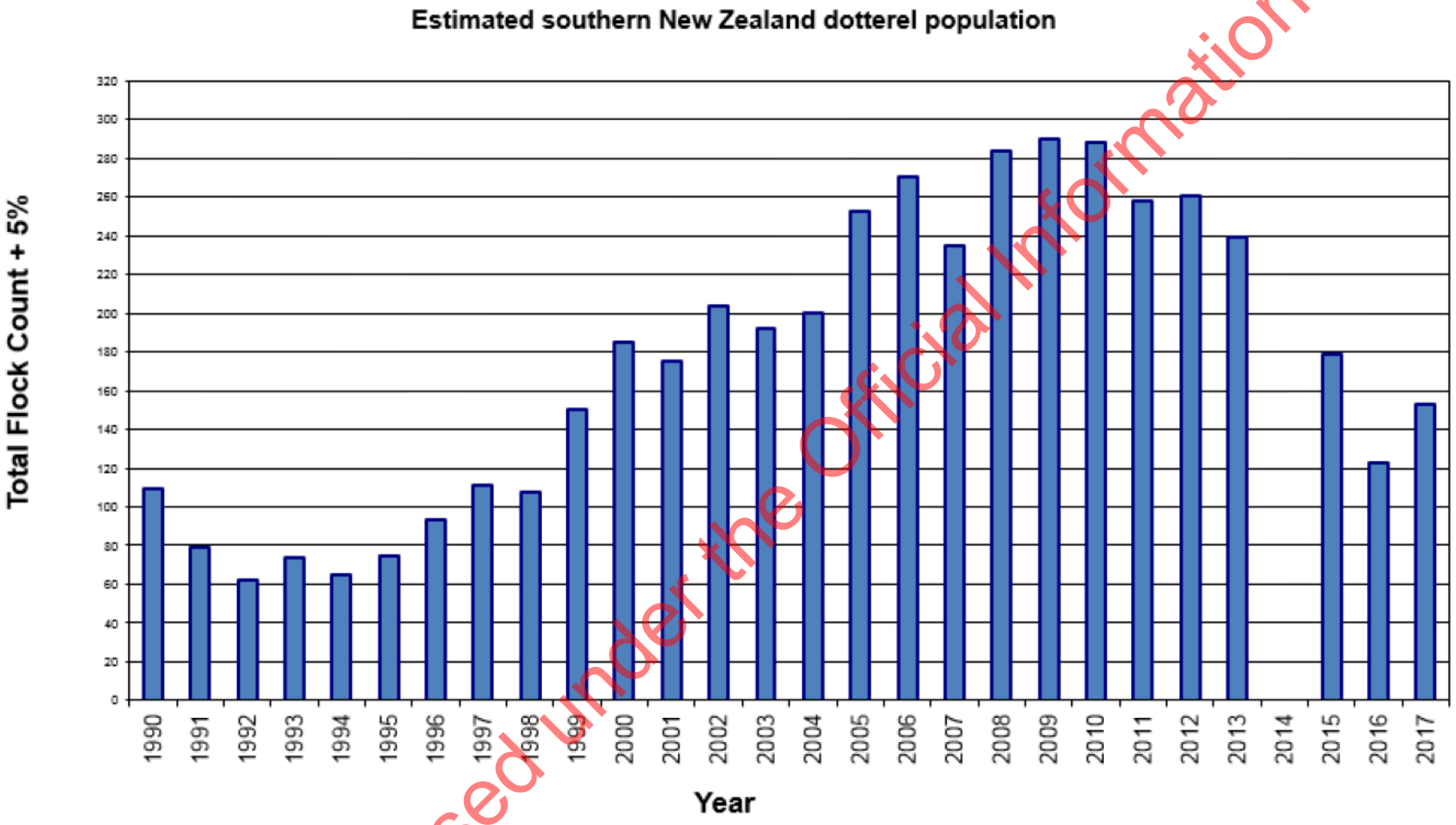


Figure 1. Estimated total SNZD population through annual flock counts +5%. Counts are completed at Mason Bay, Awarua, The Neck and Cook Arm (Port Pegasus) [DOCDM-292288]

Where?

Maps – see following pages.

- Map 1 – All layers.
- Map 2 – No topographic underlay for clarity.
- Map 3 – Raised feral cat kill traps (Tin Range core breeding area zoom). Bait stations not shown as they obscure display of the kill traps.

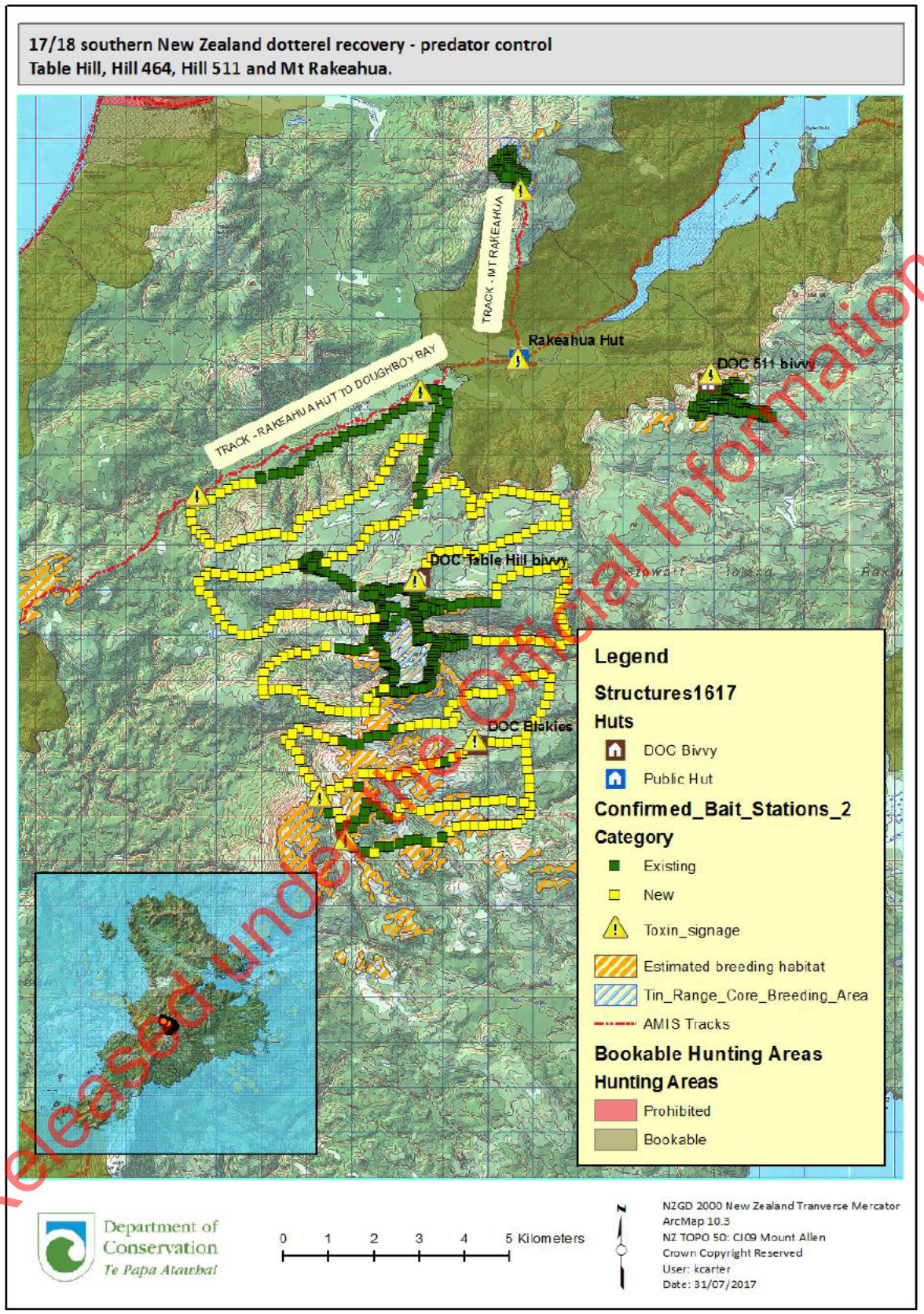


Figure 2. Three operational sub-units comprise the 16/17 control focus. Hunting areas are overlaid. Ranger bivvys and the placement of toxin warning signage are indicated.

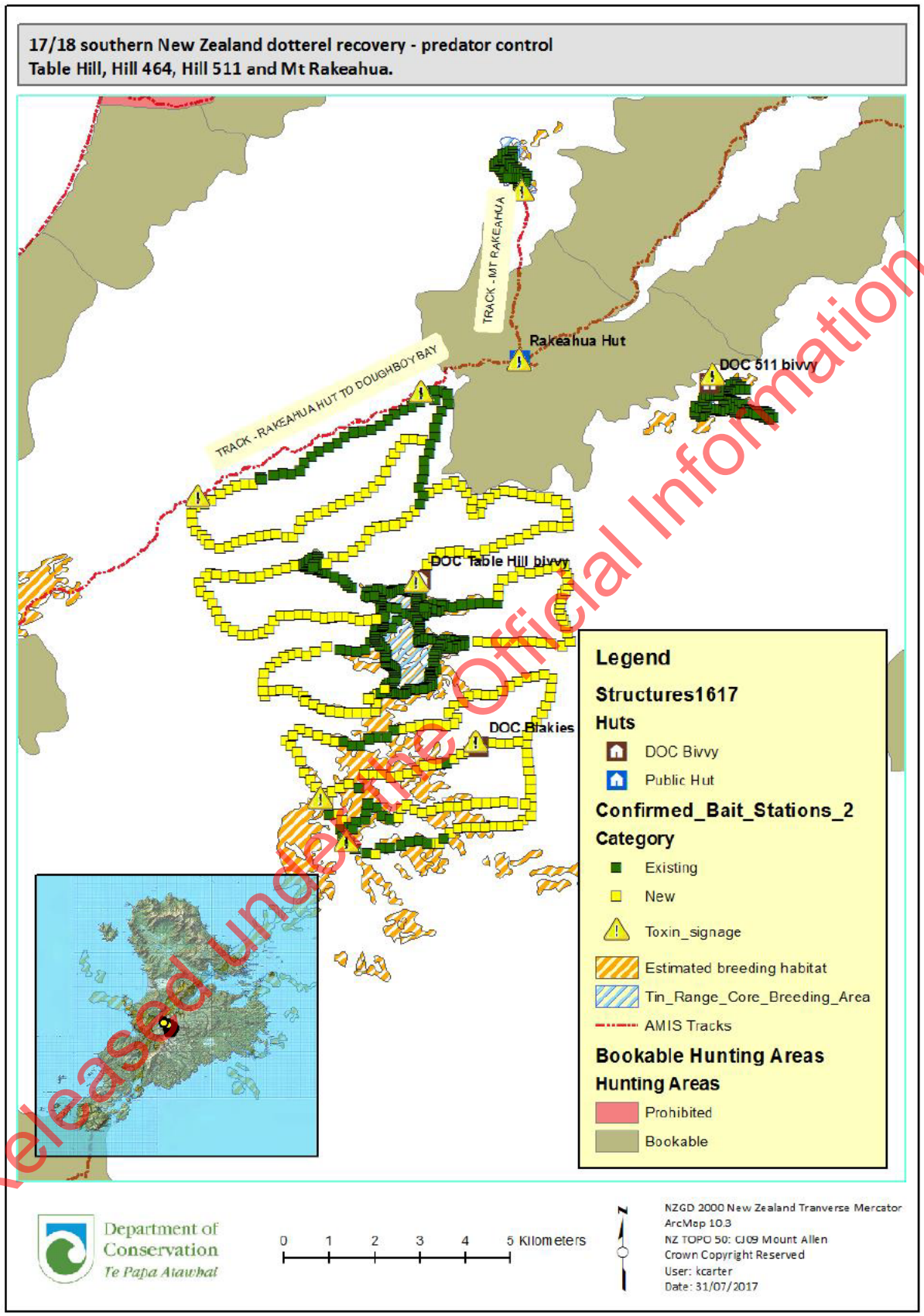


Figure 3. Topographic underlay removed for clarity. All layers shown including bait stations, control tracks core breeding areas and remainder of dotterel breeding habitat

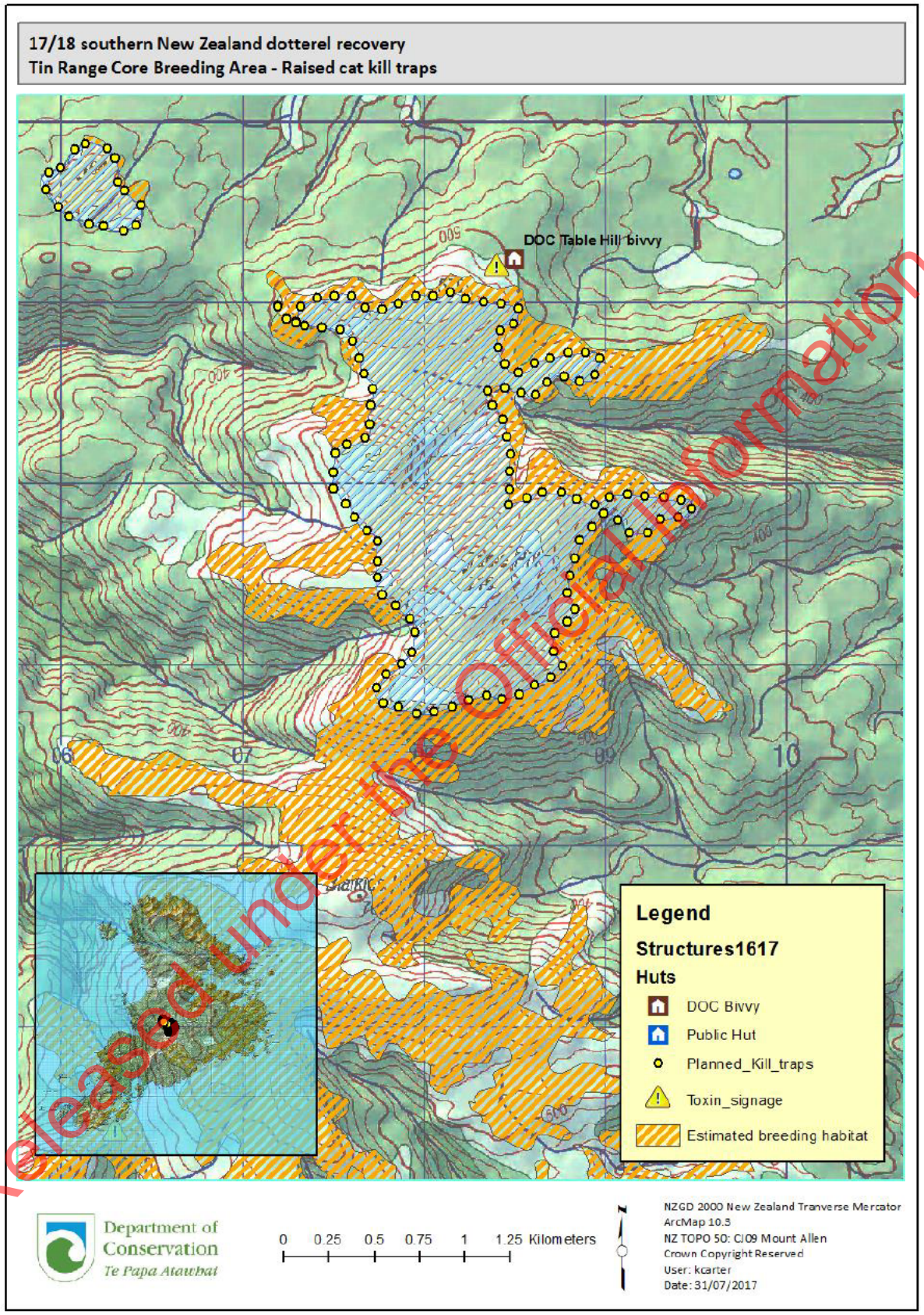


Figure 4. Bait station network removed to clearly show raised cat kill trap locations in the Tin Range core breeding area.

What?

Method

Feral cats

1. PAPP poisoning in bait-stations (Pesticide Use – 124).
2. 1080 fish polymer in bait-stations (Pesticide Use – 38).
3. Kill trapping using raised Timms traps & Belisle X220 traps in chimney trap-covers in the Tin Range core breeding area.
4. Possible ground-set leg hold and/or live cage trapping if cat sign detected in Tin Range core breeding area.

Rats

1. Brodifacoum blocks in bait stations (Pesticide Use – 57) on cat control lines to reduce bait interference and to secondarily poison cats.
    a. *NB: This does not aim to effectively control rats to low levels over a wider area.*

Spur-winged plover/white-tailed deer/Australasian harrier

1. Targeted shooting to remove resident animals from core breeding areas.

Justification for proposed methods (*AEE extract*)
A range of control tools targeting several agents of decline are required given that we don't have a robust understanding of which agents of decline are driving the SNZD population decline.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 20 years which has potentially led to the creation of a toxin-shy population.

The revised proposed methods aim introduce new control tools which establish control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

PAPP is a relatively new toxin tool to target feral cats and the only primary toxic alternative to the existing 1080 fishmeal polymer pellets.

The introduction of kill trapping for feral cats will increase the likelihood of killing cats which are toxin shy and thereby, otherwise uncontrollable.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

Localised rat suppression is required to prevent bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rats. 1080 was initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we support a strong recommendation from Science and Policy to make use of Brodifacoum for this purpose. While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, this will be the second year it has been applied to the majority of the management area. Using 1080 will not allow us to adequately control Norway rats and we would expect high levels of interference with both pre-feed and toxic PAPP thereby removing our ability to control feral cats with that method.

Live cage trapping and soft-jaw leg holds targeting feral cats will only be used in emergency situations where cats are found to have avoided the wider network of toxin and kill trapping control and are present within the Tin Range core breeding area.

Assessment of risks to non-target species (*AEE extract*)

Non-target species

Possible non-target species include:

- Stewart Island brown kiwi (Nationally Endangered) – *Apteryx australis lawryi* [Present throughout the management area]
    - Contingency ground-set leg hold traps
    - PAPP toxin

Effect of operation on native species

PAPP, Pestoff rodent blocks and 0.10% 1080 fishmeal polymer pellets

The use of 1080 fishmeal polymer pellets has not resulted in any known native by-kill in the previous 20 years of operation.

Overseas studies indicate that avian taxa are less susceptible to PAPP than mammalian carnivores though it is unclear what risk is posed to kiwi. It is possible that kiwi may be susceptible non-targets given that they may be inclined to consume mince in accessible bait-stations.

LD50 trials were undertaken on Chatham Island weka and an average LD50 was deemed to be 568mg/kg for birds ranging between 640g and 1.2kg in weight (Eason *et al.* 2010). This equates to 3 toxic baits. Kiwi are considerably heavier than weka, with males weighing 2.4kg on average and females 3.1kg. Even though kiwi haven't been tested specifically, we can assume with some confidence that the LD50 for kiwi will be accordingly greater than observed for weka. As such a kiwi will probably need to walk over a kilometre of bait-station line, eating 5 or more toxic baits in a matter of hours to receive a lethal dose. We consider this to be very unlikely.

There are questions regarding the susceptibility of reptiles given that poisoned goanna were found in Australian studies however, these are unlikely to be highly representative of reptiles in this area given a significant size difference.

Sub-lethal doses

PAPP's mode of action is through the oxidisation of haemoglobin which inhibits the ability of blood to transport oxygen to tissues and organs, resulting in unconsciousness followed by heart failure. There is limited available data on non-target sub-lethal effects, however, sub-lethal doses have been noted to pass quickly through organisms' digestive tracts (approximately 24 hours).

If possums have access to anti-coagulant toxic baits, they may receive a sub-lethal dose given their strong natural resistance to that toxin type. We plan to use secured ground-set tubing with captive baits which will prevent possum access.

The use of the more persistent anti-coagulant toxin types is controlled by a DOC policy (DOCDM-97398) which has been designed to limit the risk of bioaccumulation through toxin vectors to humans. We have controlled this through using a bait-station that is not accessible to possums and placing these in an area free of pigs (the whole of Rakiura). The bait-station will also exclude deer.

Ground-set, soft jaw leg hold traps (contingency)

While it is possible that a very few kiwi may be caught in ground set leg-hold traps targeting cats, should they be used, this is considered to be low risk to the resident population due to the unlikelihood of kiwi exposure to these traps.

Raised kill traps (Timms)

Raised kill traps are unlikely to affect any native species due to being placed 700mm above ground level. This will likely reduce the efficacy of the control method but will also reduce the impacts on ground dwelling native birds.

Chimney entrance trap stations (Belisle x220)

These kill traps are effectively ground set in a wooden tunnel station that is only accessible from a vertical chimney entrance. It is very unlikely that non-target species will enter this tunnel and so we consider the non-target effects minimal.

Native species benefits

The primary species benefit sought is the reduction of predation pressure on vulnerable nesting southern New Zealand dotterel, hatched chicks and juveniles. Previous cat control activities have been shown to be highly effective, with an increase in population size from 62 individuals in 1992 to 290 in 2009, prior to the subsequent failure.

The control of feral cats will heavily reduce the strongest predation pressure effects on and thereby likely benefit kiwi, kaka, harlequin geckos, small-eared skinks, fern bird and banded dotterel. Reptiles and juvenile native birds are also likely to benefit from the localised reduction in rat density (though this is not a target of the operation, merely a possible incidental effect).

There is no species monitoring data (other than the SNZD population) to support the above supposition, however, previous iterations of this project involved localised control in a cordon rather than a grid. The revised plan's increase in scale and coverage is more likely to deliver the secondary species benefits mentioned.

Timing

Cyclical task schedule			
Month	**Predator Control**	**Other Actions**	**Monitoring**
August 2017			
September 2017	Cats, SWP, Harrier, Deer	Cat dog survey. Track cutting/bait station installation	Nesting effort, cameras, banding.
October 2017	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
November 2017	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
December 2017	Cats, SWP, Harrier, Deer	Cat dog survey	Nesting effort, cameras, banding.
January 2018	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
February 2018	Cats, SWP, Harrier, Deer		Nesting effort, cameras, banding.
March 2018		Post pesticide operation actions. Bivvy clean up, signage checks, toxin disposal.	
April 2018			Flock counts, banding
May 2018			Banding
June 2018			Banding
July 2018			

4 weekly rolling baiting rounds

- Week 1 – Brodifacoum blocks (check and replace if required)
- Week 2 – Brodifacoum blocks (check and replace if required)
- Week 3 - PAPP pre-feed (if brodifacoum take is minimal)
- Week 4 - PAPP toxic + 1080 fish polymer bait (targeting cats)

Method detail

Applicable Best Practice:

- Kill trapping for feral cat control - DOCDM-29437
- Leg-hold trapping for feral cat control – DOCDM-29439 (contingency only)
- Brodifacoum blocks targeting rats (PU 57) - DOCDM-29380 (not aiming for rat suppression/control over wide area)
- Ground shooting of deer – DOCDM-642613
- Despatching animals caught in live capture traps – DOCDM-806487 (cat contingency)

Control methods without associated Best Practice

- PAPP targeting feral cats (PU124)
- 1080 fish polymer targeting feral cats (PU38)
- Spur-winged plover/Australasian harrier shooting

Standard Operating Procedures

- Safe Handling of Pesticides – DOCDM -22730

Pre-implementation logistics

Field accommodation

Delivery schedules are likely to focus on rangers spending longer periods based in the backcountry. This has necessitated additional bivvy and temporary field accommodation to be constructed within the management area. This was completed in the previous field season and so is now readily available to rangers.

Table Hill and Blaikies Hill have been chosen for their relatively sheltered positioning as well as being conveniently spaced for delivery (track cutting, bait station servicing and banding/monitoring) team needs. The public Rakeahua hut is also available for field operations and will be used for track cutting teams initially and then later for servicing the Rakeahua and Hill 511 bait stations.

Additional weather proof storage pods supplement available vestibule space in the bivvies which are required for additional gear associated with delivery.

Bait storage

A field freezer and generator will need to be flown to each of the bivvy sites to store mince for PAPP toxic and pre-feed delivery. Toxins will be stored in lockable, flyable aluminium containers which will be present at each of the bivvies.

Pre-season flights

Helicopter flights will be scheduled to fly up bait storage and associated gear as well as trapping and bait station construction supplies prior to field delivery.

Bait stations operations

On-going establishment

Continue to develop a grid with approximately 1km track spacing along which bait stations are placed at 200m intervals. The area includes a 2km buffer beyond the Tin Range core breeding area (Fig 2) which is based on Harper's research on feral cats having average home range diameters of this metric (Harper, 2004).

This requires approximately 55km of tracks to be cut with about 330 new bait stations to be established in addition to the existing 423. Bait station designs will follow the previously used Stewart Island feral cat station style as this has proven effective in past operations while brodifacoum will be placed in 500mm nova-coil tunnels pegged to the ground.

Track cutting and bait station installation is scheduled for September and October 2017. Remaining track cutting will be offered as a single Type C contract tender under the Supplier and Procurement Management SOP via the GETS process. Bait station installation will be completed by a mix of temporary project rangers and permanent rangers from the local DOC office.

Servicing/baiting

Baiting of the existing bait station network (423 stations) will begin in September to target a pre-breeding knock down of predators using the 4 week rolling programme as follows:

- Week 1 – Brodifacoum blocks (check and replace if required) (targeting rats and potentially cats secondarily)
- Week 2 – Brodifacoum blocks (check and replace if required) (targeting rats and potentially cats secondarily)
- Week 3 - PAPP pre-feed (once brodifacoum take is reduced indicating low rodent density)
- Week 4 - PAPP toxic + 1080 fish polymer bait (targeting cats)

The additional 330 bait stations will be incorporated as they become operative on completion of the establishment phase.

The first stage of baiting will be completed by existing staff with the second stage of baiting work being supplemented by the addition of approximately 3 new temporary rangers. Baiting work will continue on the above schedule until the end of the breeding season (approximately March 2018).

Trapping & feral cat shooting (spotlighting)

Limited kill trapping was partially implemented in 2015 near Table Hill, focussing on edges and tracks as it is generally accepted that these areas act as pathways along which predators travel. This has been expanded on in the 16/17 season with further deployment of 96 x 700mm raised Timms traps. These will be checked and re-baited weekly.

The Timms traps will be supplemented by approximately 30 Belisle X220 traps in a wooden chimney design as per Feral Cat Kill Trapping System 1 and interspersed amongst raised Timms traps.

If any cat sign is confirmed, either during a cat detecting dog survey or cat sign noted by field rangers, in or near the Tin Range core breeding area (Fig 2), this will be immediately followed up with targeted soft jaw leg-hold trapping and spotlighting for cats (shooting) within the detection vicinity.

Targeted shooting

White-tailed deer, spur-winged plover and Australasian harrier present within the Core Breeding Areas will be shot by qualified rangers early in the field season (early September) in anticipation of the start of the breeding season.

Pestlink data tables

Pesticides

	PAPP	1080 fishmeal polymer	Brodifacoum blocks	Comments
Target pest	Feral cats	Feral cats	Rat reduction, possible secondary poisoning of feral cats	Rat and possum suppression not specifically targeted. See above.
Pesticide trade name	PredaStop for cats	0.10% 1080 feral cat bait	Pestoff Rodent Blocks	
Pesticide Name	Para-aminopropiophenone	Sodium fluoroacetate	Brodifacoum	
Toxic loading	41%	0.10%	0.02g/kg	
Bait type	Paste	Pellet	Block	
Lure/mask and %	Mince ball	Fishmeal	Chocolate	
Dye	Green	Green	Blue	
Type of pre-feed (lure/lure %/dye)	Non-toxic mince ball dyed green	NA	NA	
Individual bait weight (g)	15	1.5	20	
Bait sampling?	No	No	No	
Pre-feed dates	Week 3 (Sep 17 – Mar 18)	NA	NA	
Number of pre-feeds	6	NA	NA	
Pre-feed quantity	15g/station	NA	NA	
Toxic bait dates	Week 4 (Sep 17 – Mar 18)	Week 4 (Sep 17 – Mar 18)	Week 1 & 2 (Sep 17 – Mar 18)	
Number of toxic fills	6	6	6-12 planned	Baiting intensity will depend on how quickly baits are completely removed from bait stations.
Toxic bait frequency	Monthly	Monthly	Fortnightly - Monthly	
Toxic bait quantity	200mg toxic paste in 15g mince ball	15g toxic bait	20g toxic bait	
Pre-feed to toxic interval	Approx 1 week	NA	NA	
Date bait removed	Week 1 (Sep 17 – Mar 18)	Week 1 (Sep 17 – Mar 18)	Final date – 02 March 2018	
End of caution period date	April 2018 (1 month after last toxic application)	August 2018 (5 months after last toxic application)	02 March 2020 (3 years after last toxic application)	
Bait station pattern	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	
Bait station type	Stewart Island cat bait station	Stewart Island cat bait station	Tubing secured to ground with pegs	DOCDM-856047 (SI cat bait station)
Bait station spacing	50m core-breeding area 200m x 1km buffer area	50m core-breeding area 200m x 1km buffer area	50m core-breeding area 200m x 1km buffer area	Only targeting rat reduction around bait stations
Total number of bait stations	740	740	740	
Bait station density	Average – 0.13/ha	Average – 0.13/ha	Average – 0.13/ha	

Trapping

	Kill traps	Soft-jaw legholds (contingency)	Live cage trap (contingency)	Comments
Target pest	Feral cats	Feral cats	Feral cats	
Trap style (kill/leghold/cage)	Kill	Leghold	Cage	
Trap type	Timms & Belisle x220	Soft-jaw leg-hold	Live cage trap	
Lure(s)	Fresh meat/fish	Fresh meat/fish	Fresh meat/fish	
Trapping start date	4 September 2018	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	See above contingency scenario description
Trapping completion date	3 March 2018	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	See above contingency scenario description
Number and frequency of lure renewals	1 renewal weekly (25 total)	As and when required (Sep 16 – Mar 17)	As and when required (Sep 16 – Mar 17)	
Total number of traps	126 approx	As required, targeted, <20	As required, targeted, <20	
Pattern of trap lines	Cordon surrounding Tin Range core breeding area	Targeted to cat detection area	Targeted to cat detection area	
Trap spacing	100m	100m	100m	
Frequency of trap checking	Weekly	Daily	Daily	
Trap placement	Along cordon following scrub-open edge	Along bush edges and natural runways	Along bush edges and natural runways	
Type of trap set	Raised-set (Timms)/chimney tunnel (Belisle x220)	Ground-set	Ground-set	
Trap covers	N/A	N/A	N/A	
Trap height	700mm (approved)	0	0	Approved by Kiwi Recovery Group given that possum leg holds are set at 700mm anyway.
Total trap effort (trap-nights)	182 days x 126 traps = 22,931 trap-nights	Unknown	Unknown	
Trap set density per ha	2.1	Unknown	Unknown	

Outcome and Result Monitoring

Outcome monitoring

Measuring a response in the dotterel population is critical to allow validation and refinement of management.

1. Our primary method of monitoring will be the banding of adults and fledging chicks at the nesting grounds to allow re-sightings at the flock sites.
    a. Handled birds will have their basic morphometrics measured and receive a visual health check. Disease sampling may be undertaken with swabs and/or bloods (dependent on qualified personnel).
2. Nest searching and repeat observations plus motion-activated camera trap monitoring of nests to confirm nest fate and provide productivity estimates.
3. Annual flock counts to be completed during the highest tides in April 2018. This will form our overall on-going population trend estimate as per previous years.

Should the population experience a further reduction, information received from the monitoring programme will become crucial in directing future management.

Result monitoring

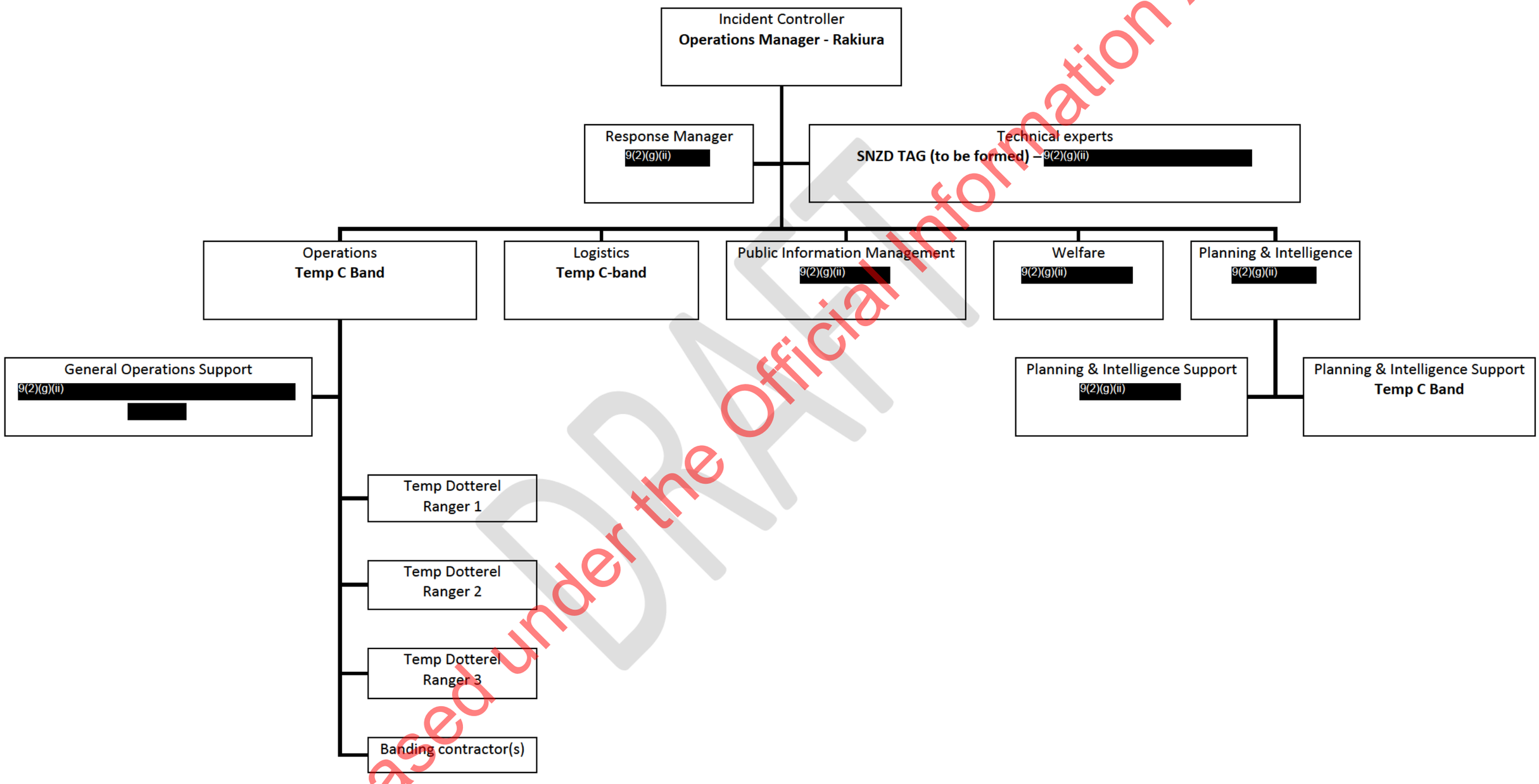
1. Cat dogs will be run before and midway through nesting season to measure cat presence within the nesting and buffer areas.
2. Field rangers will be tasked with searching for (incidental sightings and trail cameras) and recording cat sign during their other tasks.
3. Kill and live (contingency) trap results will be recorded.
4. Fur tunnels will be used to target ascertaining cat presence.
5. Shooting records of deer, spur-winged plover and harriers will be maintained.

How?

Consents required

1. Landowner or occupier consent	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission	☒ **Yes (operation involves pesticides)**
4. DOC permission	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

CIMS structure



Task list

A compliance register is being used for this operation and tasking lists are contained in DOC-3135153.

Deliverables

Title	Link
Communication plan	DOC-3135342
DOC application	DOC-3135196
Consents	(Confirmation that resource consent not required) DOC-2837856
	(DOC permission)
	(Public Health/Medical Officer of Health) (Application) (Signed MOH permission)
Safety plan	DOC-3136345
Safety briefing	DOC-3143343
Emergency response plan for transport	DOC-3136309
Emergency response plan for storage	Not required
Tender documents	To be confirmed
Contracts	To be confirmed
Checklist for info required for operational report	
Warning sign register	Pesticides GIS App
Updated budget forecasting & tracking sheet	DOC-2837018
Compliance register & tasking lists	DOC-3135153
Assessment of Environmental Effects	DOC-3135196

Relevant documents

Title	Link
16/17 Response Plan (BFOB funding bid supplementary material)	DOC-2759653
16/17 Battle For Our Birds funding application summary	DOC-2790749
17/18 Battle For Our Birds funding application summary	DOC-3072324
15/16 SNZD cat control Operational Plan	DOC-2536930
16/17 SNZD response pest control records	DOC-2901677
16/17 SNZD response Operational Plan	DOC-2824345
16/17 Track cutting and bait-station calculations	DOC-2839070
SNZD banding and monitoring database	DOC-2641608
Peer review of operational plan	To be completed
Anti-coagulant use rationale	DOC-2851151
Director's exemption to use second generation anti-coagulant	DOC-3136192

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Acknowledgements

A very sincere thanks to the following people for their considerable support in both the initial concept design, subsequent detailed planning and field logistical consideration of the urgent 16/17 southern New Zealand dotterel response which has formed the basis of "17/18 SNZD recovery" project:

9(2)(g)(ii)

9(2)(g)(ii)

OPERATIONAL PLAN
18/19 Southern New Zealand Dotterel Predator Control Programme

03 September 2018 to 30 June 2019

Version History

Version	Author	Date Written	Change/Reason for change
4	9(2)(g)(ii)	10/8/18	Made suggested amendments from peer review feedback. Updated delivery timeframes due to recruitment delays.
3	9(2)(g)(ii)	20/6/18	Added further relevant documents. Updated maps. Removed references to "core breeding areas" as no longer definitive term with expansion. Added nesting summary table.
2	9(2)(g)(ii)	12/6/18	Linking updated related documents. Removed PAPP references, amended annual timeframes. Included new barrel-set traps. Removed references to contingency ground-set leghold trapping, now a core proactive method 9(2)(g)(ii) Tech Advice).
1	9(2)(g)(ii)	8/5/18	Initial amendments to previous 17/18 operational plan

Overview

Conservation outcome

- Sustain current population growth of the southern New Zealand dotterel (SNZD) to achieve increased security against extinction with a population size of at least 300 individuals by 2025.

Scope

- Multi species target predator control programme with a primary focus on feral cats and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 4-part area of key SNZD breeding habitat including:
    1. Tin Range (5382ha)
    2. Hill 511 (78ha)
    3. Rakeahua (56ha)
    4. Rocky Mountain (97ha)
- Predator reduction achieved through a combination of vertebrate toxins, kill and live trapping and targeted shooting.
- September 2018 to June 2019

Out of scope

- Multi-purpose monitoring programme including adult colour banding, nest fate monitoring, disease screening, genetic sampling and annual flock counts.

Outcome target

1. 2019 flock count indicates that southern New Zealand dotterel population size is 167 birds or greater.

Result targets

Feral cats

1. There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat monitoring. We are aiming for zero detection through field observations of cat sign or presence.

Spur-winged plover

1. Resident spur-wing plover are removed from the management area so that no further sightings are made for remainder of season post-control.

White-tailed deer and Australasian harrier

1. All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

Control Design

Background

The previously successful annual cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years, a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The 2016/17 saw the expansion of the bait station network, introduction of new kill traps, targeted shooting for a variety of species and the trialling of PAPP as a toxic alternative to 1080. In 17/18 we ceased using PAPP due to restrictive and impractical label requirements as well as the comparatively high cost in terms of toxin supplies and lost productivity through extensive bait preparation and the need to establish demonstrable successful pre-feeding prior to laying toxic bait.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds in the April 2017 flock count. A similar result was noted in the April 2018 flock count, with an increase from 153 birds to a new estimated population size of 167.

As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach. The operational plan continues to be refined each year with the current document building on experience, feedback and information received since the previous iteration in 17/18.

Predator control 2018/19 season

Cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to breeding areas). Control methods aim to

cover a variety of toxic and non-toxic options to reduce the impact of bait or device shy cats which are likely to be present in the area after 24 years of mostly consistent predator control.

Rats are specifically controlled around bait-station lines to reduce bait-interference and to possibly achieve secondary poisoning of cats, especially those which may be device-shy.

Cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 5382ha to buffer the Tin Range breeding area.

Localised rat suppression is required to prevent bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rats. 1080 was initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we support a strong recommendation from Science and Policy to make use of Brodifacoum for this purpose. While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, this will be the third year it has been applied to the majority of the management area. Using 1080 will not allow us to adequately control Norway rats and we would expect high levels of interference with 1080 fishmeal pellets thereby removing our ability to control feral cats with that method.

DOC-2851151 lays out an analysis of the trade-offs involved in Brodifacoum use and a final recommendation to use it which was endorsed by Science and Technical staff and the local Operations Manager.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Control block [ha]	Target pest	Control timing
Tin Range [5382 ha]	Feral cats	**September 2018 to March 2019** (See DOC-5470405 (18/19 Biodiversity Overview Schedule) for a visual representation of the planned operations.)
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Mt Rakeahua [56ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Hill 511 [78ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Rocky Mountain [97ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	

Table 1. Summary of target pests, control actions and schedule.
1080 and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 5382ha grid (including the pre-existing cordon present on the Tin Range areas of Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 327ha of breeding habitat on Mt Rakeahua, Rocky Mountain and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. Brodifacoum
2. 1080 fish polymer bait

The control work and result monitoring targets the dotterel breeding season (August – March) while outcome monitoring occurs during the following flocking season (April 2019).

Justification for proposed methods (*AEE extract*)
A range of control tools targeting several predators are required given that we don't have a robust understanding of which predators are driving the SNZD population decline and to what extent.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 20 years which has potentially led to the creation of a toxin-shy population.

The revised proposed methods aim introduce new control tools which establish control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

The introduction of kill & live trapping and night shooting for feral cats will increase the likelihood of killing cats which are toxin shy.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

Site description

Locations

This operational plan covers three main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua, Rocky Mountain and Hill 511 (Figure 2).

Vegetation

Tin Range (5382ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (78ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Rocky Mountain (97ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

<u>Fauna values within management area</u>

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird - *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Predator pressures

- KNOWN - Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- POSSIBLE - Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- POSSIBLE -Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- KNOWN - White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- KNOWN - Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- KNOWN - Australasian harriers – occasionally seen in the operation area.
- LIKELY - Black backed gulls – colony present south of Hill 511.

Previous management

Relevant documentation from previous control work is indexed on the Southern New Zealand Dotterel home page (DOCDM-1117542). Previous Operational Plan for 17/18 SNZD recovery (DOC-3124929) and 16/17 SNZD response (DOC-2824345).

Predator control

A cordon of cat control using 1080 fishmeal polymer baits and waxed bromadiolone rodent blocks in bait-stations around breeding areas on Table Hill (1993), Hill 511 and Mt Rakeahua, was established in 1997. No anti-coagulants were used in 2014 and brodifacoum replaced bromadiolone in the second half of the 15/16 breeding season.

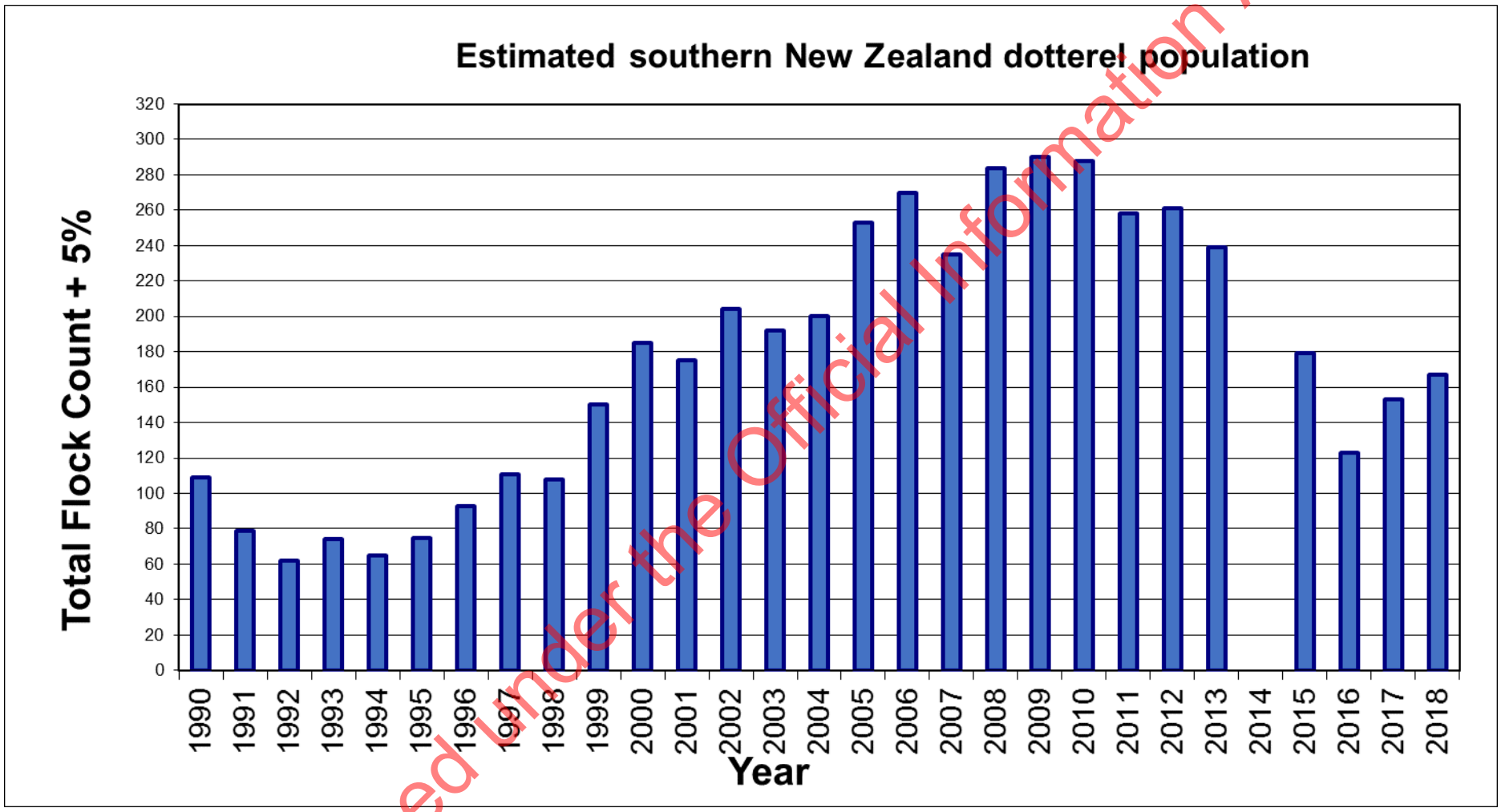


Figure 1. Estimated total SNZD population through annual flock counts +5%. Counts are completed at Mason Bay, Awarua, The Neck and Cook Arm (Port Pegasus) [DOCDM-292288]

Where?

Maps – see following pages.

- Map 1 – All layers.
- Map 2 – Treatment blocks – simplified map.

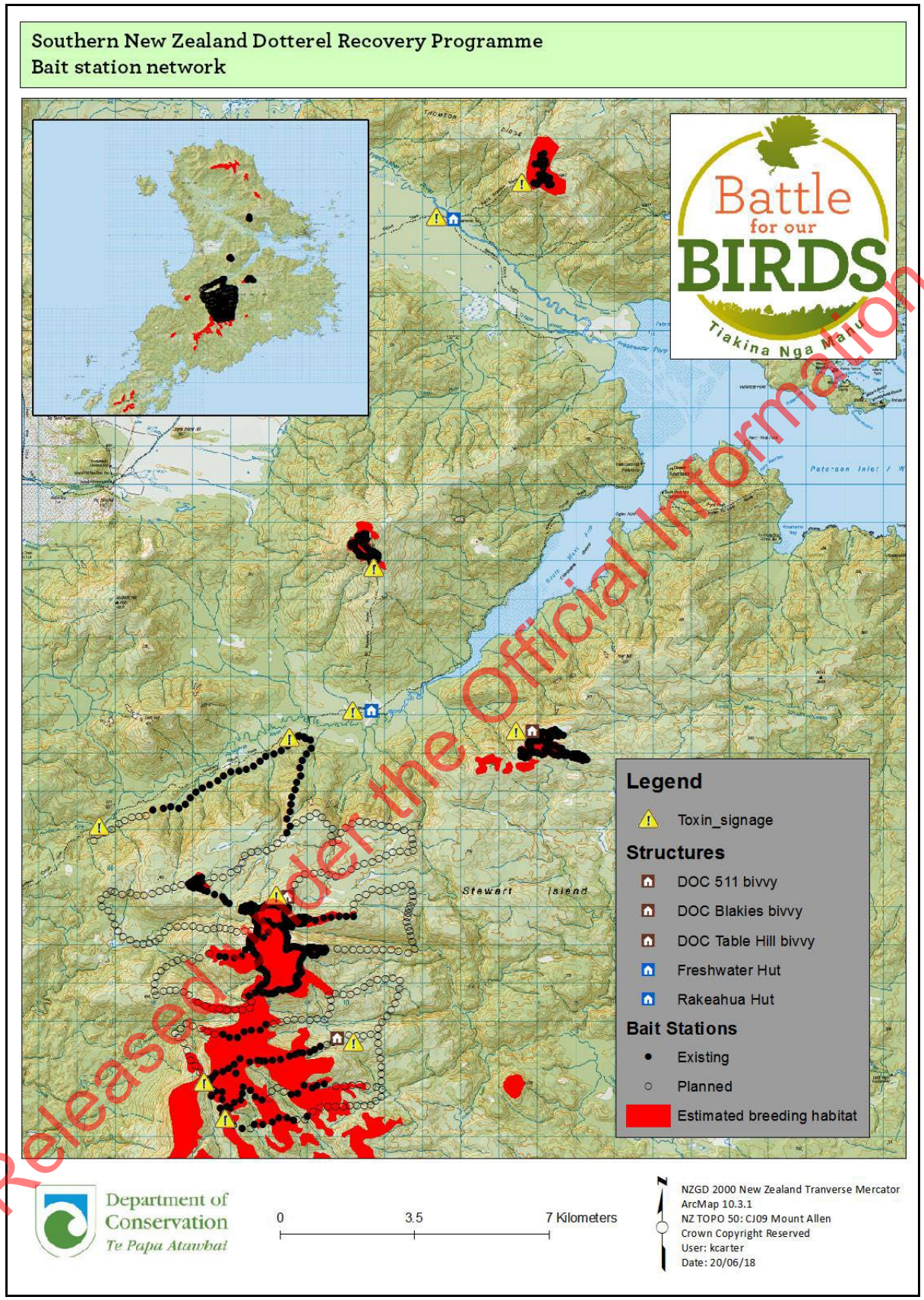


Figure 2. Four operational sub-units comprise the 18/19 control focus. Ranger bivvys, public huts and the placement of toxin warning signage are indicated. Bait station coverage, existing and planned, and estimated breeding habitat are shown.

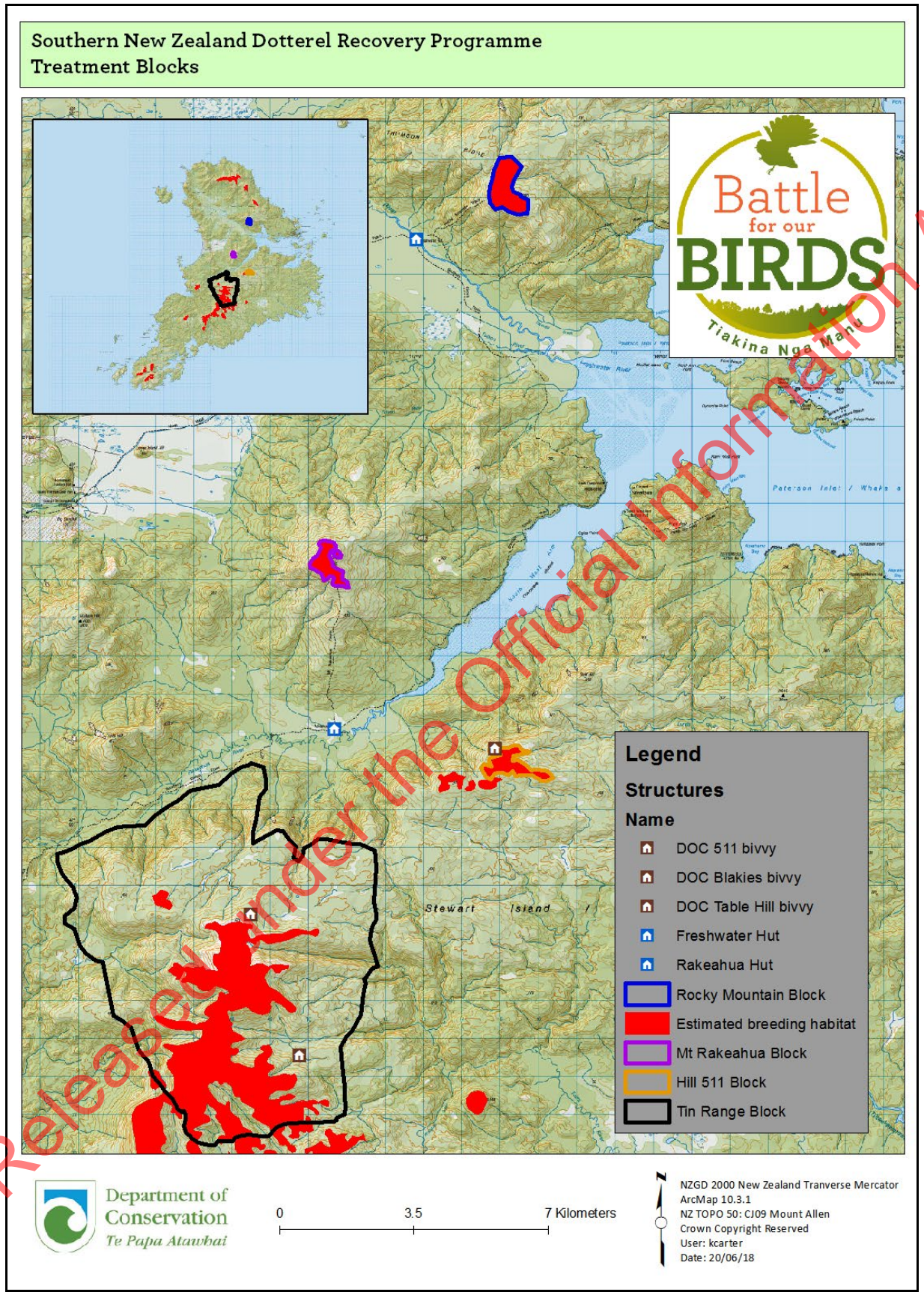


Figure 3. Minimal detail to highlight four operational sub-units (Treatment Blocks), as per the DOC Permission Application. Ranger bivvies and public huts are shown again for clarity.

What?

Method

Feral cats

1. 1080 fish polymer in bait-stations (Pesticide Use – 38).
2. Kill trapping using raised Timms traps in the Tin Range breeding area.
3. Ground-set & barrel set leg hold trapping
4. Live capture cage traps
5. Night shooting (thermal scope)

Rats

1. Brodifacoum blocks in bait stations (Pesticide Use – 57) on cat control lines to reduce bait interference and to secondarily poison cats.
    a. *NB: This does not aim to effectively control rats to low levels over a wider area.*

Spur-winged plover/white-tailed deer/Australasian harrier

1. Targeted shooting to remove resident animals from breeding areas.

Timing

Cyclical task schedule Month	Control methods	Frequency	Other actions
August 2018	Deferred due to recruitment delays		Deferred due to recruitment delays
September 2018 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	Track cutting/bait station installation
October 2018 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	Track cutting/bait station installation
November 2018 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	Track cutting/bait station installation
December 2018 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	Track cutting/bait station installation
January 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
February 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping	2 x rebait/reset 90 traps 2 x 458 bait station fill 2 x 458 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
March 2019			Post pesticide operation actions. Bivvy clean up, signage checks, toxin disposal.
April 2019			
May - July 2019			Operational Planning/Pest link reporting

Rolling baiting rounds

1. Tin Range – 40 person-day trip – Brodifacoum, 1080, shooting, trapping, monitoring
2. Rakeahua, Rocky Mountain, Hill 511 – 15 person day trip – Brodifacoum, 1080, shooting, monitoring

See DOC-5470405 (18/19 Biodiversity Overview Schedule) for a visual representation of the planned operations.

Method detail

Applicable Best Practice:

- Kill trapping for feral cat control - DOCDM-29437
- Leg-hold trapping for feral cat control – DOCDM-29439
- Brodifacoum blocks targeting rats (PU 57) - DOCDM-29380
  (not aiming for rat suppression/control over wide area)
- Ground shooting of deer – DOCDM-642613
- Despatching animals caught in live capture traps – DOCDM-806487

Control methods without associated Best Practice

- 1080 fish polymer targeting feral cats (PU38)
- Spur-winged plover/Australasian harrier shooting

Standard Operating Procedures

- Safe Handling of Pesticides – DOCDM -22730

Pre-implementation logistics

Field accommodation

Delivery schedules are likely to focus on rangers spending longer periods based in the backcountry. This has necessitated additional bivvy and temporary field accommodation to be constructed within the management area. This was completed in 2016/17 and is now readily available to rangers and contractors.

Table Hill and Blaikies Hill have been chosen for their relatively sheltered positioning as well as being conveniently spaced for delivery (track cutting, bait station servicing and banding/monitoring) team needs. The public Rakeahua hut is also available for field operations and will be used for track cutting teams initially and then later for servicing the Rakeahua and Hill 511 bait stations. Freshwater Hut is available for servicing the Rocky Mountain bait stations.

Additional weather proof storage pods supplement available vestibule space in the bivvies which are required for additional gear associated with delivery.

Bait storage

Toxins will be stored in lockable, flyable aluminium containers which will be present at each of the bivvies.

Transport

Helicopter flights are scheduled (DOC-5470405) to fly up bait storage and associated gear as well as trapping and bait station construction supplies prior to field delivery. Flights are scheduled for all field delivery trips to the Tin Range Block to increase predator control and monitoring efficiency.

Bait stations operations

On-going establishment

Continue to develop a grid with approximately 1km track spacing along which bait stations are placed at 200m intervals. The area includes a 2km buffer beyond the Tin Range breeding area (Fig 2) which is based on Harper's research on feral cats having average home range diameters of this metric (Harper, 2004).

This requires approximately 14km of tracks to be cut with about 70 new bait stations to be established in addition to the existing 459. Bait station designs will follow the previously used Stewart Island feral cat station style as this has proven effective in past operations while brodifacoum will be placed in 500mm long nova-coil tunnels (65mm entrance diameter) pegged to the ground.

Track cutting and bait station installation is scheduled for August to December 2018. Bait station installation will be completed by a mix of temporary project rangers and permanent rangers from the local DOC office.

Servicing/baiting

Baiting of the existing bait station network (459 stations) will begin in August to target a pre-breeding knock down of predators using the rolling programme described above.

The additional 70 bait stations will be incorporated as they become operative on completion of the establishment phase.

Four additional temporary rangers will be hired to support existing rangers to deliver the expanded work programme. Baiting work will continue on the above schedule until the end of the breeding season (approximately March 2019).

Trapping & feral cat shooting (spotlighting)

Limited kill trapping was partially implemented in 2015 near Table Hill, focussing on edges and tracks as it is generally accepted that these areas act as pathways along which predators travel. This has been expanded on in the 16/17 season with further deployment of 96 x

700mm raised Timms traps. These will be checked and re-baited once every 10 day trip (9 trips estimated for the 18/19 breeding season).

The Timms traps will be supplemented with barrel-set leg hold traps as well as mobile ground-set leg hold trapping targeting areas of cat presence.

Spotlighting for cats will take place opportunistically, as weather and logistics allow.

Targeted shooting

White-tailed deer, spur-winged plover and Australasian harrier present within the breeding areas will be shot by qualified rangers early in the field season (early August) in anticipation of the start of the breeding season. Opportunistic control will follow.

Pestlink data tables

Pesticides

	1080 fishmeal polymer	Brodifacoum blocks	Comments
Target pest	Feral cats	Rat reduction, possible secondary poisoning of feral cats	Rat and possum suppression not specifically targeted. See above.
Pesticide trade name	0.10% 1080 feral cat bait	Pestoff Rodent Blocks	
Pesticide Name	Sodium fluoroacetate	Brodifacoum	
Toxic loading	0.10%	0.02g/kg	
Bait type	Pellet	Block	
Lure/mask and %	Fishmeal	Chocolate	
Dye	Green	Blue	
Type of pre-feed (lure/lure %/dye)	NA	NA	
Individual bait weight (g)	1.5	20	
Bait sampling?	No	No	
Pre-feed dates	NA	NA	
Number of pre-feeds	NA	NA	
Pre-feed quantity	NA	NA	
Toxic bait dates	Fortnightly (Aug 18 – Mar 19)	Fortnightly (Aug 18 – Mar 19)	
Number of toxic fills	9	9-12 planned	Baiting intensity will depend on how quickly baits are completely removed from bait stations.
Toxic bait frequency	Fortnightly	Fortnightly	
Toxic bait quantity	15g toxic bait	20g toxic bait	
Pre-feed to toxic interval	NA	NA	
Date bait removed	Final date – 1 March 2019	Final date – 01 March 2019	
End of caution period date	August 2019 (5 months after last toxic application)	02 March 2022 (3 years after last toxic application)	
Bait station pattern	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	
Bait station type	Stewart Island cat bait station	Tubing secured to ground with pegs	DOCDM-856047 (SI cat bait station)
Bait station spacing	50m breeding area 200m x 1km buffer area	50m breeding area 200m x 1km buffer area	Only targeting rat reduction around bait stations
Total number of bait stations	459 (with more being added)	459 (with more being added)	
Bait station density	Average – 0.13/ha	Average – 0.13/ha	

Trapping

	Kill traps	Soft-jaw legholds	Live cage trap	Comments
Target pest	Feral cats	Feral cats	Feral cats	
Trap style (kill/leghold/cage)	Kill	Leghold	Cage	
Trap type	Timms	Soft-jaw leg-hold	Live cage trap	
Lure(s)	Fresh meat/fish	Fresh meat/fish	Fresh meat/fish	
Trapping start date	13 August 2018	As and when required (Aug 18 – Mar 19)	As and when required (Aug 18 – Mar 19)	See above contingency scenario description
Trapping completion date	15 February 2019	As and when required (Aug 18 – Mar 19)	As and when required (Aug 18 – Mar 19)	See above contingency scenario description
Number and frequency of lure renewals	1 renewal every trip (approx. 9 in total)	As and when required (Aug 18 – Mar 19)	As and when required (Aug 18 – Mar 19)	
Total number of traps	90 approx	As required, targeted, <20	As required, targeted, <20	
Pattern of trap lines	Cordon surrounding Tin Range breeding area	Targeted to cat detection area	Targeted to cat detection area	
Trap spacing	100m	100m	100m	
Frequency of trap checking	Weekly	Daily	Daily	
Trap placement	Along cordon following scrub-open edge	Along bush edges and natural runways	Along bush edges and natural runways	
Type of trap set	Raised-set (Timms)	Ground-set/barrel-set	Ground-set	
Trap covers	N/A	N/A	N/A	
Trap height	700mm (approved)	0/700mm (barrel-sets)	0	Approved by Kiwi Recovery Group given that possum leg holds are set at 700mm anyway.
Total trap effort (trap-nights)	125 days (season) x 90 traps = 11,250 trap-nights	Unknown	Unknown	
Trap set density per ha	2.1	Unknown	Unknown	

Outcome and Result Monitoring

Outcome monitoring

Measuring a response in the dotterel population is critical to allow validation and refinement of management.

1. Our primary method of monitoring will be the banding of adults and fledging chicks at the nesting grounds to allow re-sightings at the flock sites.
    a. Handled birds will have their basic morphometrics measured and receive a visual health check. Disease sampling may be undertaken with swabs and/or bloods (dependent on qualified personnel).
2. Nest searching and repeat observations plus motion-activated camera trap monitoring of nests to confirm nest fate and provide productivity estimates.
3. Annual flock counts to be completed during the highest tides in April 2019. This will form our overall on-going population trend estimate as per previous years.

Should the population experience a reduction, information received from the monitoring programme will become crucial in directing future management.

Result monitoring

1. Field rangers will be tasked with searching for (incidental sightings and trail cameras) and recording cat sign during their other tasks.
2. Kill and live trap results will be recorded.
3. Shooting records of deer, spur-winged plover and harriers will be maintained.

Monitoring schedule

Month	Monitoring
August 2018	Deferred due to recruitment delays
September 2018	Nesting effort, cameras.
October 2018	Nesting effort, cameras.
November 2018	Nesting effort, cameras.
December 2018	Nesting effort, cameras.
January 2019	Nesting effort, cameras.
February 2019	Nesting effort, cameras.
March 2019	
April 2019	Flock counts, banding
May 2019	Banding
June 2019	Banding
July 2019	

Previous management

Nest Monitoring

Nest monitoring through grid searching and subsequent camera monitoring have increased our knowledge of the likely predator suite, disturbance and fertility issues impacting SNZD breeding success.

A 2013/2014 wildlife management student from Otago University undertook an investigation into the then apparent "population plateau". The study included 5 monitored nests, 2 of which were believed to be incubated by female-female pairs, 1 nest successful (100% hatch rate) and 2 unknown fates. Nest survey and monitoring in 2016/17 found 4 out of 14 nests hatched with 1 confirmed predation, 1 abandoned nest and 8 unknown fates.

Nest survey and monitoring in 2017/18 found 19 nests, of which 5 were confirmed hatches and a further 4 suspected, 6 unknown outcomes, 1 confirmed abandonment, 1 infertile nest (F/F pair)

Year	Total nests found	Confirmed hatches (1+ chick)	Suspected hatches	Suspected Predation	Abandoned nest	Likely infertile (4+ eggs)	Unknown
13/14 MSc study	5	1	0	0	0	2	2
15/16 SNZD Project	13	4	0	1	5	0	3
16/17 SNZD Response	14	4	0	1	1	0	8
17/18 SNZD Recovery	19	5	4	0	1	1	8

- *NB: This data isn't standardised/calibrated by search effort.*

Banding

A banding programme was led by [redacted] in the 1990s. Towards the end of the decade, most of the population had been banded. Over time the proportion of banded birds in the population declined through recruitment/replacement and the cessation of banding work.

Banding work restarted in 2013 and continued through until 2015, resulting in 13 individuals being banded. A dedicated temporary contract was initiated in the 2015/16 breeding season which saw a further 38 birds banded (including 5 pre-fledglings giving us birds of known age). A further 21 birds have been banded in 2016/17 taking the likely banded total to 72 or just under 50% of the current estimated population. 18 birds were banded in 2017/18 (at time of writing) which we estimate remains around 49% of the current estimated population due to an apparent increase seen during the 2018 flock count.

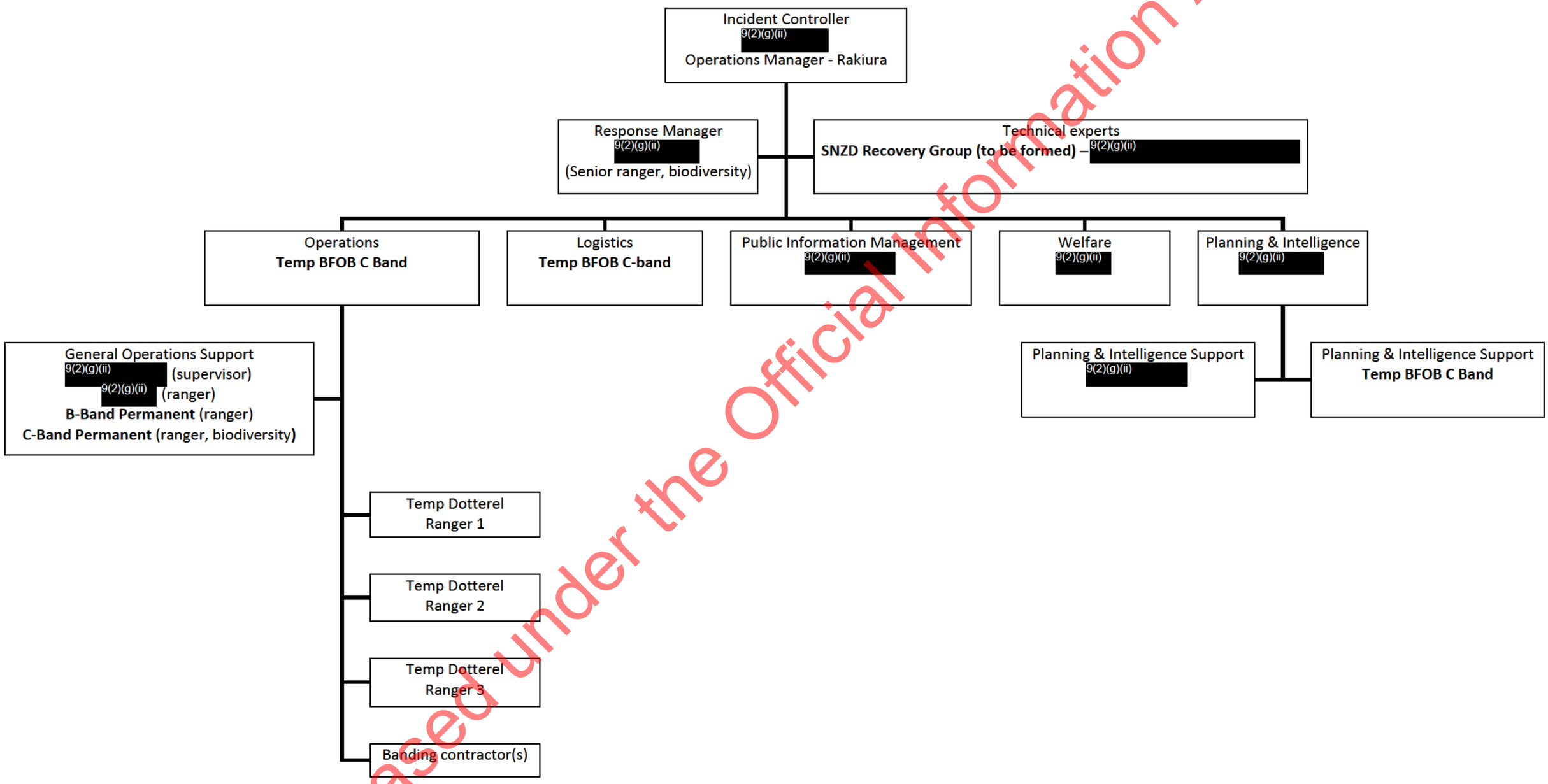
The banding has allowed us to start tracking the movements of birds and ascertain whether birds will pair with the same individuals. We're able to obtain better total population estimates as we can more sure that we're not double counting unidentifiable birds.

How?

Consents required

1. Landowner or occupier consent	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission	☒ **Yes (operation involves pesticides)**
4. DOC permission	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

CIMS structure



Task list

A compliance register is being used for this operation and tasking lists are contained in DOC-5505493.

Deliverables

Title	Link
Communication plan	DOC-5505523
DOC permission application	DOC-5505548
Consents	(Confirmation that resource consent not required) DOC-2837856
	(DOC permission)
	(Public Health/Medical Officer of Health) (Application) DOC-5554107 & DOC-5554106 (Signed MOH permission)
Safety plan	DOC-5505567
Safety briefing	DOC-3143343
Emergency response plan for transport	DOC-3136309
Emergency response plan for storage	Not required
Tender documents	(Tin Range Track Cutting Procurement Plan) DOC-3149427 (Tin Range Track Cutting Request for Tender) DOC-5495899 (Evaluation Report) DOC-5553948
Contracts	(Draft GMC for Track Cutting) DOC-5499531
Checklist for info required for operational report	
Warning sign register	Pesticides GIS App
BFOB Funding Application	DOC-5479466
Compliance register & tasking lists	DOC-5505493
Assessment of Environmental Effects	DOC-5505548
Key Facts Sheet – Effects	DOC-5505719
Key Facts Sheet - Notification	DOC-5505749

Relevant documents

Title	Link
16/17 Response Plan (BFOB funding bid supplementary material)	DOC-2759653
16/17 Battle For Our Birds funding application summary	DOC-2790749
17/18 Battle For Our Birds funding application summary	DOC-3072324
18/19 Battle For Our Birds funding application (4 year estimates)	DOC-5479466
15/16 SNZD cat control Operational Plan	DOC-2536930
16/17 SNZD response Operational Plan	DOC-2824345
17/18 SNZD Recovery Operational Plan	DOC-3124929
SNZD response pest control records	DOC-2901677
Anti-coagulant use rationale	DOC-2851151
SNZD banding and monitoring database	DOC-2641608
Peer review of 17/18 SNZD Recovery Operational Plan	DOC-5499222
17/18 Director's exemption to use second generation anti-coagulant	DOC-3139632
18/19 Director's exemption to use second generation anti-coagulant	DOC-5506623
Peer review of 18/19 operational plan	DOC-5525526

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Acknowledgements

A very sincere thanks to the following people for their considerable support in both the initial concept design, subsequent detailed planning and field logistical consideration of the urgent 16/17 southern New Zealand dotterel response which has formed the basis of "17/18 SNZD recovery project" and "18/19 SNZD Recovery Programme":

- 9(2)(g)(ii) [redacted]

- 9(2)(g)(ii) [redacted]

Department of Conservation
Te Papa Atawhai

TIAKINA NGĀ MANU
Battle for our birds

OPERATIONAL PLAN
19/20 Southern New Zealand Dotterel Predator Control Programme

2 September 2019 to 30 June 2020

Version History

Version	Author	Date Written	Change/Reason for change
7	9(2)(g)(ii)	12/08/19	Updated acknowledgements, predator control history and 18/19 nest monitoring outcomes.
6	9(2)(g)(ii)	1/08/19	Updated maps and confirmed field season staff capacity for various tasks.
5	9(2)(g)(ii)	8/07/19	Updated timings and references for 19/20 season.
4	9(2)(g)(ii)	10/8/18	Made suggested amendments from peer review feedback. Updated delivery timeframes due to recruitment delays.
3	9(2)(g)(ii)	20/6/18	Added further relevant documents. Updated maps. Removed references to "core breeding areas" as no longer definitive term with expansion. Added nesting summary table.
2	9(2)(g)(ii)	12/6/18	Linking updated related documents. Removed PAPP references, amended annual timeframes. Included new barrel-set traps. Removed references to contingency ground-set leghold trapping, now a core proactive method 9(2)(g)(ii) Tech Advice).
1	9(2)(g)(ii)	8/5/18	Initial amendments to previous 17/18 operational plan

Overview

Conservation outcome

- Sustain current population growth of the southern New Zealand dotterel (SNZD) to achieve increased security against extinction with a population size of at least 300 individuals by 2025.

Scope

- Multi species target predator control programme with a primary focus on feral cats and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 4-part area of key SNZD breeding habitat including:
    1. Tin Range (4293ha)
    2. Hill 511 (78ha)
    3. Rakeahua (56ha)
    4. Rocky Mountain (97ha)
- Predator reduction achieved through a combination of vertebrate toxins, kill and live trapping and targeted shooting.
- September 2019 to June 2020

Out of scope

- Multi-purpose monitoring programme including adult colour banding, nest fate monitoring, disease screening, genetic sampling and annual flock counts.

Outcome target

1. 2020 flock count indicates that southern New Zealand dotterel population size is 170 birds or greater.

Result targets

Feral cats

1. There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat monitoring. We are aiming for zero detection through field observations of cat sign or presence.

Spur-winged plover

1. Resident spur-wing plover are removed from the management area so that no further sightings are made for remainder of season post-control.

White-tailed deer and Australasian harrier

1. All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

Control Design

Background

The previously successful annual cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years, a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The 2016/17 saw the expansion of the bait station network, introduction of new kill traps, targeted shooting for a variety of species and the trialling of PAPP as a toxic alternative to 1080. In 17/18 we ceased using PAPP due to restrictive and impractical label requirements as well as the comparatively high cost in terms of toxin supplies and lost productivity through extensive bait preparation and the need to establish demonstrable successful pre-feeding prior to laying toxic bait.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds in the April 2017 flock count. A similar result was noted in the April 2018 flock count, with an increase from 153 birds to an estimated population size of 167. The increase appears to have slowed with the April 2019 flock count estimating 170 birds.

As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach. The operational plan continues to be refined each year with the current document building on experience, feedback and information received since the previous iteration in 18/19.

Predator control 2019/20 season

Cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to breeding areas). Control methods aim to cover a variety of toxic and non-toxic options to reduce the impact of bait or device shy cats which are likely to be present in the area after 25 years of mostly consistent predator control.

Rats are specifically controlled around bait-station lines to reduce bait-interference and to possibly achieve secondary poisoning of cats, especially those which may be device-shy.

Cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 4293ha to buffer the Tin Range breeding area.

Localised rat suppression is required to prevent bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rats. 1080 was initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we support a strong recommendation from Science and Policy to make use of Brodifacoum for this purpose. While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, this will be the fourth year it has been applied to the majority of the management area. Using 1080 will not allow us to adequately control Norway rats and we would expect high levels of interference with 1080 fishmeal pellets thereby removing our ability to control feral cats with that method.

DOC-2851151 lays out an analysis of the trade-offs involved in Brodifacoum use and a final recommendation to use it which was endorsed by Science and Technical staff and the local Operations Manager.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Control block [ha]	Target pest	Control timing
Tin Range [4293 ha]	Feral cats	**2 September 2019 to 13 March 2020** (See DOC-5918612 for a visual representation of the planned operations.)
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Mt Rakeahua [56ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Hill 511 [78ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Rocky Mountain [97ha]	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	

Table 1. Summary of target pests, control actions and schedule.
1080 and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 4293ha grid (including the pre-existing cordon present on the Tin Range areas of Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 327ha of breeding habitat on Mt Rakeahua, Rocky Mountain and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. Brodifacoum
2. 1080 fish polymer bait

The control work and result monitoring targets the dotterel breeding season (September – March) while outcome monitoring occurs during the following flocking season (April 2020).

Justification for proposed methods (*AEE extract*)
A range of control tools targeting several predators are required given that we don't have a robust understanding of which predators are driving the SNZD population decline and to what extent.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 25 years which has potentially led to the creation of a toxin-shy population.

The revised proposed methods aim introduce new control tools which establish control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

The introduction of kill & live trapping and night shooting for feral cats will increase the likelihood of killing cats which are toxin shy.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

Site description

Locations

This operational plan covers four main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua, Rocky Mountain and Hill 511 (Figure 2).

Vegetation

Tin Range (4293 ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (78ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Rocky Mountain (97ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

<u>Fauna values within management area</u>

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird - *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Predator pressures

- KNOWN - Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- POSSIBLE - Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- POSSIBLE - Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- KNOWN - White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- KNOWN - Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- KNOWN - Australasian harriers – occasionally seen in the operation area.
- LIKELY - Black backed gulls – colony present south of Hill 511.

Previous management

Relevant documentation from previous control work is indexed on the Southern New Zealand Dotterel home page (DOCDM-1117542). Previous Operational Plans as linked for 18/19 (DOC-5479762) for 17/18 (DOC-3124929) and 16/17 (DOC-2824345).

Predator control

A cordon of cat control using 1080 fishmeal polymer baits and waxed bromadiolone rodent blocks in bait-stations around breeding areas on Table Hill (1994), Hill 511 and Mt Rakeahua, was established in 1997. No anti-coagulants were used in 2014 and brodifacoum replaced bromadiolone in the second half of the 15/16 breeding season.

Brodifacoum was reintroduced in 2016 based on technical advice received from 9(2)(g)(ii) taking into account the urgent need for successful feral cat control with functional extinction predicted at just two years away at that time. An exemption from DOC's policy on using second-generation anti-coagulant toxins on the mainland has been granted annually in 2116, 2017, 2018 and the 2018 DOC/EPA permission to use brodifacoum has been varied to a 10 year period (in an effort to fix issues with the Pesticides GIS App).

Raised Timms traps were introduced to include a non-toxic, passive control tool for feral cats but these proved ineffective with no cat captures over the subsequent 3 seasons. Ground-set leg-hold trapping was introduced in 2016 and treated as a contingency method to respond to evidenced cat presence in the breeding habitat. This was later revised based on technical advice from 9(2)(g)(ii) in 2017 which identified that this is widely recognised as the most effective method for feral cat control and so should be the primary method used in a proactive manner. This was successfully implemented in 2018 with the confirmed capture of 4 feral cats. The risk to non-targets remains a divisive issue for technical advisors having to weigh the need to use the best feral cat control tool to protect the *Nationally Critical* Southern NZ Dotterel and the risk to iconic non-target species such as the *Nationally Vulnerable* Southern brown kiwi. Havahart live capture cage traps, Victor soft-jaw leg-holds on raised barrels and in chimney trap

boxes and coni-bear kill traps have also been introduced to the programme to increase the diversity of trap types to target maximum exposure of all possible cat behaviours.

Spur-winged plover, Australasian harrier and white-tailed deer were targeted using ground-hunting, both deliberately and opportunistically. Data analysis highlights the number of missed opportunities for removal resulting from the inherent trade-off of field ranger effort between filling bait-stations and focussed hunting forays.

Year	Deer seen	Deer shot	SWP seen	SWP Shot	Australasian harrier seen	Australasian harrier shot
16/17 SNZD Response	8	6	16	1	0	0
17/18 SNZD Recovery	11	3	19	4	3	0
18/19 SNZD Recovery	8	6	21	4	2	1

- ***NB** – Not standardised for search effort. Number of individuals seen likely to include repeated sightings of same individuals.*

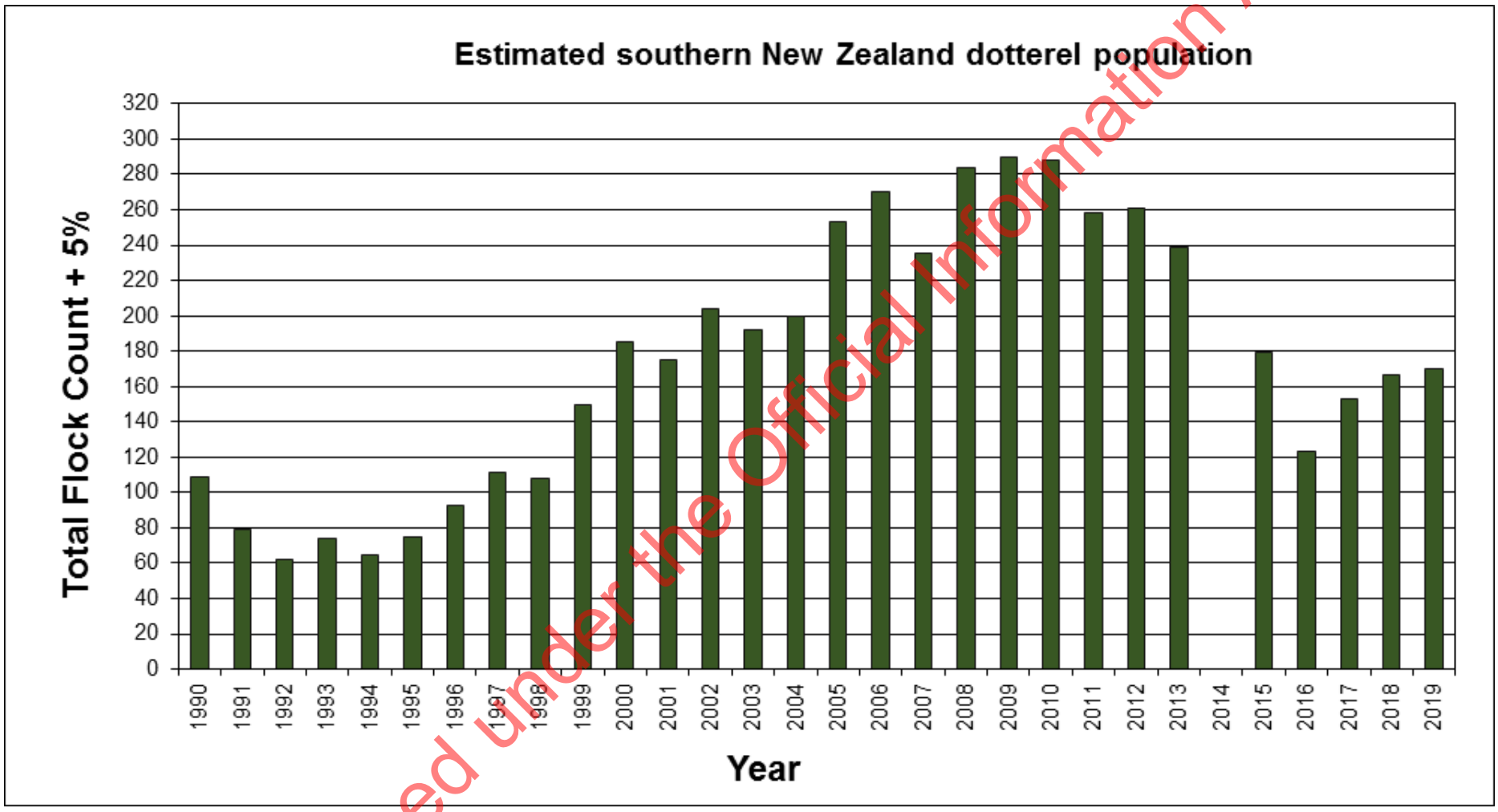

Figure 1. Estimated total SNZD population through annual flock counts +5%. Counts are completed at Mason Bay, Awarua, The Neck and Cook Arm (Port Pegasus) [DOCDM-292288]

Where?

Maps – see following pages.

- Map 1 – All layers.
- Map 2 – Treatment blocks – simplified map.

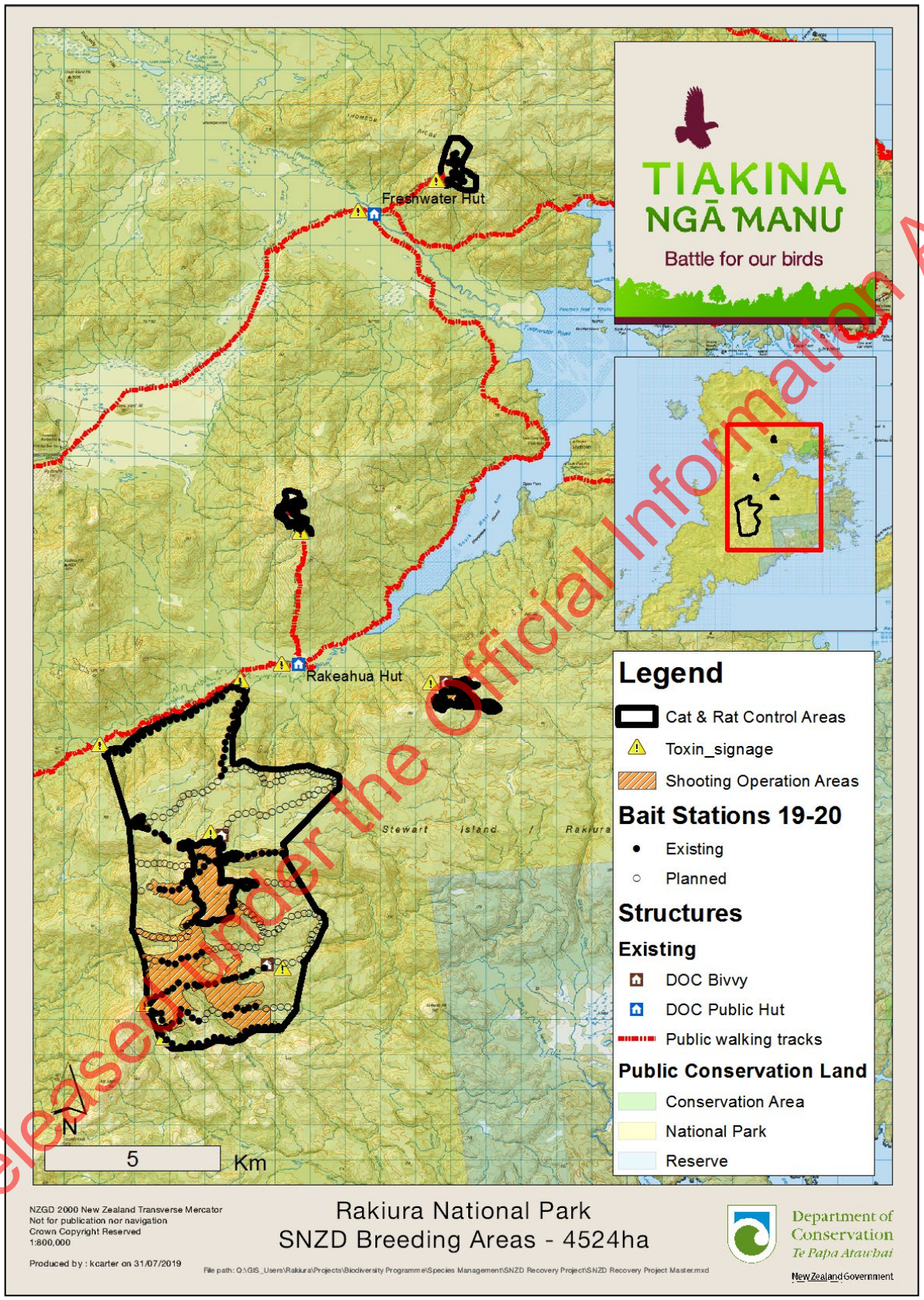

Figure 2. Four operational sub-units comprise the 19/20 control focus. Ranger bivvys, public huts and the placement of toxin warning signage are indicated. Bait station coverage, existing and planned, and shooting operations.

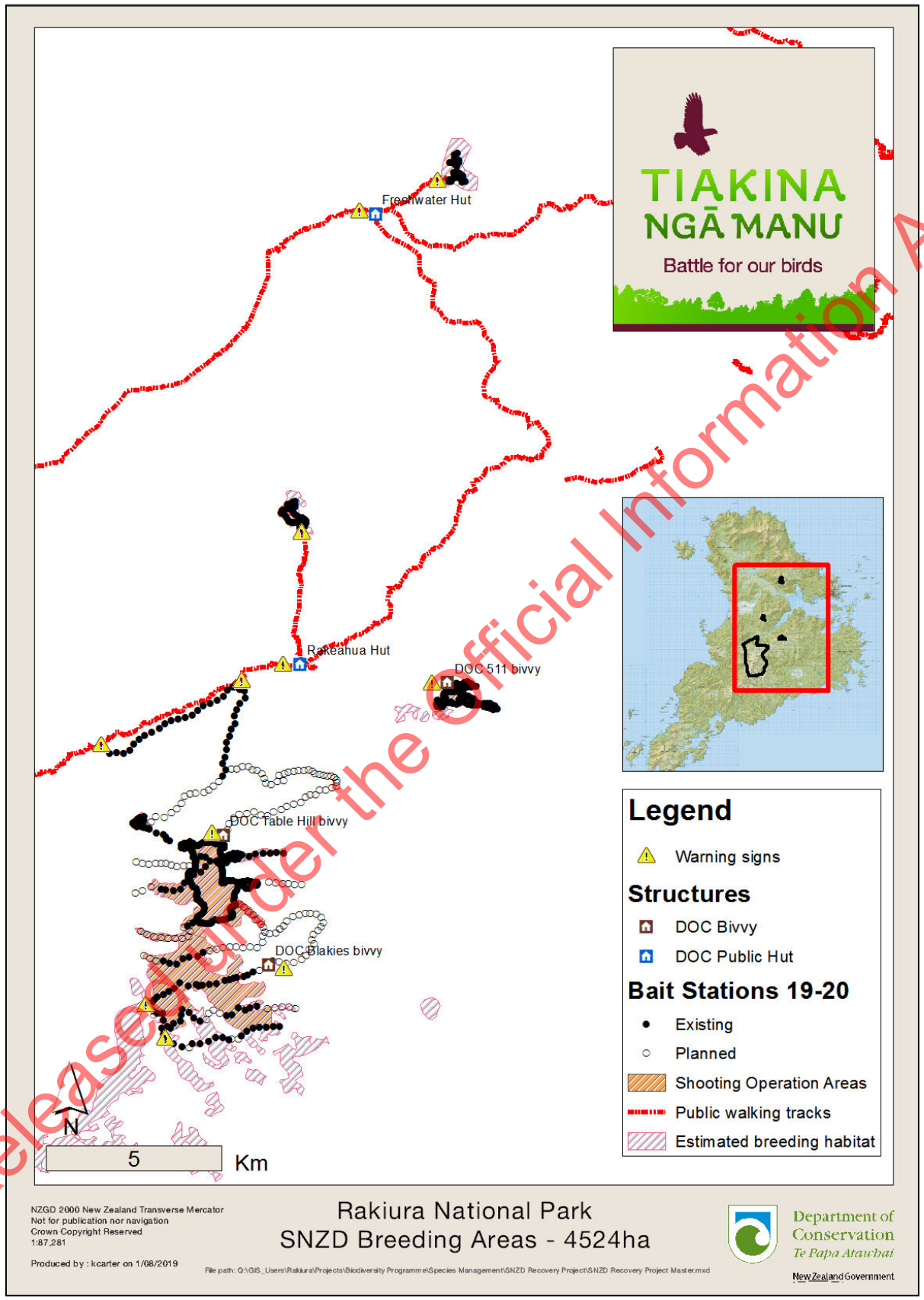

Figure 3. Minimal detail to highlight four operational sub-units (Treatment Blocks), as per the DOC Permission Application. Ranger bivvies and public huts are shown again for clarity.

What?

Method

Feral cats

1. 1080 fish polymer in bait-stations (Pesticide Use – 38).
2. Kill trapping using Belisle Super X220 traps.
3. Ground-set & barrel set leg hold trapping in breeding habitat
4. Live capture cage traps
5. Night shooting (thermal scope)

Rats

1. Brodifacoum blocks in bait stations (Pesticide Use – 57) on cat control lines to reduce bait interference and possibly to secondarily poison cats.
    a. *NB: This does not aim to effectively control rats to low levels over a wider area.*

Spur-winged plover/white-tailed deer/Australasian harrier

1. Targeted shooting to remove resident animals from breeding areas.

Timing

Cyclical task schedule			
Month	**Control methods**	**Frequency**	**Other actions**
August 2019	*Deferred due to recruitment delays and lack of required qualifications.*		
September 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
October 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
November 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
December 2019 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
January 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	
February 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 traps 2 x 468 bait station fill 2 x 468 bait station fill 8 x person-nights shooting 20 x person-trap-night rechecks	

March 2020			Post pesticide operation actions. Bivvy clean up, signage checks, toxin disposal.
April 2020			
May - July 2020			Operational Planning/Pest link reporting

Rolling baiting rounds

1. Tin Range – 30 person-day trip – Brodifacoum, 1080, shooting, trapping, monitoring
2. Rakeahua, Rocky Mountain, Hill 511 – 5 person day trip – Brodifacoum, 1080, shooting, monitoring

See DOC-5918612 for a visual representation of the planned operations.

Method detail

Applicable Best Practice:

- Kill trapping for feral cat control - DOCDM-29437
- Leg-hold trapping for feral cat control – DOCDM-29439
- Brodifacoum blocks targeting rats (PU 57) - DOCDM-29380
  (not aiming for rat suppression/control over wide area)
- Ground shooting of deer – DOCDM-642613
- Despatching animals caught in live capture traps – DOCDM-806487

Control methods without associated Best Practice

- 1080 fish polymer targeting feral cats (PU38)
- Spur-winged plover/Australasian harrier shooting

Standard Operating Procedures

- Safe Handling of Pesticides – DOCDM -22730

Pre-implementation logistics

Field accommodation

Delivery schedules are likely to focus on rangers spending longer periods based in the backcountry. This has necessitated additional bivvy and temporary field accommodation to be constructed within the management area. This was completed in 2016/17 and is now readily available to rangers and contractors.

Table Hill and Blaikies Hill have been chosen for their relatively sheltered positioning as well as being conveniently spaced for delivery (track cutting, bait station servicing and banding/monitoring) team needs. The public Rakeahua hut is also available for field operations and will be used for servicing the Rakeahua and Hill 511 bait stations. Freshwater Hut is available for servicing the Rocky Mountain bait stations.

Additional weather proof storage pods supplement available vestibule space in the bivvies which are required for additional gear associated with delivery.

Bait storage

Toxins will be stored in lockable, flyable aluminium containers which will be present at each of the bivvies.

Transport

Helicopter flights are scheduled (DOC-5918612) to fly up bait storage and associated gear as well as trapping and bait station construction supplies prior to field delivery. Flights are scheduled for all field delivery trips to the Tin Range Block to increase predator control and monitoring efficiency.

Bait stations operations

On-going establishment

Continue to develop a grid with approximately 1km track spacing along which bait stations are placed at 200m intervals. The area includes a 2km buffer beyond the Tin Range breeding area (Fig 2) which is based on Harper's research on feral cats having average home range diameters of this metric (Harper, 2004).

An additional 11.6km of track was cut during 18/19 and so 57 new bait stations are to be established in addition to the existing 468. Bait station designs will follow the previously used Stewart Island feral cat station style as this has proven effective in past operations while brodifacoum will be placed in 500mm long RP65 downpipe tunnels (65mm entrance diameter) pegged to the ground.

Bait station installation is scheduled for September to December 2019 and will be completed by a mix of temporary project rangers and permanent rangers from the local DOC office.

Servicing/baiting

Baiting of the existing bait station network (468 stations) will begin in September to target a pre-breeding knock down of predators using the rolling programme described above.

The additional 57 bait stations will be incorporated as they become operative on completion of the establishment phase.

Four additional temporary rangers will be hired to support existing rangers to deliver the expanded work programme. Baiting work will continue on the above schedule until the end of the breeding season (approximately March 2020).

Trapping & feral cat shooting (spotlighting)

Following the removal of the raised Timms traps from the field in 18/19 we aim to deploy 100 Belisle Super X220 kill traps in chimney boxes across the 4 main breeding locations.

Leg hold traps will be placed on top of raised barrels as well as ground-set with hazing to reduce the likelihood of non-target capture.

Live capture cage traps will be placed near huts and on routes that are being checked daily by field rangers.

Any feral cats caught in a live capture trap will be euthanised using a rifle.

Spotlighting for cats will take place opportunistically, as weather and logistics allow.

Targeted shooting

White-tailed deer, spur-winged plover and Australasian harrier present within the breeding areas will be shot by qualified rangers early in the field season (early September) in anticipation of the start of the breeding season. Opportunistic control will follow with field rangers noting that deer presence on the open tops begins in approximately November, coinciding with the flowering of alpine herb species.

Pestlink data tables

Pesticides

	1080 fishmeal polymer	Brodifacoum blocks	Comments
Target pest	Feral cats	Rat reduction, possible secondary poisoning of feral cats	Rat and possum suppression not specifically targeted. See above.
Pesticide trade name	0.10% 1080 feral cat bait	Pestoff Rodent Blocks	
Pesticide Name	Sodium fluoroacetate	Brodifacoum	
Toxic loading	0.10%	0.02g/kg	
Bait type	Pellet	Block	
Lure/mask and %	Fishmeal	Chocolate	
Dye	Green	Blue	
Type of pre-feed (lure/lure %/dye)	NA	NA	
Individual bait weight (g)	1.5	20	
Bait sampling?	No	No	
Pre-feed dates	NA	NA	
Number of pre-feeds	NA	NA	
Pre-feed quantity	NA	NA	
Toxic bait dates	Fortnightly (Sep 19 – Mar 20)	Fortnightly (Sep 19 – Mar 20)	
Number of toxic fills	12 planned	6-12 planned	Baiting intensity will depend on how quickly baits are completely removed from bait stations.
Toxic bait frequency	Fortnightly	Fortnightly	
Toxic bait quantity	15g toxic bait	20g toxic bait	
Pre-feed to toxic interval	NA	NA	
Date bait removed	Final date – 1 March 2020	Final date – 01 March 2020	
End of caution period date	August 2020 (5 months after last toxic application)	02 March 2023 (3 years after last toxic application)	
Bait station pattern	1000mx200m grid buffering inner cordon (50m spacing)	1000mx200m grid buffering inner cordon (50m spacing)	
Bait station type	Stewart Island cat bait station	Tubing secured to ground with pegs	DOCDM-856047 (SI cat bait station)
Bait station spacing	50m breeding area 200m x 1km buffer area	50m breeding area 200m x 1km buffer area	Only targeting rat reduction around bait stations
Total number of bait stations	468 (with more being added)	468 (with more being added)	
Bait station density	Average – 0.13/ha	Average – 0.13/ha	

Trapping

	Kill traps	Soft-jaw legholds	Live cage trap	Comments
Target pest	Feral cats	Feral cats	Feral cats	
Trap style (kill/leghold/cage)	Kill	Leghold	Cage	
Trap type	Belisle Super X220	Soft-jaw leg-hold	Live cage trap	
Lure(s)	Fresh meat/fish	Fresh meat/fish	Fresh meat/fish	
Trapping start date	2 September 2019	2 September 2019	2 September 2019	
Trapping completion date	14 February 2020	14 February 2020	14 February 2020	
Number and frequency of lure renewals	1 renewal every trip (approx. 9 in total)	As and when required (Aug 19 – Mar 20)	As and when required (Aug 19 – Mar 20)	
Total number of traps	100	As required, targeted, <20	As required, targeted, <20	
Pattern of trap lines	Cordon surrounding Tin Range breeding area, access tracks to Hill511, Rocky Mt and Mt Rakeahua	Targeted to open alpine tops within SNZD breeding habitat and/or areas of cat presence	Targeted to open alpine tops within SNZD breeding habitat and/or areas of cat presence	
Trap spacing	100m	100m	100m	
Frequency of trap checking	Weekly	Daily	Daily	
Trap placement	Along cordon following scrub-open edge	Along bush edges and natural runways	Along bush edges and natural runways	
Type of trap set	Double-set chimney box	Ground-set/barrel-set	Ground-set	
Trap covers	N/A	N/A	N/A	
Trap height	0	0/700mm (barrel-sets)	0	
Total trap effort (trap-nights)	90 days (season) x 100 traps = 9,000 trap-nights	Unknown	Unknown	
Trap set density per ha	0.22	Unknown	Unknown	

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Outcome and Result Monitoring

Outcome monitoring

Measuring a response in the dotterel population is critical to allow validation and refinement of management.

1. Our primary method of monitoring will be the banding of adults and fledging chicks at the nesting grounds to allow re-sightings at the flock sites.
    a. Handled birds will have their basic morphometrics measured and receive a visual health check. Disease sampling may be undertaken with swabs and/or bloods (dependent on qualified personnel).
2. Nest searching and repeat observations plus motion-activated camera trap monitoring of nests to confirm nest fate and provide productivity estimates.
3. Annual flock counts to be completed during the highest tides in April 2020. This will form our overall on-going population trend estimate as per previous years.

Should the population experience a reduction, information received from the monitoring programme will become crucial in directing future management.

Result monitoring

1. Field rangers will be tasked with searching for (incidental sightings and trail cameras) and recording cat sign during their other tasks.
2. Kill and live trap results will be recorded.
3. Shooting records of deer, spur-winged plover and harriers will be maintained.

Monitoring schedule

Month	Monitoring
August 2019	
September 2019	Nesting effort, cameras.
October 2019	Nesting effort, cameras.
November 2019	Nesting effort, cameras.
December 2019	Nesting effort, cameras.
January 2020	Nesting effort, cameras.
February 2020	Nesting effort, cameras.
March 2020	
April 2020	Flock counts, banding
May 2020	Banding
June 2020	Banding
July 2020	

Previous management

Nest Monitoring

Nest monitoring through grid searching and subsequent camera monitoring have increased our knowledge of the likely predator suite, disturbance and fertility issues impacting SNZD breeding success.

A 2013/2014 wildlife management student from Otago University undertook an investigation into the then apparent "population plateau". The study included 5 monitored nests, 2 of which were believed to be incubated by female-female pairs, 1 nest successful (100% hatch rate) and 2 unknown fates. Nest survey and monitoring in 2016/17 found 4 out of 14 nests hatched with 1 confirmed predation, 1 abandoned nest and 8 unknown fates.

Nest survey and monitoring in 2017/18 found 19 nests, of which 5 were confirmed hatches and a further 4 suspected, 6 unknown outcomes, 1 confirmed abandonment, 1 infertile nest (F/F pair)

Year	Total nests found	Confirmed hatches (1+ chick)	Suspected hatches	Suspected Predation	Abandoned nest	Likely infertile (4+ eggs)	Unknown
13/14 MSc study	5	1	0	0	0	2	2
15/16 SNZD Project	13	4	0	1	5	0	3
16/17 SNZD Response	14	4	0	1	1	0	8
17/18 SNZD Recovery	19	5	4	0	1	1	8
18/19 SNZD Recovery	19	8	7	1	2	0	1

- *NB: This data isn't standardised/calibrated by search effort.*

Banding

A banding programme was led by John Dowding in the 1990s. Towards the end of the decade, most of the population had been banded. Over time the proportion of banded birds in the population declined through recruitment/replacement and the cessation of banding work.

Banding work restarted in 2013 and continued through until 2015, resulting in 13 individuals being banded. A dedicated temporary contract was initiated in the 2015/16 breeding season which saw a further 38 birds banded (including 5 pre-fledglings giving us birds of known age). A further 21 birds were banded in 2016/17 taking the likely banded total to 72 or just under 50% of the estimated population at that time. 31 birds were banded in 2017/18 which we estimate remained around 54% of then current estimated population due to an apparent increase seen during the 2018 flock count. Finally, banding through the 2018/19 season added a further 50 birds to the remaining banded population. Assuming zero mortality since banding resumed in 2013 we would expect 77% of the current 170 birds to be banded. This remains to be tested through the accumulation of banded vs unbanded bird sightings.

The banding has allowed us to start tracking the movements of birds and ascertain whether birds will pair with the same individuals. We're able to obtain better total population estimates as we can more sure that we're not double counting unidentifiable birds.

How?

Consents required

1. Landowner or occupier consent	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission	☒ **Yes (operation involves pesticides)**
4. DOC permission	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

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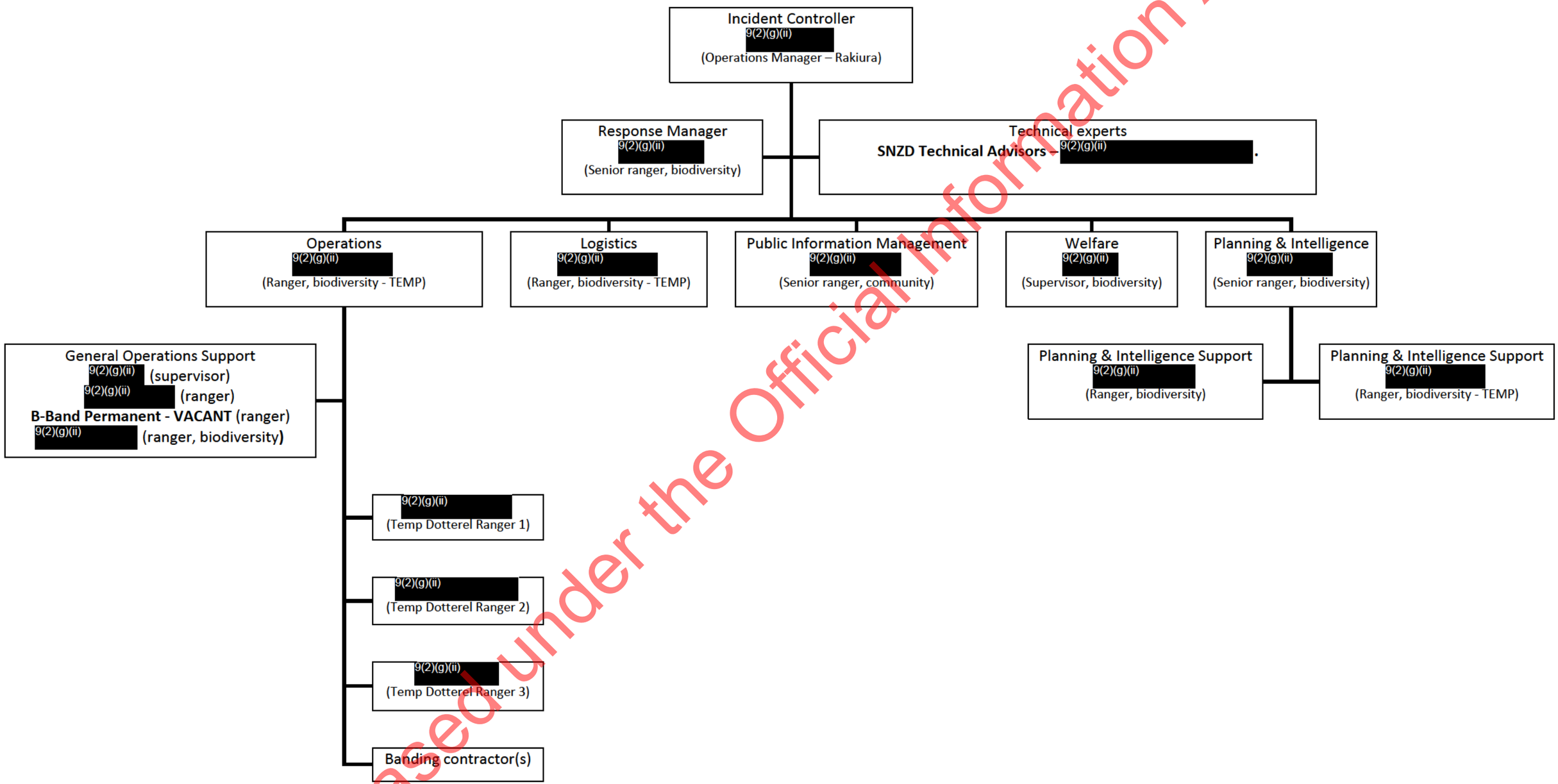
CIMS structure



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Task list

A compliance register is being used for this operation and tasking lists are contained in DOC-6008030.

Deliverables

Title	Link
Communication plan	DOC-6023637
DOC permission application	DOC-6008050
Public Health Permission application	DOC-6027156
Safety plan	DOC-6040141
Safety briefing	DOC-3143343
Emergency response plan for transport	DOC-3136309
Tender documents	Not applicable
Contracts	Not applicable
Checklist for info required for operational report	DOC Pesticides App
Warning sign register	DOC Pesticides App
BFOB Funding Application	DOC-5479466
Compliance register & tasking lists	DOC-6008030
Assessment of Environmental Effects	DOC-6027156
Key Facts Sheet – Effects	DOC-6007993
Key Facts Sheet - Notification	DOC-6027131
Public Health Permission – signed copy	Pending
DOC/EPA Permission – signed copy	Pending

Relevant documents

Title	Link
16/17 Response Plan (BFOB funding bid supplementary material)	DOC-2759653
16/17 Battle For Our Birds funding application summary	DOC-2790749
17/18 Battle For Our Birds funding application summary	DOC-3072324
18/19 Battle For Our Birds funding application (4 year estimates)	DOC-5479466
15/16 SNZD cat control Operational Plan	DOC-2536930
16/17 SNZD response Operational Plan	DOC-2824345
17/18 SNZD Recovery Operational Plan	DOC-3124929
SNZD response pest control records	DOC-2901677
Anti-coagulant use rationale	DOC-2851151
SNZD banding and monitoring database	DOC-2641608
Peer review of 17/18 SNZD Recovery Operational Plan	DOC-5499222
17/18 Director's exemption to use second generation anti-coagulant	DOC-3139632
18/19 Director's exemption to use second generation anti-coagulant	DOC-5506623
Peer review of 18/19 operational plan	DOC-5525526
18/19 SNZD Recovery Operational Plan	DOC-5479762

References

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King C. 1990. The Handbook of New Zealand Mammals. *Oxford University Press*.

Acknowledgements

A very sincere thanks to the following people for their considerable support in both the initial concept design, subsequent detailed planning and field logistical consideration of the urgent "16/17 Southern New Zealand Dotterel Response" which has formed the basis of "17/18 SNZD Recovery Project" and "18/19 SNZD Recovery Programme":

- 9(2)(g)(ii)
- 9(2)(g)(ii)

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Multi-species predator control Operational Plan
Southern New Zealand Dotterel breeding habitat
26 August 2020 to 30 June 2021

Version History

Version	Reason for change	Date
10	Updated CIMS chart with new staff. Linked in task assignment register to replace task specs section. Updated details around DOC permission assessment	01/09/20
9	Completed new sections required by updated template. Updated timings to reflect recruitment delays.	05/08/20
8	Brought information into new template and updated timings and references for 20/21 FY.	05/06/20
7	Updated acknowledgements, predator control history and 18/19 nest monitoring outcomes.	12/08/19
6	Updated maps and confirmed field season staff capacity for various tasks.	01/08/19
5	Updated timings and references for 19/20 season.	08/07/19
4	Made suggested amendments from peer review feedback. Updated delivery timeframes due to recruitment delays.	10/08/18
3	Added further relevant documents. Updated maps. Removed references to "core breeding areas" as no longer definitive term with expansion. Added nesting summary table.	20/06/18
2	Linking updated related documents. Removed PAPP references, amended annual timeframes. Included new barrel-set traps. Removed references to contingency ground-set leghold trapping, now a core proactive method (9(2)(g)(ii) Tech Advice).	12/06/18
1	Initial amendments to previous 17/18 operational plan	08/05/18

Contents

Section A Project management

1. Project scope

- Multi species target predator control programme with a primary focus on feral cats and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 4-part area of key SNZD breeding habitat including:
    1. Tin Range (4293ha) – breeding habitat plus buffer
    2. Hill 511 (78ha) – breeding habitat only
    3. Rakeahua (56ha) – breeding habitat only
    4. Rocky Mountain (97ha) – breeding habitat only

- Predator reduction achieved through a combination of vertebrate toxins, kill and live trapping and targeted shooting.

- August 2020 to June 2021

Out of scope

- Multi-purpose monitoring programme including adult colour banding, nest fate monitoring, disease screening, genetic sampling and annual flock counts.

2. Summary table of key documents

Document	Reference	Purpose
Project home page	DOCDM-1117452	A quick reference collation of documents created for or relevant to this project
Communication plan	DOC-6315454	Plan covering the consultation and notification of stakeholders and visitors about the operation which also serves as a record of those consulted and/or notified.
Compliance register	DOC-6315470	Register of conditions and performance standards to be met by the project;

3. Objectives and targets

Long-term conservation goal

Increase current population growth of the southern New Zealand dotterel (SNZD) to achieve increased security against extinction with a population size of at least 300 individuals by 2025.

Outcome target

2021 flock count indicates that the SNZD population size is of 199 birds or greater (the average annual increase required over five years to achieve the long-term goal.

Result targets

Feral cats

- There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat density monitoring. We are aiming for zero detection through field observations of cat sign or presence.

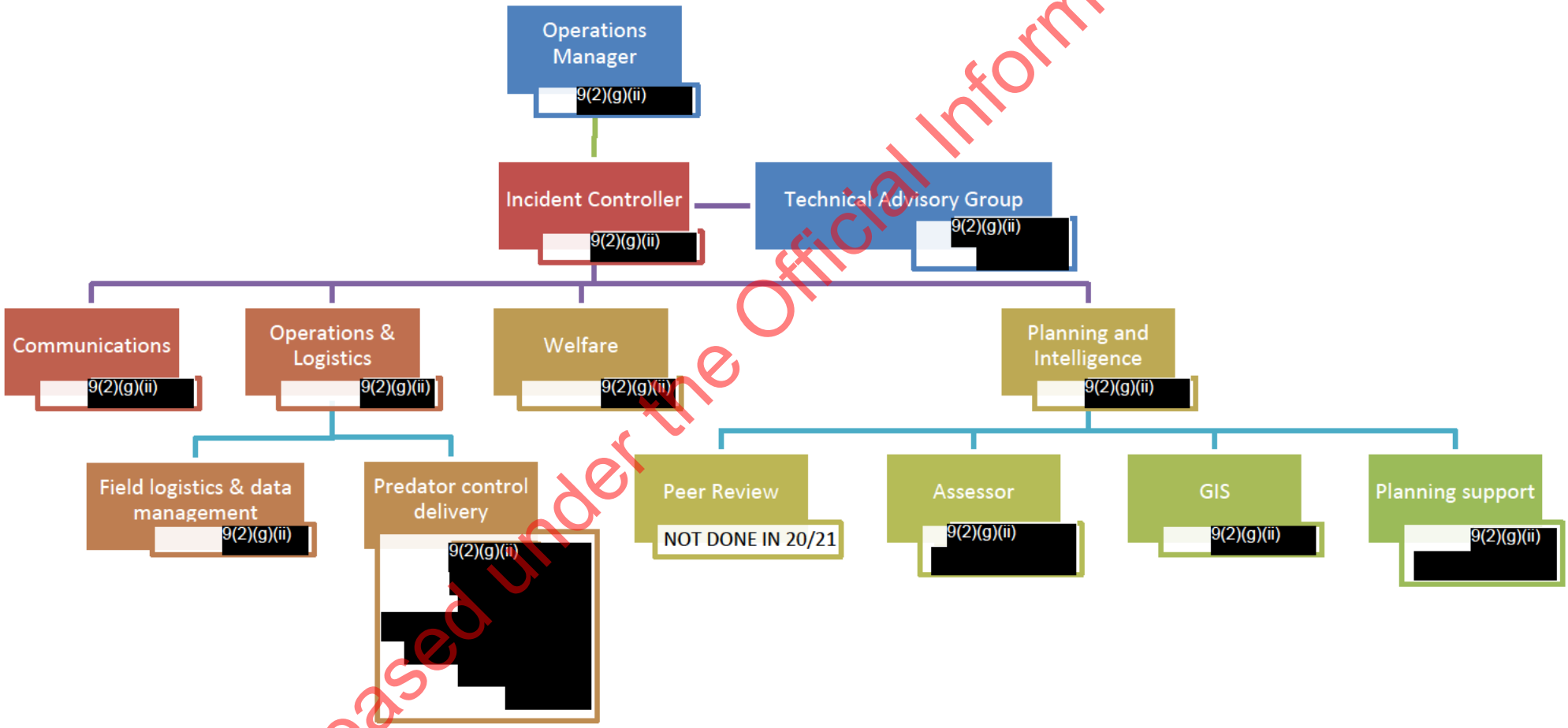
Spur-winged plover

- Resident spur-winged plover are removed from the management area so that no further sighting are made for the remainder of the breeding season.

White-tailed deer and Australasian harrier

- All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

4. Project team



Key Roles and Responsibilities

Title	Role	Responsibilities
Incident Controller 9(2)(g)(ii)	Take charge and lead the project	Ensure Task Assignment is fulfilled as agreed to deliver project outcomes. Liaise with Technical Advisory Group to help guide planning and delivery. Be accountable to the Operations Manager for delivery to standard.
Planning 9(2)(g)(ii)	Ensure project is planned to DOC SOP standards	Plans, manages and reports on operation using Operational Planning for Pest Operations SOP docdm-1488532.
Communications 9(2)(g)(ii)	Supervise consultation and notification to DOC SOP standards	Plans, manages and records all consultation and notification tasks identified in the project communication plan.
Operations 9(2)(g)(ii)	Supervise implementation	Manage tasks identified, specified and delegated in operational plan.
Logistics 9(2)(g)(ii)	Provide logistical supplies requested.	Manage logistical tasks identified, specified and delegated in operational plan
GIS 9(2)(g)(ii)	Provide mapping services to support the planning and delivery of the project	GIS mapping required during planning and implementation. Support and mentoring for correct use of Pesticides App.
Peer Reviewer **NOT REQUIRED**	To support the operational planner with independent comments and questions early in the process, when there is still flexibility for significant changes if necessary.	Provides a written independent review of the operational plan in Planning phase Step 3 before consents are obtained.
Readiness checker **NOT REQUIRED**	To independently review all planning to assess readiness for the Operational phase.	Reviews the operational plan and associated documents in Pre-Operational phase Step 7 in order to identify non-compliance, gaps and risks. Works with the operational planner to develop a plan to remedy the priority issues before the operation goes ahead.
Assessor 9(2)(g)(ii)	To support the DOC consent provider through meeting the requirements of the Assessing applications for DOC consent SOP	Reviews the application against SOP standards and prepares a recommendation for consent provider.

Title	Role	Responsibilities
Planning support 9(2)(g)(ii) [redacted]	Support Planning and Intelligence lead	Consider information gathered from monitoring and fieldwork activities and relay to Planning Lead.
Field logistics & data management 9(2)(g)(ii) [redacted]	Support Operations/Logistics lead with day-to-day supervision and logistical planning.	Refine task assignments with more detail. Ensure field data is captured and recorded using appropriate systems.
Predator control delivery 9(2)(g)(ii) [redacted]	Implement predator control activities	Complete task assignments. Report back to Operations lead on any issues arising. Provide suggestions to Operations lead for improvements in field delivery and operation as a whole.
Welfare 9(2)(g)(ii) [redacted]	Ensure processes and systems are in place to monitor and implement health, safety and wellbeing of team.	Monitor operations to ensure standard health and safety protocols are implemented. Capture and report incidents in Risk Manager. Share relevant lessons with wider team to ensure shared learning. Demand a immediate cessation of operations if dangerous practices or unmanaged risks noted until suitably dealt with.

5. Contracts

Helicopter contractors will be engaged as the primary method of field transport. Services will be secured through DOC's revised Heli Order process selecting operators from the national supplier panel. As this is a logistics contract, it will be supervised by the Operations/Logistics Lead ([redacted]).

Water taxi suppliers may also be engaged as a back-up contingency when constraints prevent use of DOC dinghies. No formal contract is in place with these service suppliers.

6. Consents required

1. Landowner or occupier consent (The operation is contained within the Rakiura National Park)	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission (Public Health South)	☒ **Yes (operation involves pesticides)**
4. DOC permission (Provider: [redacted] – Operations Manager, Rakiura) (Assessor: SSI Pesticide Permissions process)	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

7. Consultation

This is an on-going annual predator control programme and so local residents, Treaty Partners and key stakeholders are well acquainted with the nature of this work. This is an adaptive programme, however, and so we treat each year as an independent operation. We go through standard consultation processes accordingly.

The main drive of the consultation plan is listed in the Communications Plan (DOC-6315454). This document also contains a running communications log which contains data from previous years as well, reflective of the on-going, annual nature of the recovery programme.

Iwi

Treaty Partners are prioritised for consultation and so we aim to initiate refreshed discussion with each of the four local rūnaka before approaching other stakeholders on an annual basis. This ensures that we have a "no surprises" approach to Treaty Partner engagement. Kāi Tahu look to papatipu runaka to engage with the department on 1080 and pest control matters and this is formally done through the Kaitaiki Rōpu ki Murihiku framework. A presentation regarding the mid to long-term future of the recovery programme was offered to a Kaitiaki Rōpu in November 2019. Iwi remained supportive of the programme and indicated support for a move to increasing control to landscape scales. Further to this, we have directly contacted the four local papatipu runaka in July 2020 as part of our Consultation on Effects and it was tabled again at a hui on the 28th of July 2020.

Adjoining landowners/occupiers

Not required as the operation is completely within the Rakiura National Park.

Key stakeholder groups

The following groups have been identified for proactive consultation as per the Communications Plan:

- New Zealand Deerstalkers Association – Southland Branch
- Predator Free Rakiura
- Ornithological Society of New Zealand/Birds NZ – Southland Branch
- Southland Conservation Board
- Rakiura residents
- Stewart Island District Nurse
- NZ Police – Oban
- Halfmoon Bay School

The records of this consultation are recorded in the communications plan (DOC-6315454).

8. Monitoring

There is no specific monitoring related to the predator control operation planned, however, non-target captures in all traps (kill and live-capture) will be recorded in the Trapping App and reported through to our Technical Advisory Group and form part of the annual report and Pestlink report.

9. Timeline and Milestones

July 2020	Consultation on effects initiated Consent application lodged
August 2020	Confirm Operational Plan Stakeholder, Partner notification 24-hour notice (if required) Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated Field logistics set up • Bivvy supply runs • Toxin transferred to field storage • Warning signage confirmed • Complete rodent bait station deployment • Complete feral cat bait station maintenance • Complete kill trap deployment Initiation of ground control • 1080 and brodifacoum deployed in bait stations • Kill traps activated • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Live capture traps activated Initiation of dotterel monitoring • Determine presence/absence of adults • Determine pre-breeding/breeding behaviour • Record and monitor any early nesting attempts

<table>
<tr><td>September 2020</td><td rowspan="5">Continuation of ground-control
Reapply 1080 treatment to bait station network every week on Hill 511, Rocky Mountain and Mount Rakeahua.
Reapply 1080 treatment to bait station network every two weeks on Tin Range
Apply brodifacoum to rodent bait stations at a rate determined by bait take so that palatable blocks are always present
Spur-winged plover, Australasian harrier, white-tailed deer identified and removed
Check and rebait kill traps weekly on Hill 511, Rocky Mountain (including access track) and Mount Rakeahua (including access track)
Check and rebait kill traps every two weeks on the Tin Range
Undertake live capture trapping on weekly on the Tin Range
Continuation of dotterel monitoring
Grid search for nests weekly in all breeding areas
Record all banded bird re-sightings and pairing information
Place nest cameras on all nests
Review nest camera data to determine nest fate and hatching rate
Pest monitoring
Record all target pest sightings
Place unused cameras on bait stations and traps to determine interaction rates
Collect feral cat genetic sample material</td></tr>
<tr><td>October 2020</td></tr>
<tr><td>November 2020</td></tr>
<tr><td>December 2020</td></tr>
<tr><td>January 2021</td></tr>
<tr><td>February 2021</td><td>Field season shut down
Secure bivvies for winter period
Remove toxin from field
Complete data reporting and camera footage analysis
Deploy bait and carcass monitoring
End of field season debrief</td></tr>
<tr><td>March 2021</td><td>Initiate bird banding at flocking sites
Initiate feral cat genetic sample analyses</td></tr>
<tr><td>April 2021</td><td>Outcome monitoring (flock counts)
Bird banding continues</td></tr>
<tr><td>May 2021</td><td>Toxin disposal
Review Operational Plan
Bird banding finalised and report delivered
Technical Advisory Group meeting</td></tr>
<tr><td>June 2021</td><td>Toxin purchase
PestLink reporting
Annual reporting</td></tr>
</table>

10. Project risks and mitigation

The primary risk in this operation is that the planned activities do not achieve the outcomes sought as the SNZD population is critically endangered and threatened with imminent extinction. We aim to mitigate this by investing in a robust monitoring programme that aims to provide more clarity on the relative importance of the various factors affecting the dotterel population. Monitoring data analyses will enable the programme to be adaptive and more targeted over time.

The ground-setting of leghold traps targeting feral cats raises the risk of the non-target capture of kiwi. Discussions have been held between local operations staff, technical advisors in the Kiwi Recovery Group (KRG) and DOC's wildlife vet with the aim of understanding how this can be best mitigated and managed. Technical advice informing the SNZD recovery programme has strongly recommended the use of this control method as it's generally accepted to be the most effective method of feral cat control. It's crucial that the best methods possible are employed to provide the SNZD population with the best chance of avoiding extinction. While the KRG recognised the conundrum the local district faces in terms of balancing the risk of trapping vs the risk of inaction, they highlighted that their primary function is to advocate solely for the interests of kiwi and so could not endorse ground-set trapping in any form or context. Operations staff were seeking advice on an acceptable level of kiwi by-catch which would not have a population level effect. This would allow the establishment of a by-catch limit whereby ground-set trapping would cease for the season if reached. The lack of advice has meant that there is currently no identified limit and the local Operations Manager will need to decide when to cease ground-set trapping. The non-target capture of a kiwi would likely pose public perception risk to the programme because kiwi are a valued, iconic species while the endangered southern dotterel is obscured and little known by the general public.

11. Project debrief and reporting

October 2020	NFPL reporting	9(2)(g)(ii)	
February 2021	Breeding season debrief	9(2)(g)(ii)	
March 2021	NFPL reporting	9(2)(g)(ii)	
June 2021	NFPL reporting Annual report PestLink reporting Technical Advisory Group meeting	9(2)(g)(ii)	
Monthly	Financial reporting	9(2)(g)(ii)	

12. Project Compliance register

Please find the compliance register on DOC-6315470

Section B Operational

13.Site description

Conservation Values

Locations

This operational plan covers four main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua, Rocky Mountain and Hill 511 (Figure 2).

Vegetation

Tin Range (4293 ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (78ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Rocky Mountain (97ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Fauna values within management area

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird – *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Threats

- KNOWN - Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- POSSIBLE - Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- POSSIBLE - Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- KNOWN - White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- KNOWN - Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- KNOWN - Australasian harriers – occasionally seen in the operation area.
- LIKELY - Black backed gulls – colony present south of Hill 511.

Issues

Some hunters have challenged the validity of white-tailed deer impacts on the southern dotterel. The belief is that the trail camera video captures an isolated event and is not reflective of white-tailed deer generally despite a range of published literature describing their impacts on ground-nesting birds in their native range in North America.

Other management at the site

Nil. These sites are only actively managed as part of the Southern NZ Dotterel Recovery Programme. This has been an annual programme since 1994.

14. Control Design

Background

The previously successful annual feral cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent feral cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years (as at 2016), a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The 2016/17 programme focussed on the expansion of the bait station network, introduction of new kill traps for feral cats, targeted shooting of white-tailed deer, spur-winged plover and Australasian Harrier and the trialling of PAPP in a mince ball matrix as a toxic alternative to 1080 targeting feral cats. In 17/18 we ceased using PAPP due to restrictive and impractical label requirements as well as the comparatively high cost in terms of the toxin itself, lost productivity through extensive bait preparation and the need to establish demonstrable successful pre-feeding prior to laying toxic bait which was considered impractical in an area where feral cats are believed to be transitory.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds in the April 2017 flock count. A similar result was noted in the April 2018 flock count, with an increase from 153 birds to an estimated population size of 167. The increase appears to have slowed with the April 2019 flock count estimating 170 birds and June 2020 count at 173.

As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach. The operational plan continues to be refined each year with the current document building on experience, feedback and information received since the previous iteration in 19/20.

Predator control 2020/21 season

Feral cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to breeding areas). This season we intend to reduce the black-backed gull density at a colony near the Hill 511 SNZD breeding habitat by means of a small-scale alphachloralose operation, this will be planned as a separate operation with separate planning/consultation process if training (licences) can be secured in time. Furthermore, we intend to introduce kill trapping to access tracks following spurs to the breeding habitats at Mount Rakeahua and Rocky Mountain.

Control methods aim to cover a variety of toxic and non-toxic options to reduce the impact of bait or device shy cats which are likely to be present in the area after 22 years of mostly consistent predator control from 1994 to 2016.

Feral cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 4293ha to buffer the Tin Range breeding area.

Localised rat suppression is required to prevent 1080 bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rat carcasses though the frequency of this is not understood, nor the rate at which a feral cat would need to consume carcasses to avoid sub-lethal dosing effects.

1080 cereal pellets were initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we support a strong recommendation from Science and Policy to make use of Brodifacoum for this purpose. While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, there is considered to be no alternative if we aim to rely on 1080 to reduce feral cat densities. This will be the fifth year it has been applied to the majority of the management area.

DOC-2851151 lays out an analysis of the trade-offs involved in Brodifacoum use and a final recommendation to use it which was endorsed by Science and Technical staff and the local Operations Manager.

Future predator control requirements

We envisage that annual predator control will be required for the foreseeable future given that the SNZD population remains critically endangered and conservation dependent. Effective predator control is currently all that stands between the population and a decline towards extinction.

The programme will continue to employ an adaptive management approach while we know little about the relative importance of the wide variety of factors believed to affect the population. Future monitoring or research may enable us to better refine management intervention to target maximum reproductive success and survivorship.

There is a strong recommendation from technical advisors to the programme to increase the scale of feral cat control to further buffer the scattered utilised breeding habitat. The expansion of ground-based infrastructure has proven slow and costly through 2017 to 2019 and so expansion has paused for now. The introduction of aerial control methods for feral cats would require extensive consultation and engagement from Treaty Partners, stakeholders and the resident community.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Control block [ha]	Target pest	Control timing
Tin Range [4293 ha] – toxin, trapping, shooting	Feral cats	**26 August 2020 to 29 January 2021** (See DOC-6218416 for a visual representation of the planned operations.)
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Mt Rakeahua [56ha] – Toxin, trapping + 38ha trapping only area	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Hill 511 [78ha] Toxin, trapping, shooting + 138ha trapping only area	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
	Black-backed gulls (planned later)	
Rocky Mountain [97ha] Toxin, trapping + 18ha trapping only area.	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	

Table 1. Summary of target pests, control actions and schedule.

1080 and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 4293ha grid (including the pre-existing cordon present on the Tin Range areas of Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 327ha of breeding habitat on Mt Rakeahua, Rocky Mountain and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. 0.02g/kg brodifacoum rodent blocks
2. 1080 fish-meal polymer bait

The control work and result monitoring targets the dotterel breeding season (September – February) while outcome monitoring occurs during the following flocking season (April 2021).

Justification for proposed methods (*AEE extract*)

A range of control tools targeting several predators are required given that we don't have a robust understanding of which predators are driving the SNZD population decline and to what extent.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 26 years which has potentially led to the creation of a toxin-shy population.

The revised proposed methods aim introduce new control tools which establish control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

The introduction of kill & live trapping and night shooting for feral cats will increase the likelihood of killing cats which are toxin shy.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

15. Method(s)

Bait stations

0.1% 1080 in fishmeal polymer baits will be applied to "Stewart Island bait stations for feral cats" which are modified 4L plastic pails raised approximately 200mm on ground pegs. These are arranged in a cordon around key breeding areas and spaced between 50 – 70 metres along that line. The cordon follows the scrub edge and encircles the open alpine zone around known breeding hotspots. The Tin Range cordon is buffered by a larger grid of bait stations on 1000km x 200m spacings. Existing bait will be removed and replaced with new bait on each baiting round.

0.02g/kg brodifacoum rodent blocks will be applied to nova-coil style bait stations which are RP65 smooth bore plastic downpipe, 500mm in length, pegged to the ground near a feral cat bait station. The primary purpose of baiting these stations is to prevent 1080 bait interference and so we plan on placing these rodent stations close to the feral cat bait station. Existing bait will be removed and replaced with new bait on each baiting round.

Kill trapping

50 x double-set Belisle Super X220 kill traps in chimney/submarine boxes will be placed near key breeding areas on the Tin Range, targeting areas of known feral cat presence and traditional patrol routes. These sets will also be placed on access tracks to Mount Rakeahua, Rocky Mountain and Hill 511 which are known to be frequented by feral cats moving to those breeding areas. Kill traps will be baited using salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Kill trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29437)

Live capture trapping

Hav-a-hart cage traps will be deployed on bait station lines, access tracks and areas of known feral cat presence and traditional patrol routes and checked daily. These traps will be baited with salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Cage trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29441).

Victor 1.5 soft catch traps will be used in hazed ground-sets and raised on up-turned barrels to create a platform that feral cats will jump onto to reach the bait/lure. Trap locations will vary and target linear landscape features, areas of known feral cat presence including traditional patrol routes, access tracks and areas including a high number of dotterel nests. Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Leg hold trapping for feral cat control" (DOCDM-29439).

Ground hunting

White-tailed deer will be shot on sight as practical using a .303 or greater calibre rifle. White-tailed deer hunting will follow the "Ground shooting of deer – best practice for human pest animal control" standards (DOCDM-642613).

Spur-winged plover will be shot on sight as practical using a .220 or greater calibre rifle.

Australasian harrier will be shot on sight as practical using a shotgun.

Thermal scope and spotlights will be used in combination during night hunting work in strictly defined boundaries in key breeding habitat. This will primarily target feral cat nocturnal activity but opportunities to remove white-tailed deer and possums will be taken advantage of using this methodology. This work is subject to approval from the Operations Manager and has stringent health and safety procedures to further mitigate any risks on top of the existing New Zealand Firearms Safety Code. The Managerial authorisation prescribes set personnel of proven hunting experience, set locations as identified on the map used in public consultation, specifies the locations of warning signage and best practice standards required, safety briefing procedures and a 16 hour minimum notification of intended operation to allow contact with stakeholders and transport operators to identify any people in the area. A secondary verbal approval is then required before commencement and this will only be issued if there's a high degree of confidence that no people are in the shooting area. An example of the approval and conditions is available on DOC-6048511. A similar approval will be sought for the 2020/2021 season.

Predator control schedule

Month	Control methods	Frequency	Other actions
August 2020	*Deferred due to recruitment delays and lack of required qualifications.*		
September 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
October 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
November 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
December 2020 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
January 2021 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
February 2021 All treatment blocks	Demobilisation Close traps Remove all toxin		

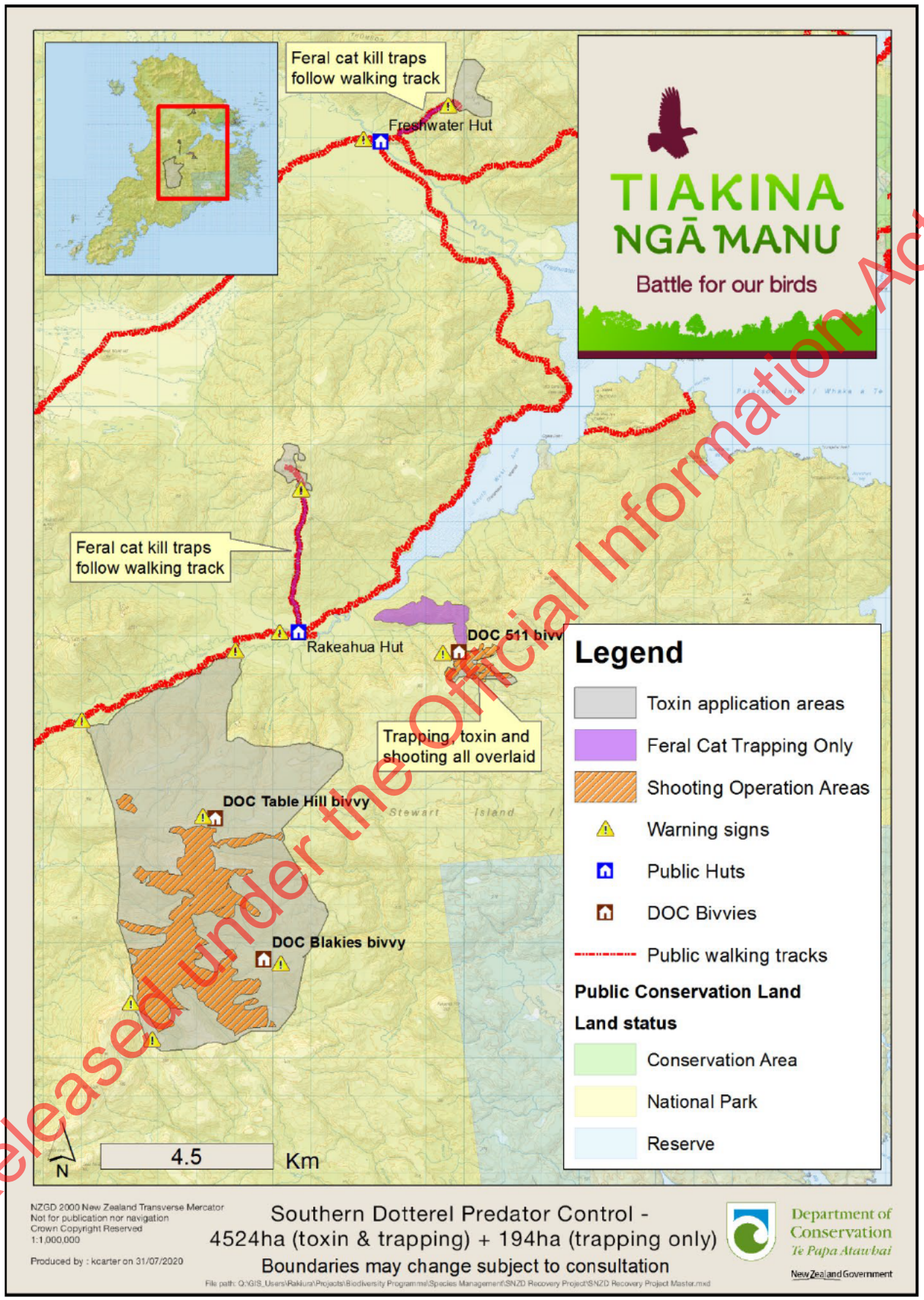
16. Block and treatment area boundaries

The Treatment Area is entirely contained within the Rakiura National Park and so there are no boundaries with other landowners/occupiers. The treatment blocks are separated into two four-part multi shape polygons in the Pesticides App; one for each toxin type. We've elected to combine the treatment blocks into one multi-shape feature to reduce the high level of duplication during Pestlink reporting given the high number of target species and various methods at each site.

The north-eastern corner boundary of the Tin Range polygon was determined by avoiding an overlap with a bookable hunting block. The treatment boundaries on Hill 511, Rocky Mountain and Mount Rakeahua are defined by the sub-alpine scrub boundary with the open tops.

Kill trapping (Belisle Super X220 double set traps in chimney box) is planned to overlap with the public tracks going up Mount Rakeahua and Rocky Mountain (see map below).

All GIS data is stored on the following Q Drive folder: Q:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Species Management\SNZD Recovery Project

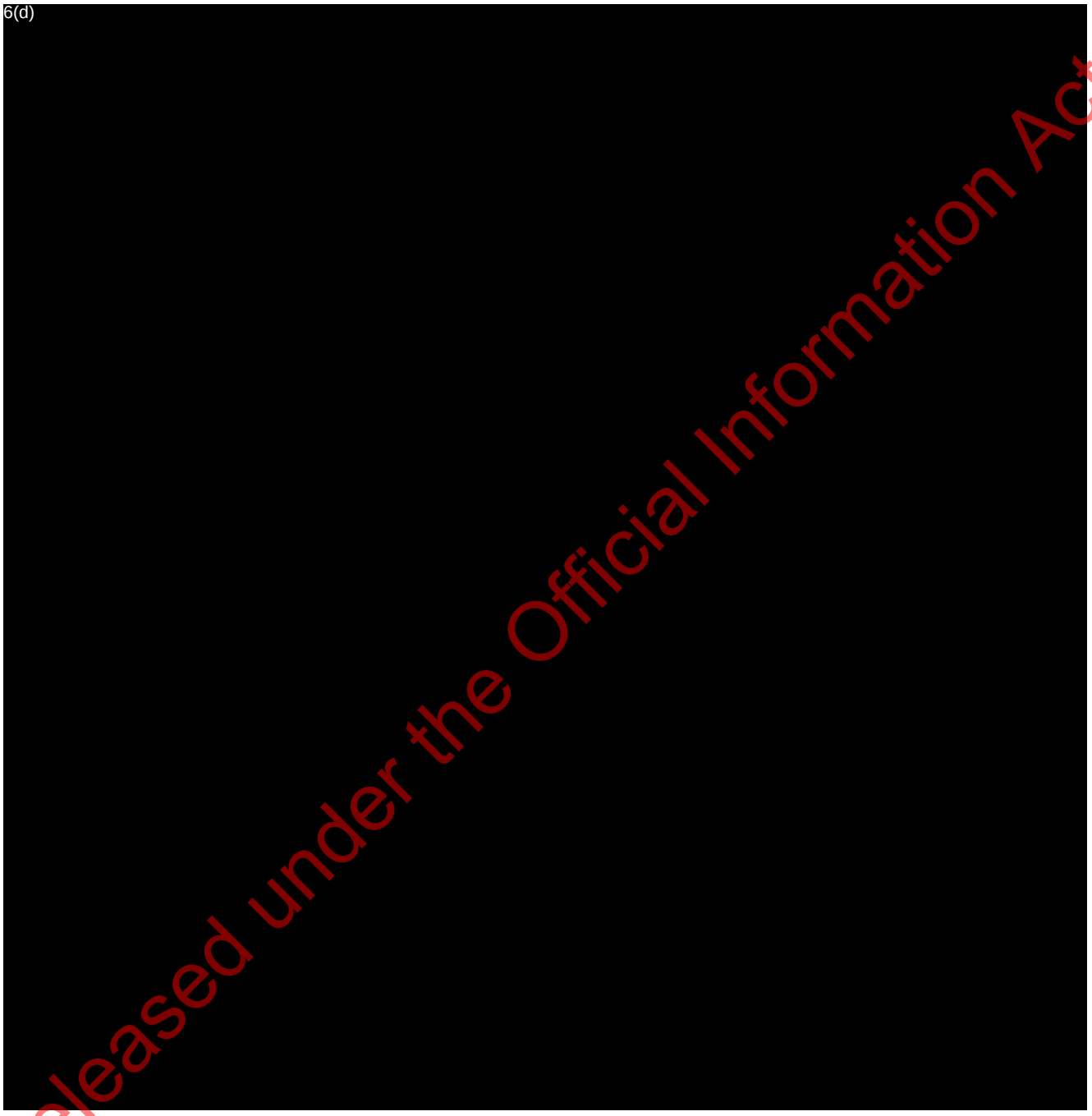


17. Loading sites & other set up

There is no loading site required as this is a ground-based operation.

18. Security

6(d)



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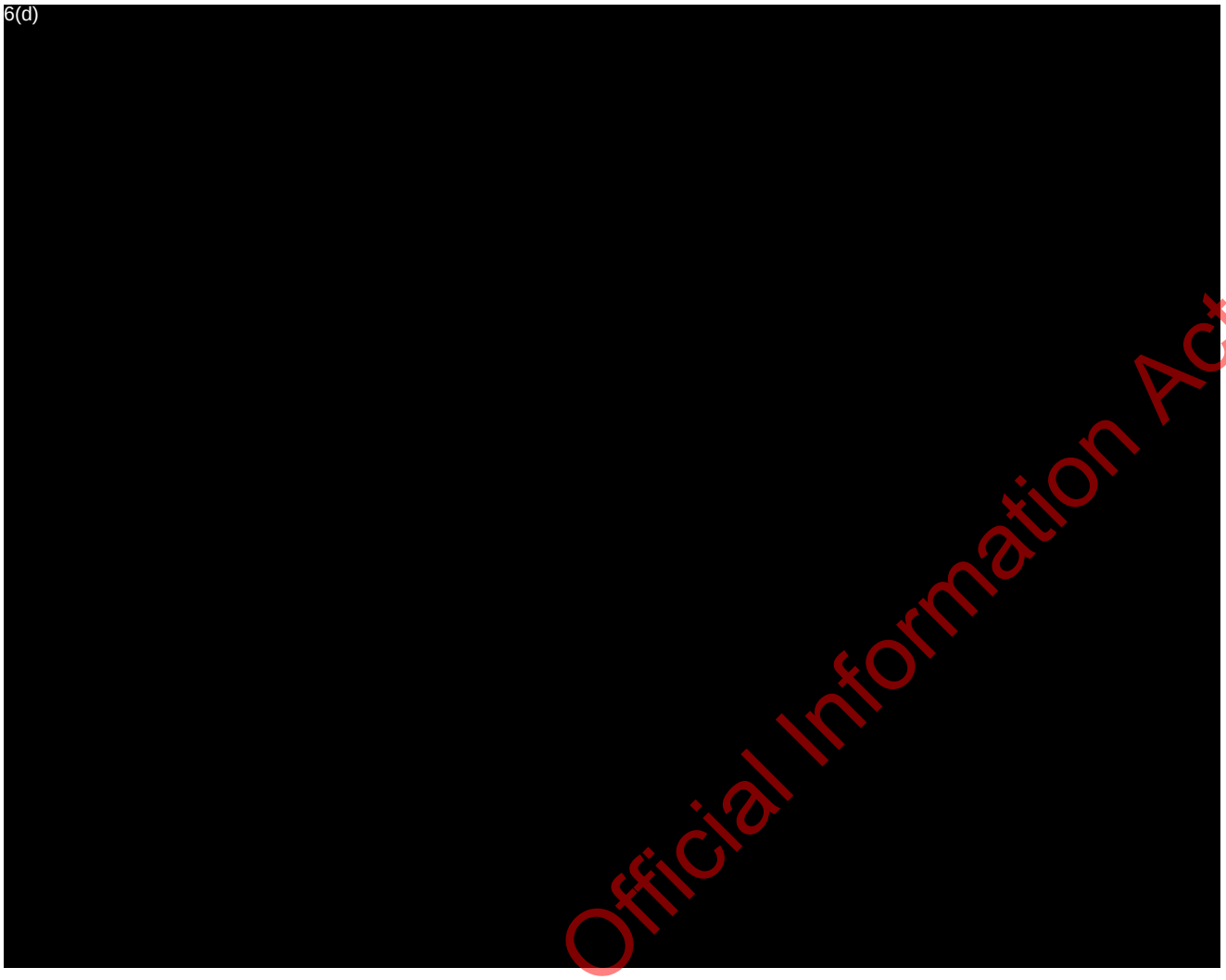


19. Public safety

The general public, identified stakeholders, interest groups and Treaty Partners have been consulted with regarding this operation using a variety of mechanisms including e-mails, phone calls, posters, mail box drops, face to face meetings and newspaper publications. Maps and key information regarding the operation have been provided. Please refer to the Communications Plan and communications register for more detail on DOC-6315454.

Warning signage is in place at all likely points of entry to the operational area. Records of these are available on the DOC GIS Pesticide App and in the following folder: S:\Biodiversity\Assets\Dotterels\2020-21\Warning signs

The majority of the bait stations will not be visible from walking tracks, however, any bait station along a walking track will have a small class 6 white diamond skull and crossbones sticker attached.

Kill traps will be present along the walking tracks up Mount Rakeahua and Rocky Mountain in chimney/submarine trap boxes. These boxes will be labelled with the text “Danger – Do Not Touch” and a logo of a hand with a circle and slash through it to depict that it should not be touched.

Information sheets will be made available at the Rakeahua and Freshwater public huts to describe the work being done and the safety precautions that visitors should adhere to.

20. Bait, storage and transport

20 x 10kg plastic buckets with sealed lids containing both 0.1% 1080 fishmeal pellets and 20 x 10kg plastic buckets with sealed lids containing 0.02g/kg brodifacoum rodent blocks will be transported from 6(d), 9(2)(g)(ii) commercial freight depot in Bluff using 6(d), 9(2)(g) will transfer the toxin to Rakiura main wharf using the 6(d), 9(2)(g)(ii) will then transfer the consignment to the Rakiura Pesticide Store where it will be signed in on the relevant HSNO tracking sheets.

The toxin will be transferred from the Rakiura Pesticide Store to locked metal bins (secondary containment) for field storage during the breeding season and then driven to 6(d), 9(2)(g)(ii) using a flat-bed truck with a loader crane.

The bins will be flown as internal and underslung loads from 6(d), 9(2)(g)(ii) to the following locations:

Flight 1

6(d), 9(2)(g)(ii)

Flight 2

6(d), 9(2)(g)(ii)

All bins will display the product labels, a class 6 toxic white diamond warning sticker and an orange and black striped dangerous goods sticker (see example photo). This will ensure that all toxin field storage will be within the operational area which includes warning signage at key entry points.

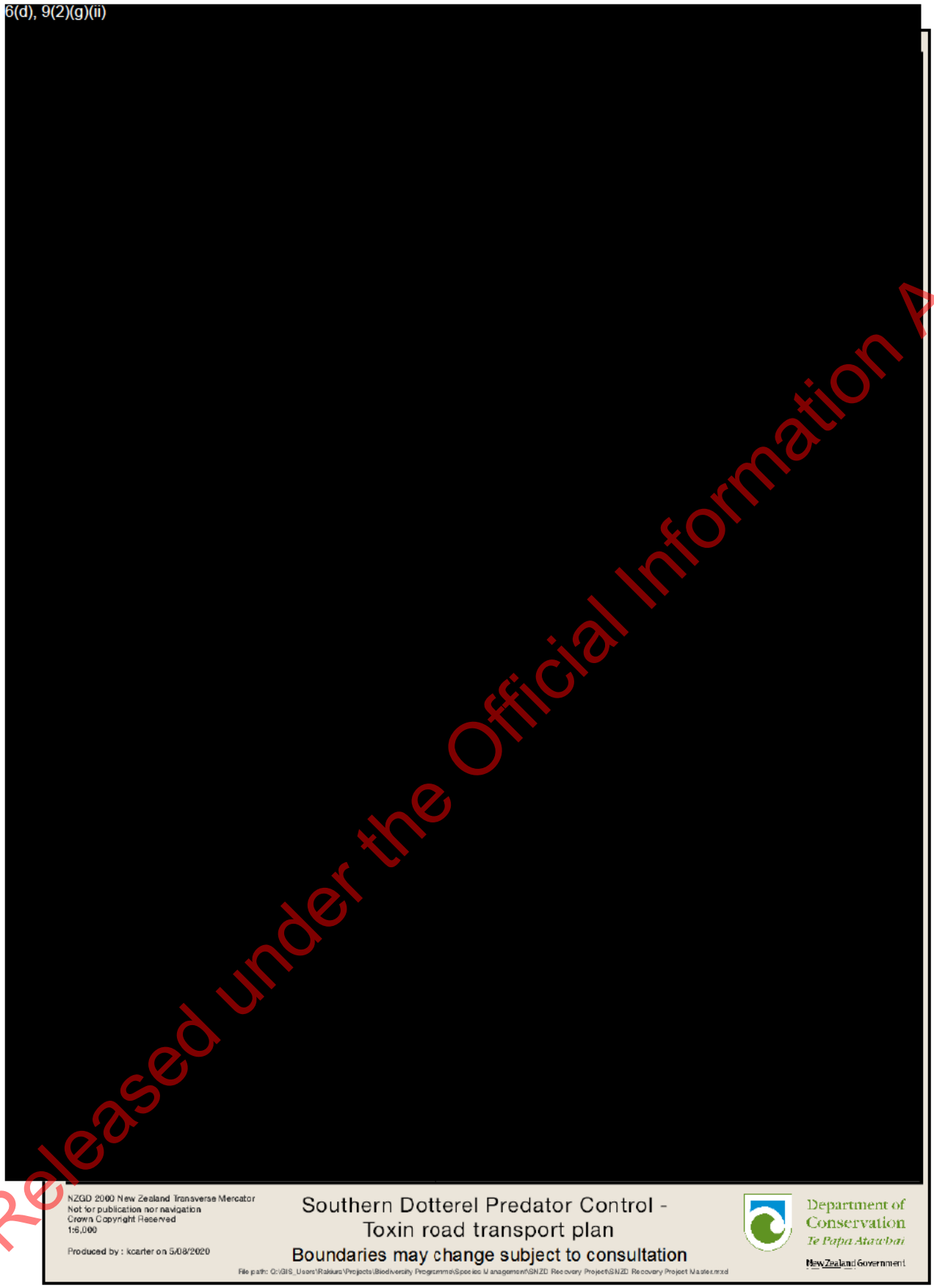
Any toxin removed from bait stations during the operational period will be returned to the nearest metal bin and secured with two security key padlocks. At the end of the season all bins will be returned to 6(d), 9(2)(g)(ii) using internal and underslung loads. These will be transported using the flat-deck truck with loader crane and returned to the Rakiura Pesticide Store where it will be signed in on the relevant HSNO tracking sheets and stored until disposal has been arranged.

A transport safety plan with full details is available on DOC-6392452.

The Rakiura Pesticide Store has been granted a location test certificate available on XXXXX.

Secure field storage for toxin.

6(d), 9(2)(g)(ii)



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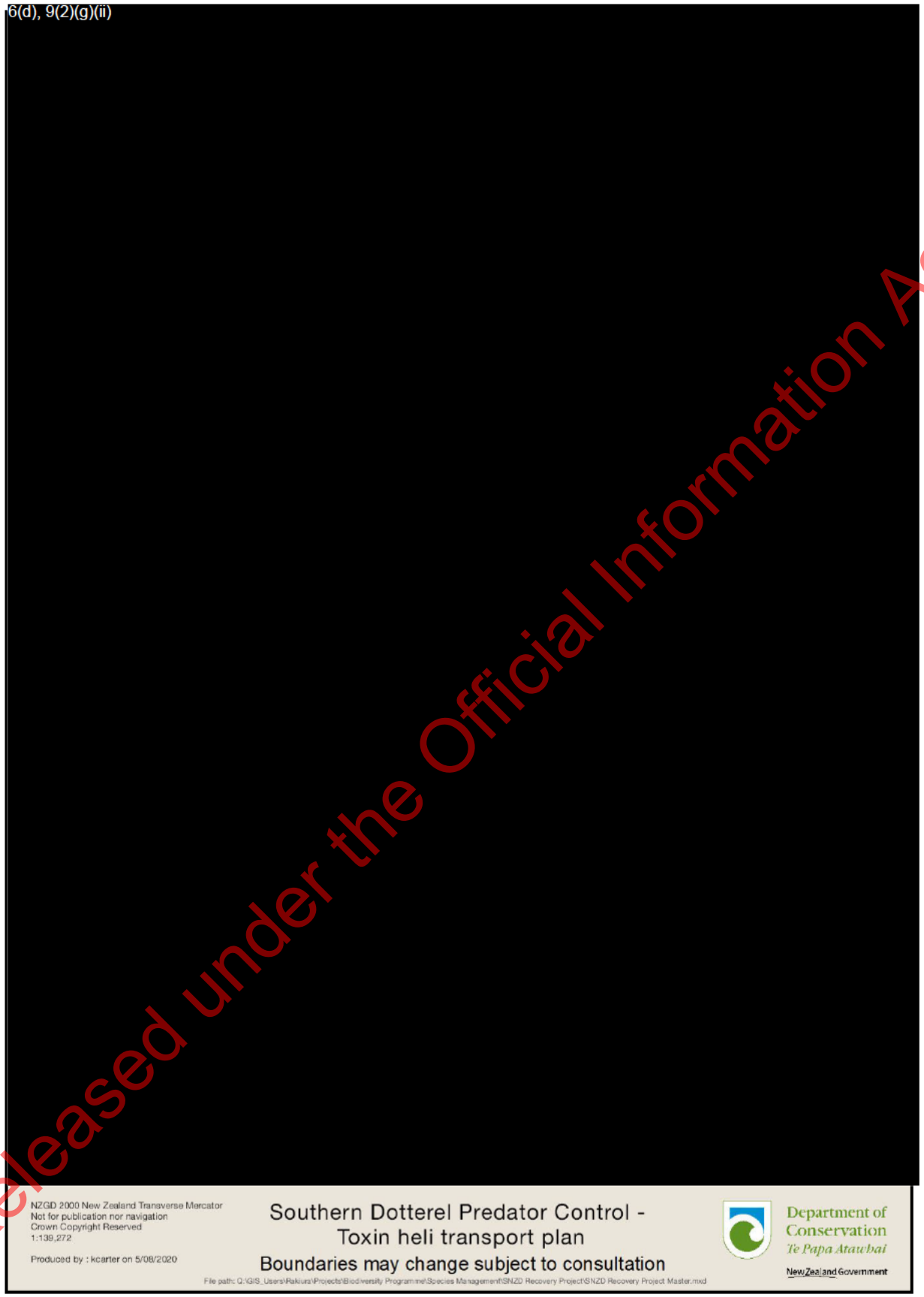
Southern Dotterel Predator Control -
Toxin road transport plan

Boundaries may change subject to consultation

File path: C:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Species Management\SNZD Recovery Project\SNZD Recovery Project Master.mxd

Department of Conservation
Te Papa Atawbai
New Zealand Government

6(d), 9(2)(g)(ii)



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Southern Dotterel Predator Control -
Toxin heli transport plan

Boundaries may change subject to consultation

File path: Q:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Species Management\SNZD Recovery Project\SNZD Recovery Project Master.mxd

Department of Conservation
Te Papa Atawbai
New Zealand Government

21. Incidents and emergencies

A safety plan has been prepared using Risk Manager which covers the normal emergency procedures. Pesticide related incidents will be managed using the relevant Safe Handling Sheet from the Safe Handling of Pesticides SOP.

Transport emergencies are covered by the toxin transport safety plan on DOC-6392452.

Emergencies at the Rakiura Office work site will be managed using the relevant sections of the office location emergency response plan.

A spill response emergency drill will be run at random during the induction period of new staff and include existing staff. This will be scheduled after a programme briefing scheduled in mid-August which will cover emergency response procedures.

22. Decision making on the day of bait application

Not applicable for this operation.

23. Demobilisation

Field operations will begin demobilisation in the week starting 25 January 2021. All remaining toxin will be retrieved from bait stations and returned to the metal bins/field storage ready for transport back to the Fern Gully hangar as per the toxin transport safety plan on DOC-6392452.

All kill traps will be unset and live capture traps removed from the field for storage and maintenance back at the Rakiura Office.

Bait stations and kill traps will be left on site for future operations.

Warning signage will be checked prior to departure from the field.

Bait and carcass monitoring will be initiated if required by the DOC/EPA permission.

Rubbish and any remaining food will be packaged for removal via helicopter.

Section C Project Task List

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Preparing Phase already completed in previous years – this is an annualised programme.					
Planning	July 2020	Ensure Rakiura Pesticide Store has current location test certificate	9(2)(g)(ii)	NA	Inspection complete, certificate pending
	July 2020	Consultation on effects initiated	9(2)(g)(ii)	NA	Complete
	July 2020	Consent applications lodged	9(2)(g)(ii)	NA	Complete – waiting on confirmation of DOC/EPA permission. Currently being assessed 1/09
Pre-Operational	August 2020	Confirm Operational Plan	9(2)(g)(ii)	NA	
	10 – 25 August 2020	Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated	9(2)(g)(ii)	NA	
	24 August 2020	Stakeholder, Partner notification	9(2)(g)(ii)	NA	
	25 August 2020	24-hour notice (if required)	9(2)(g)(ii)	NA	

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Operational	September 2020	Field logistics set up • Bivvy supply runs • Toxin transferred to field storage • Warning signage confirmed • Complete rodent bait station deployment • Complete feral cat bait station maintenance • Complete kill trap deployment Initiation of ground control • 1080 and brodifacoum deployed in bait stations • Kill traps activated • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Live capture traps activated Initiation of dotterel monitoring • Determine presence/absence of adults • Determine pre-breeding/breeding behaviour • Record and monitor any early nesting attempts	9(2)(g)(ii) 9(2)(g)(ii) 9(2)(g)(ii)		

APF phase	Target date	Task	Delegated to	Task Assignment	Status
	September 2020	Continuation of ground-control • Reapply 1080 treatment to bait station network every week on Hill 511, Rocky Mountain and Mount Rakeahua. • Reapply 1080 treatment to bait station network every two weeks on Tin Range • Apply brodifacoum to rodent bait stations at a rate determined by bait take so that palatable blocks are always present • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Check and rebait kill traps weekly on Hill 511, Rocky Mountain (including access track) and Mount Rakeahua (including access track) • Check and rebait kill traps every two weeks on the Tin Range • Undertake live capture trapping on weekly on the Tin Range	9(2)(g)(ii)		
	October 2020		9(2)(g)(ii)		
	November 2020		9(2)(g)(ii)		
	December 2020		9(2)(g)(ii)		
	January 2021	Continuation of dotterel monitoring • Grid search for nests weekly in all breeding areas • Record all banded bird re-sightings and pairing information • Place nest cameras on all nests • Review nest camera data to determine nest fate and hatching rate	9(2)(g)(ii)		

APF phase	Target date	Task	Delegated to	Task Assignment	Status
		Pest monitoring • Record all target pest sightings • Place unused cameras on bait stations and traps to determine interaction rates • Collect feral cat genetic sample material			
Post Operational	February 2021	Field season shut down Secure bivvies for winter period Remove toxin from field Complete data reporting and camera footage analysis Deploy bait and carcass monitoring End of field season debrief	9(2)(g)(ii)		
	March 2021	Initiate bird banding at flocking sites Initiate feral cat genetic sample analyses	9(2)(g)(ii)		
	April 2021	Outcome monitoring (flock counts) Bird banding continues	9(2)(g)(ii)		
	May 2021	Toxin disposal Review Operational Plan Bird banding finalised and report delivered Technical Advisory Group meeting	9(2)(g)(ii)		

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Reporting	June 2021	Toxin purchase PestLink reporting Annual reporting	9(2)(g)(ii)		

Section D Task specifications

Task assignments have been issued instead of “task specifications” as the template is better suited to rangers undertaking multiple tasks over a longer timeframe (eg: multiple 10 day trips).

Task Assignments are kept in the following register – DOC-6298163

Department of Conservation
Te Papa Atawhai

Multi-species predator control Operational Plan
Southern New Zealand Dotterel breeding habitat
09 August 2021 to 30 June 2022

Version History

Version	Reason for change	Date
11	Updated timings and references for 21/22 season. Added in southern black-backed gull control part of operation. Note Biodiversity Supervisor role still vacant at time of writing.	14/06/21
10	Updated CIMS chart with new staff. Linked in task assignment register to replace task specs section. Updated details around DOC permission assessment	01/09/20
9	Completed new sections required by updated template. Updated timings to reflect recruitment delays.	05/08/20
8	Brought information into new template and updated timings and references for 20/21 FY.	05/06/20
7	Updated acknowledgements, predator control history and 18/19 nest monitoring outcomes.	12/08/19
6	Updated maps and confirmed field season staff capacity for various tasks.	01/08/19
5	Updated timings and references for 19/20 season.	08/07/19
4	Made suggested amendments from peer review feedback. Updated delivery timeframes due to recruitment delays.	10/08/18
3	Added further relevant documents. Updated maps. Removed references to “core breeding areas” as no longer definitive term with expansion. Added nesting summary table.	20/06/18
2	Linking updated related documents. Removed PAPP references, amended annual timeframes. Included new barrel-set traps. Removed references to contingency ground-set leghold trapping, now a core proactive method 9(2)(g)(ii) Tech Advice).	12/06/18
1	Initial amendments to previous 17/18 operational plan	08/05/18

Contents

Section A Project management

1. Project scope

- Multi species target predator control programme with a primary focus on feral cats and Southern black-backed gulls and a secondary focus on rats, spur-winged plover, Australasian harriers and white-tailed deer covering a 4-part area of key SNZD breeding habitat including:
    1. Tin Range (4293ha) – breeding habitat plus buffer
    2. Hill 511 (78ha) – breeding habitat only
    3. Rakeahua (56ha) – breeding habitat only
    4. Rocky Mountain (97ha) – breeding habitat only
    5. Southern 511 (10ha) – southern black-backed gull colony

- Predator reduction achieved through a combination of vertebrate toxins, kill and live trapping and targeted shooting.

- August 2021 to June 2022

Out of scope

- Multi-purpose monitoring programme including adult colour banding, nest fate monitoring, disease screening, genetic sampling and annual flock counts.

2. Summary table of key documents

Document	Reference	Purpose
Project home page	DOCDM-1117452	A quick reference collation of documents created for or relevant to this project
Communication plan	DOC-6689454	Plan covering the consultation and notification of stakeholders and visitors about the operation which also serves as a record of those consulted and/or notified.
Compliance register	DOC-6689473	Register of conditions and performance standards to be met by the project;

3. Objectives and targets

Long-term conservation goal

Increase current population growth of the southern New Zealand dotterel (SNZD) to achieve increased security against extinction with a population size of at least 300 individuals by 2025.

Outcome target

2022 flock count indicates that the SNZD population size is of 192 birds or greater (the average annual increase required over four years to achieve the long-term goal).

Result targets

Feral cats

- There are no reliable result targets for cats as we cannot measure their presence/absence and density accurately. There are no known standard methods of cat density monitoring. We are aiming for zero detection through field observations of cat sign or presence.

Southern black-backed gull

- 100% kill of all resident nesting gulls and their eggs.

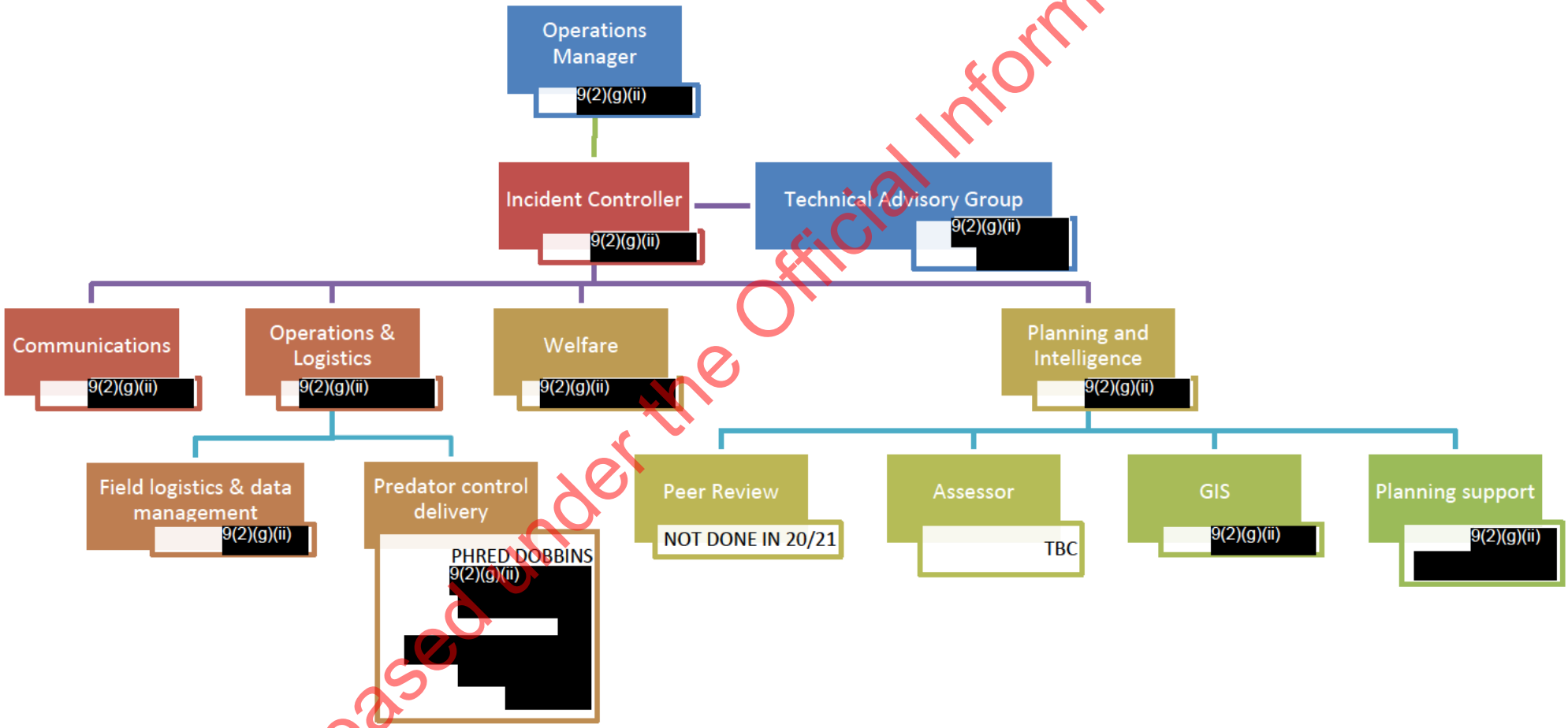
Spur-winged plover

- Resident spur-winged plover are removed from the management area so that no further sighting are made for the remainder of the breeding season.

White-tailed deer and Australasian harrier

- All white-tailed deer and Australasian harrier observed by field rangers are removed as far as practical.

4. Project team



Key Roles and Responsibilities

Title	Role	Responsibilities
Incident Controller 9(2)(g)(ii) [redacted]	Take charge and lead the project	Ensure Task Assignment is fulfilled as agreed to deliver project outcomes. Liaise with Technical Advisory Group to help guide planning and delivery. Be accountable to the Operations Manager for delivery to standard.
Planning 9(2)(g)(ii) [redacted]	Ensure project is planned to DOC SOP standards	Plans, manages and reports on operation using Operational Planning for Pest Operations SOP docdm-1488532.
Communications 9(2)(g)(ii) [redacted]	Supervise consultation and notification to DOC SOP standards	Plans, manages and records all consultation and notification tasks identified in the project communication plan.
Operations 9(2)(g)(ii) [redacted]	Supervise implementation	Manage tasks identified, specified and delegated in operational plan.
Logistics 9(2)(g)(ii) [redacted]	Provide logistical supplies requested.	Manage logistical tasks identified, specified and delegated in operational plan
GIS 9(2)(g)(ii) [redacted]	Provide mapping services to support the planning and delivery of the project	GIS mapping required during planning and implementation. Support and mentoring for correct use of Pesticides App.
Peer Reviewer **NOT REQUIRED**	To support the operational planner with independent comments and questions early in the process, when there is still flexibility for significant changes if necessary.	Provides a written independent review of the operational plan in Planning phase Step 3 before consents are obtained.
Readiness checker **NOT REQUIRED**	To independently review all planning to assess readiness for the Operational phase.	Reviews the operational plan and associated documents in Pre-Operational phase Step 7 in order to identify non-compliance, gaps and risks. Works with the operational planner to develop a plan to remedy the priority issues before the operation goes ahead.

Title	Role	Responsibilities
Assessor TBC	To support the DOC consent provider through meeting the requirements of the Assessing applications for DOC consent SOP	Reviews the application against SOP standards and prepares a recommendation for consent provider.
Planning support 9(2)(g)(ii) [redacted]	Support Planning and Intelligence lead	Consider information gathered from monitoring and fieldwork activities and relay to Planning Lead.
Field logistics & data management 9(2)(g)(ii) [redacted]	Support Operations/Logistics lead with day-to-day supervision and logistical planning.	Refine task assignments with more detail. Ensure field data is captured and recorded using appropriate systems.
Predator control delivery 9(2)(g)(ii) [redacted] TBC – SNZD TEMP	Implement predator control activities	Complete task assignments. Report back to Operations lead on any issues arising. Provide suggestions to Operations lead for improvements in field delivery and operation as a whole.
Welfare 9(2)(g)(ii) [redacted]	Ensure processes and systems are in place to monitor and implement health, safety and wellbeing of team.	Monitor operations to ensure standard health and safety protocols are implemented. Capture and report incidents in Risk Manager. Share relevant lessons with wider team to ensure shared learning. Demand a immediate cessation of operations if dangerous practices or unmanaged risks noted until suitably dealt with.

5. Contracts

Helicopter contractors will be engaged as the primary method of field transport. Services will be secured through DOC's revised Heli Order process selecting operators from the national supplier panel. As this is a logistics contract, it will be supervised by the Operations/Logistics Lead ([redacted]).

Water taxi suppliers may also be engaged as a back-up contingency when constraints prevent use of DOC dinghies. No formal contract is in place with these service suppliers.

6. Consents required

1. Landowner or occupier consent (The operation is contained within the Rakiura National Park)	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission (Public Health South)	☒ **Yes (operation involves pesticides)**
4. DOC permission (Provider: [redacted] – Operations Manager, Rakiura) (Assessor: SSI Pesticide Permissions process)	☒ **Yes (operation involves pesticides)**
5. EPA permission	Not required

7. Consultation

This is an ongoing annual predator control programme and so local residents, Treaty Partners and key stakeholders are well acquainted with the nature of this work. This is an adaptive programme, however, and so we treat each year as an independent operation. We go through standard consultation processes accordingly.

The main drive of the consultation plan is listed in the Communications Plan (DOC-6689454). This document also contains a running communications log which contains data from previous years as well, reflective of the on-going, annual nature of the recovery programme.

Iwi

Treaty Partners are prioritised for consultation and so we aim to initiate refreshed discussion with each of the four local rūnaka before approaching other stakeholders on an annual basis. This ensures that we have a "no surprises" approach to Treaty Partner engagement. Kāi Tahu look to papatipu runaka to engage with the department on 1080 and pest control matters and this is formally done through the Kaitaiki Rōpu ki Murihiku framework. A presentation regarding the mid to long-term future of the recovery programme was offered to a Kaitiaki Rōpu in November 2019. Iwi remained supportive of the programme and indicated support for a move to increasing control to landscape scales. Further to this, we have directly contacted the four local papatipu runaka in June 2020 as part of our previous round of Consultation on Effects and it was tabled again at a hui on the 28th of July 2020. We will reconnect with iwi in June or July 2021 as part of the new season's Consultation on Effects. Furthermore, a specific meeting will be held with DOC management, technical advice and iwi to discuss the loss of approximately 18 birds over the 20/21 season and how to best respond. This has been scheduled on 2 August 2021.

Adjoining landowners/occupiers

Not required as the operation is completely within the Rakiura National Park.

Key stakeholder groups

The following groups have been identified for proactive consultation as per the Communications Plan:

- New Zealand Deerstalkers Association – Southland Branch
- New Zealand Deerstalkers Association – National Office
- Predator Free Rakiura
- Ornithological Society of New Zealand/Birds NZ – Southland Branch
- Southland Conservation Board
- Rakiura residents
- Stewart Island District Nurse
- NZ Police – Oban
- Halfmoon Bay School

The records of this consultation are recorded in the communications plan (DOC-6689454).

8. Monitoring

There is no specific monitoring related to the predator control operation planned, however, non-target captures in all traps (kill and live-capture) will be recorded in the Trapping App and reported through to our Technical Advisory Group and form part of the annual report and Pestlink report.

Furthermore, active monitoring of the southern black-billed gull alpha-chloralose operation will take place during the delivery to ascertain effectiveness against the result target set.

9. Timeline and Milestones

July 2021	Consultation on effects initiated Consent application lodged
August 2021	Confirm Operational Plan Stakeholder, Partner notification 24-hour notice (if required) Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated Field logistics set up • Bivvy supply runs • Toxin transferred to field storage • Warning signage confirmed • Complete rodent bait station deployment • Complete feral cat bait station maintenance • Complete kill trap deployment Initiation of ground control • 1080 and brodifacoum deployed in bait stations • Kill traps activated • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Live capture traps activated Initiation of dotterel monitoring • Determine presence/absence of adults • Determine pre-breeding/breeding behaviour • Record and monitor any early nesting attempts

September 2021 October 2021 November 2021 December 2021 January 2022	Continuation of ground-control • Reapply 1080 treatment to bait station network every week on Hill 511, Rocky Mountain and Mount Rakeahua. • Reapply 1080 treatment to bait station network every two weeks on Tin Range • Apply brodifacoum to rodent bait stations at a rate determined by bait take so that palatable blocks are always present • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Check and rebait kill traps weekly on Hill 511, Rocky Mountain (including access track) and Mount Rakeahua (including access track) • Check and rebait kill traps every two weeks on the Tin Range • Undertake live capture trapping on weekly on the Tin Range November 2021 • Undertake Hill 511 Southern black-backed gull control operation Continuation of dotterel monitoring • Grid search for nests weekly in all breeding areas • Record all banded bird re-sightings and pairing information • Place nest cameras on all nests • Review nest camera data to determine nest fate and hatching rate Pest monitoring • Record all target pest sightings • Place unused cameras on bait stations and traps to determine interaction rates • Collect feral cat genetic sample material Field season shut-down Secure bivvies for winter period Remove toxin from field
February 2022	Complete data reporting and camera footage analysis Deploy bait and carcass monitoring End of field season debrief
March 2022	Initiate bird banding at flocking sites Initiate feral cat genetic sample analyses
April 2022	Outcome monitoring (flock counts) Bird banding continues
May 2022	Toxin disposal Review Operational Plan Bird banding finalised and report delivered Technical Advisory Group meeting
June 2022	Toxin purchase PestLink reporting Annual reporting

10. Project risks and mitigation

The primary risk in this operation is that the planned activities do not achieve the outcomes sought as the SNZD population is critically endangered and threatened with imminent extinction. We aim to mitigate this by investing in a robust monitoring programme that aims to provide more clarity on the relative importance of the various factors affecting the dotterel population. Monitoring data analyses will enable the programme to be adaptive and more targeted over time.

The ground-setting of leghold traps targeting feral cats raises the risk of the non-target capture of kiwi. Discussions have been held between local operations staff, technical advisors in the Kiwi Recovery Group (KRG) and DOC's wildlife vet with the aim of understanding how this can be best mitigated and managed. Technical advice informing the SNZD recovery programme has strongly recommended the use of this control method as it's generally accepted to be the most effective method of feral cat control. It's crucial that the best methods possible are employed to provide the SNZD population with the best chance of avoiding extinction. While the KRG recognised the conundrum the local district faces in terms of balancing the risk of trapping vs the risk of inaction, they highlighted that their primary function is to advocate solely for the interests of kiwi and so could not endorse ground-set trapping in any form or context. Operations staff were seeking advice on an acceptable level of kiwi by-catch which would not have a population level effect. This would allow the establishment of a by-catch limit whereby ground-set trapping would cease for the season if reached. The lack of advice has meant that there is currently no identified limit and the local Operations Manager will need to decide when to cease ground-set trapping. The non-target capture of a kiwi would likely pose public perception risk to the programme because kiwi are a valued, iconic species while the endangered southern dotterel is obscured and little known by the general public.

11. Project debrief and reporting

October 2021	NFPL reporting	9(2)(g)(ii)	
February 2022	Breeding season debrief	9(2)(g)(ii)	
March 2022	NFPL reporting	9(2)(g)(ii)	
June 2022	NFPL reporting Annual report PestLink reporting Technical Advisory Group meeting	9(2)(g)(ii)	
Monthly	Financial reporting	9(2)(g)(ii)	

12. Project Compliance register

Please find the compliance register on DOC-6689473

Section B Operational

13.Site description

Conservation Values

Locations

This operational plan covers four main areas focussing on capturing the bulk of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua, Rocky Mountain and Hill 511 (Figure 2).

Vegetation

Tin Range (4293 ha)

The lower slopes of the management area are covered in mixed podocarp forest with kamahi and southern rata as dominant cover.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua (56ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511 (83ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Rocky Mountain (97ha)

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Fauna values within management area

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird – *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Threats

- KNOWN - Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- POSSIBLE - Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- POSSIBLE - Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- KNOWN - White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- KNOWN - Spur-winged plover – present in low numbers (2 pairs noted on Table Hill/Blaikies in the 15/16 breeding season). Another one to two pairs for each site (464, 511 etc).
- KNOWN - Australasian harriers – occasionally seen in the operation area.
- LIKELY – Southern black backed gulls – colony present south of Hill 511.

Issues

Some hunters have challenged the validity of white-tailed deer impacts on the southern dotterel. The belief is that the trail camera video captures an isolated event and is not reflective of white-tailed deer generally despite a range of published literature describing their impacts on ground-nesting birds in their native range in North America.

The current control design is ground-based with limited coverage. The project aims to intercept individual feral cats before they encounter southern dotterel nesting habitat. Technical advice received has highlighted that this approach represents a high investment, minimal return scenario and they have strongly recommended moving to a landscape scale operation targeting possums or rats, both of which are likely to have a significant secondary kill of feral cats. Such a fundamental change to the programme requires building social licence to operate and trust with key partners and stakeholders.

Furthermore, DOC is looking to integrate all aspects of biodiversity work on Rakiura under the Predator Free Rakiura (PFR) banner which means any such operation would be affected by this context. Currently the DOC internal "task force" for PFR (Tier 3 Directors) do not support a shift to landscape scale control due to the social licence risk posed to a future island-wide eradication.

Other management at the site

Nil. These sites are only actively managed as part of the Southern NZ Dotterel Recovery Programme. This has been an annual programme since 1994.

14. Control Design

Background

The previously successful annual feral cat control project had failed to achieve annual outcome targets set for the years 2011 – 2016. An accelerating SNZD population decline rate despite largely consistent feral cat control necessitated a revised control design based on technical review. Given that the agent(s) of decline remain largely unclear and the rate of population contraction forecasted functional extinction in as little as 2 to 3 years (as at 2016), a range of possible agents of decline must be targeted to maximise the probability of achieving the desired outcome target.

The 2016/17 programme focussed on the expansion of the bait station network, introduction of new kill traps for feral cats, targeted shooting of white-tailed deer, spur-winged plover and Australasian Harrier and the trialling of PAPP in a mince ball matrix as a toxic alternative to 1080 targeting feral cats. In 17/18 we ceased using PAPP due to restrictive and impractical label requirements as well as the comparatively high cost in terms of the toxin itself, lost productivity through extensive bait preparation and the need to establish demonstrable successful pre-feeding prior to laying toxic bait which was considered impractical in an area where feral cats are believed to be transitory.

The revised control design applied in the 2016/17 breeding season appears to have been successful with the population index (flock count) rising 21% from 126 to 153 birds in the April 2017 flock count. A similar result was noted in the April 2018 flock count, with an increase from 153 birds to an estimated population size of 167. The increase appears to have slowed with the April 2019 flock count estimating 170 birds and June 2020 count at 173.

This should be contrasted against an apparent failure in the 20/21 season where approximately 18 birds were lost with the population falling back to an estimated 155 individuals.

As such we aim to continue application of the revised operational plan as part of an on-going adaptive management approach. The operational plan continues to be refined each year with the current document building on experience, feedback and information received since the previous iteration in 20/21.

Predator control 2021/22 season

Feral cats remain the primary target of control (large scale) with secondary targets including spur-winged plover, Australasian harriers and white-tailed deer (confined to breeding areas). Southern black-backed gulls have been included as a key target this season following the significant loss of dotterel over the last season. We intend to reduce the southern black-backed gull density at a colony near the Hill 511 SNZD breeding habitat by means of a 10-hectare alpha-chloralose operation,

Control methods aim to cover a variety of toxic and non-toxic options to reduce the impact of bait or device shy cats which are likely to be present in the area after 22 years of mostly consistent predator control from 1994 to 2016.

Feral cats maintain large home ranges and are known to travel long distances over short periods of time (Harper, 2004). This necessitates a large-scale management area and so we aim to target 4293ha to buffer the Tin Range breeding area.

Localised rat suppression is required to prevent 1080 bait-interference and increase feral cat toxin exposure. There is the potential for an added benefit in that feral cats may be secondarily poisoned through the consumption of toxic rat carcasses though the frequency of this is not understood, nor the rate at which a feral cat would need to consume carcasses to avoid sub-lethal dosing effects.

1080 cereal pellets were initially considered, however, due to Norway rats being the predominant rodent species over most of the management area, we support a strong recommendation from Science and Policy to make use of Brodifacoum for this purpose. While use of a second-generation anti-coagulant does pose bio-accumulation risk with on-going use, there is considered to be no alternative if we aim to rely on 1080 to reduce feral cat densities. This will be the fifth year it has been applied to the majority of the management area.

DOC-2851151 lays out an analysis of the trade-offs involved in Brodifacoum use and a final recommendation to use it which was endorsed by Science and Technical staff and the local Operations Manager.

Future predator control requirements

We envisage that annual predator control will be required for the foreseeable future given that the SNZD population remains critically endangered and conservation dependent. Effective predator control is currently all that stands between the population and a decline towards extinction.

The programme will continue to employ an adaptive management approach while we know little about the relative importance of the wide variety of factors believed to affect the population. Future monitoring or research may enable us to better refine management intervention to target maximum reproductive success and survivorship.

There is a strong recommendation from technical advisors to the programme to increase the scale of feral cat control to further buffer the scattered utilised breeding habitat. The expansion of ground-based infrastructure has proven slow and costly through 2017 to 2019 and so expansion has paused for now. The introduction of aerial control methods for feral cats would require extensive consultation and engagement from Treaty Partners, stakeholders and the resident community. Please see comments in the Issues section above.

We believe that the most effective control design will comprise of several methods targeting a range of pest targets (Table 1).

Control block [ha]	Target pest	Control timing
Tin Range [4293 ha] – toxin, trapping, shooting	Feral cats	**9 August 2021 to 4 February 2022** (See DOC-6485501 for a visual representation of the planned operations.)
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Mt Rakeahua [56ha] – Toxin, trapping + 38ha trapping only area	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
Hill 511 [83ha] Toxin, trapping, shooting + 138ha trapping only area	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	
	Southern black-backed gulls	
Rocky Mountain [97ha] Toxin, trapping + 18ha trapping only area.	Feral cats	
	Rats	
	Australasian Harrier/Spur Wing Plover	
	White-tailed deer	

Table 1. Summary of target pests, control actions and schedule.

1080 and brodifacoum will be used in an expanded bait-station network on an approximately 1km x 200m, 4293ha grid (including the pre-existing cordon present on the Tin Range areas of Table Hill & Hill 464) which targets both male & female cat home ranges; supported by 327ha of breeding habitat on Mt Rakeahua, Rocky Mountain and Hill 511, protected by an existing cordon of bait stations spaced at approximately every 50m.

The toxin control will occur in the following sequence:

1. 0.02g/kg brodifacoum rodent blocks
2. 1080 fish-meal polymer bait
3. 80-100g/kg alpha-chloralose powder in margarine on bread pieces

The control work and result monitoring targets the dotterel breeding season (September – February) while outcome monitoring occurs during the following flocking season (April 2022). The hand-laid alpha-chloralose operation will be scheduled in XXX to target peak nesting.

Justification for proposed methods (*AEE extract*)

A range of control tools targeting several predators are required given that we don't have a robust understanding of which predators are driving the SNZD population decline and to what extent.

The previous iteration of feral cat control consistently used the same toxin type in the same locations (few minor changes in rat toxin in the last two years) for 26 years which has potentially led to the creation of a toxin-shy population.

The revised proposed methods aim introduce new control tools which establish control variability which is widely accepted as desirable in long-term pest control operations where selection and learned behaviour are considered risks of prolonged exposure to any one method.

The introduction of kill & live trapping and night shooting for feral cats will increase the likelihood of killing cats which are toxin shy.

The on-going use of 1080 fishmeal polymer baits was considered desirable given the efficacy noted in the past. In combination with a range of other methods, cat control efficacy is maximised.

Alpha-chloralose is the preferred method for southern black-backed gull control as we can't risk creating a gun-shy population which could relocate to a more logistically challenging location for control. A well delivered alpha-chloralose operation should eliminate almost all individuals during peak nesting, heavily reducing the breeding population both now and in future years.

15. Method(s)

Bait stations

0.1% 1080 in fishmeal polymer baits will be applied to "Stewart Island bait stations for feral cats" which are modified 4L plastic pails raised approximately 200mm on ground pegs. These are arranged in a cordon around key breeding areas and spaced between 50 – 70 metres along that line. The cordon follows the scrub edge and encircles the open alpine zone around known breeding hotspots. The Tin Range cordon is buffered by a larger grid of bait stations on 1000km x 200m spacings. Existing bait will be removed and replaced with new bait on each baiting round.

0.02g/kg brodifacoum rodent blocks will be applied to nova-coil style bait stations which are RP65 smooth bore plastic downpipe, 500mm in length, pegged to the ground near a feral cat bait station. The primary purpose of baiting these stations is to prevent 1080 bait interference and so we plan on placing these rodent stations close to the feral cat bait station. Existing bait will be removed and replaced with new bait on each baiting round.

Hand-laid bait

80-100g/kg alpha-chloralose powder mixed with margarine and applied to bread slices will be hand laid throughout the southern black-backed gull nesting colony near Hill 511 during their peak breeding season at a rate of 1kg/ha. This will follow 3 to 5 applications of non-toxic pre-feed of margarine spread on bread slices. Toxin application will only follow once pre-feeding success has been established (ie – no left over/uneaten pre-feed after application).

Kill trapping

50 x double-set Belisle Super X220 kill traps in chimney/submarine boxes will be placed near key breeding areas on the Tin Range, targeting areas of known feral cat presence and traditional patrol routes. These sets will also be placed on access tracks to Mount Rakeahua, Rocky Mountain and Hill 511 which are known to be frequented by feral cats moving to those breeding areas. Kill traps will be baited using salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Kill trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29437)

Live capture trapping

Hav-a-hart cage traps will be deployed on bait station lines, access tracks and areas of known feral cat presence and traditional patrol routes and checked daily. These traps will be baited with salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Cage trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29441).

Victor 1.5 soft catch traps will be used in hazed ground-sets and raised on up-turned barrels to create a platform that feral cats will jump onto to reach the bait/lure. Trap locations will vary and target linear landscape features, areas of known feral cat presence including traditional patrol routes, access tracks and areas including a high number of dotterel nests. Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Leg hold trapping for feral cat control" (DOCDM-29439).

Ground hunting

White-tailed deer will be shot on sight as practical using a .303 or greater calibre rifle. White-tailed deer hunting will follow the "Ground shooting of deer – best practice for human pest animal control" standards (DOCDM-642613).

Spur-winged plover will be shot on sight as practical using a .220 or greater calibre rifle.

Australasian harrier will be shot on sight as practical using a shotgun.

Thermal scope and spotlights will be used in combination during night hunting work in strictly defined boundaries in key breeding habitat. This will primarily target feral cat nocturnal activity but opportunities to remove white-tailed deer and possums will be taken advantage of using this methodology. This work is subject to approval from the Operations Manager and has stringent health and safety procedures to further mitigate any risks on top of the existing New Zealand Firearms Safety Code.

The Managerial authorisation prescribes set personnel of proven hunting experience, set locations as identified on the map used in public consultation, specifies the locations of warning signage and best practice standards required, safety briefing procedures and a 16 hour minimum notification of intended operation to allow contact with stakeholders and transport operators to identify any people in the area. A secondary verbal approval is then required before commencement and this will only be issued if there's a high degree of confidence that no people are in the shooting area. An example of the approval and conditions is available on DOC-6048511. A similar approval will be sought for the 2021/2022 season.

Predator control schedule

Month	Control methods	Frequency	Other actions
August 2021	Kill trapping Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 7 x person-nights shooting 20 x person-trap-night rechecks	Field operations set up Bivvy supply runs Warning signage checks
September 2021 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
October 2021 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
November 2021 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	
November 2021 Hill 511 SBB gull colony	Alpha-chloralose (PU17)	3 to 5 x non-toxic pre-feed 1 x toxic hand lay at 1kg/ha	
December 2021 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	2 x rebait/reset 100 kill traps 2 x 468 bait station fill 2+ x 468 bait station fill 7 x person-nights shooting 20 x person-trap-night rechecks	

January 2022 All treatment blocks	Kill trapping 1080 toxin (PU38) Brodifacoum (PU57) Ground-shooting Leghold trapping Cage trapping	1 x rebait/reset 100 kill traps 1 x 468 bait station fill 1+ x 468 bait station fill 4 x person-nights shooting 10 x person-trap-night rechecks	Demobilisation Close traps Remove all toxin

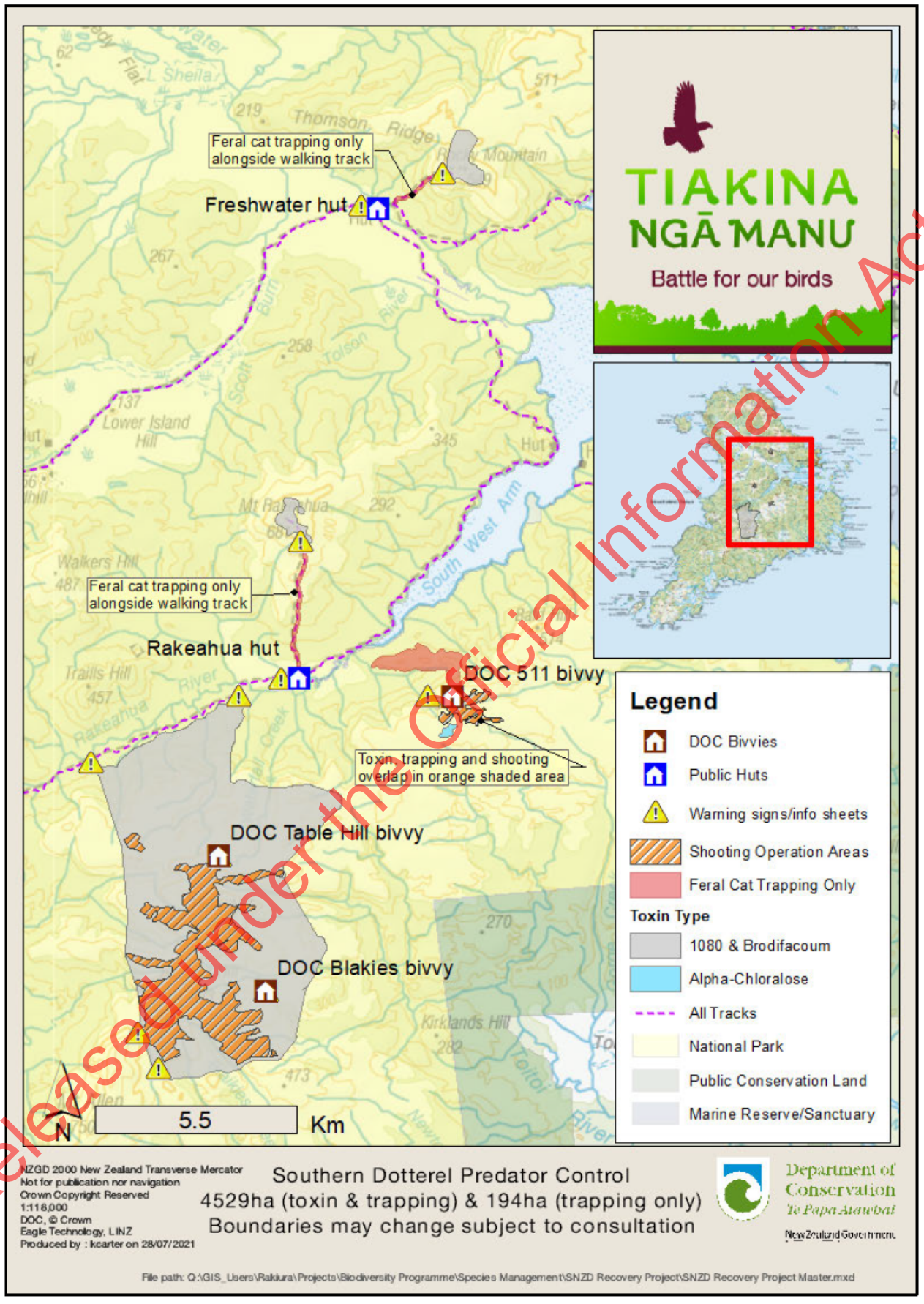
16. Block and treatment area boundaries

The Treatment Area is entirely contained within the Rakiura National Park and so there are no boundaries with other landowners/occupiers. The treatment blocks are separated into two four-part multi shape polygons in the Pesticides App; one for 1080 and the other for brodifacoum. There is an additional treatment block south of Hill 511 for the alpha-chloralose operation. We've elected to combine the treatment blocks into one multi-shape feature to reduce the high level of duplication during Pestlink reporting given the high number of target species and various methods at each site.

The north-eastern corner boundary of the Tin Range polygon was determined by avoiding an overlap with a bookable hunting block. The treatment boundaries on Hill 511, Rocky Mountain and Mount Rakeahua are defined by the sub-alpine scrub boundary with the open tops.

Kill trapping (Belisle Super X220 double set traps in chimney box) is planned to overlap with the public tracks going up Mount Rakeahua and Rocky Mountain (see map below).

All GIS data is stored on the following Q Drive folder: Q:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Species Management\SNZD Recovery Project

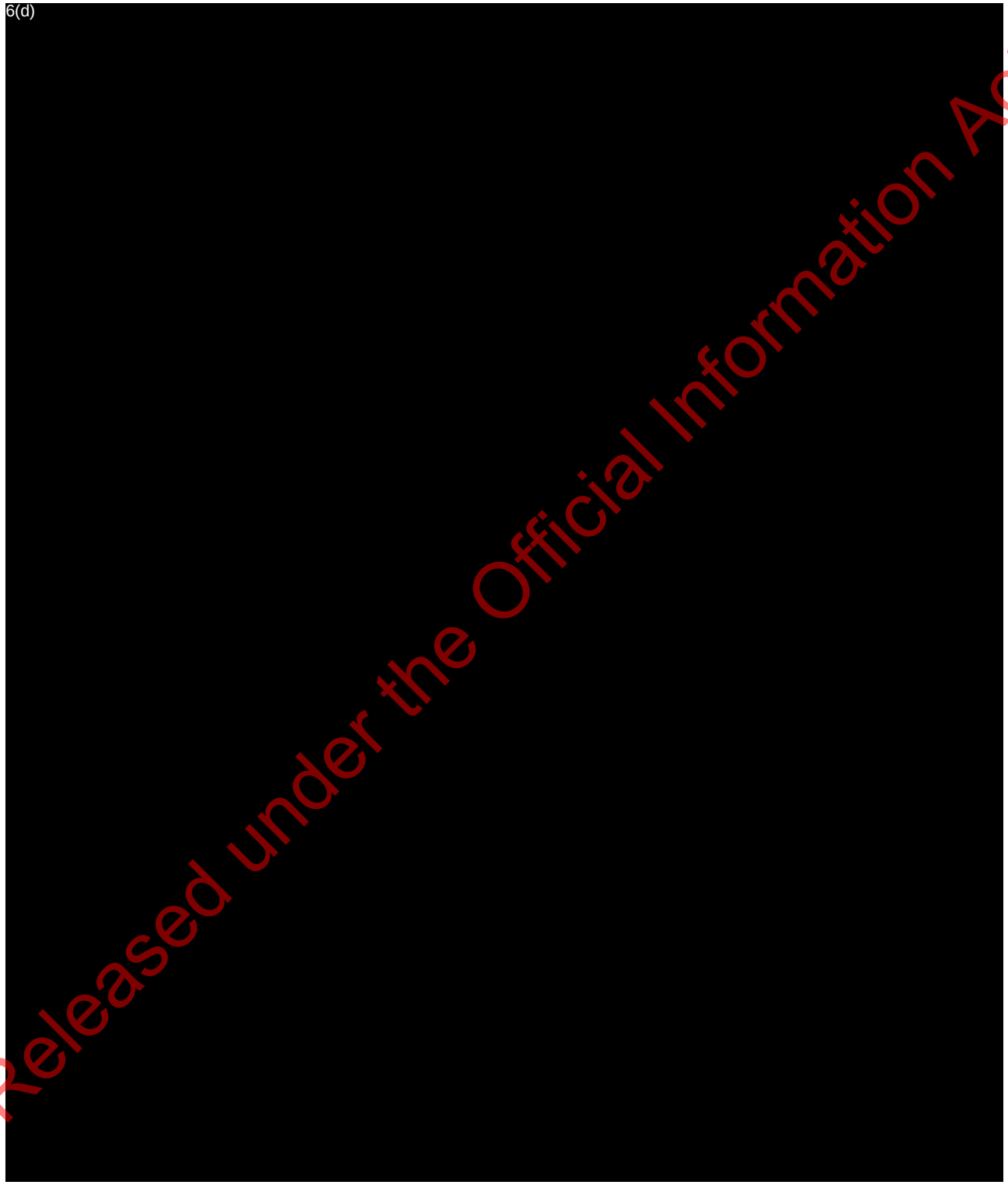


17. Loading sites & other set up

There is no loading site required as this is a ground-based operation.

18. Security

6(d)



6(d)

19. Public safety

The general public, identified stakeholders, interest groups and Treaty Partners have been consulted with regarding this operation using a variety of mechanisms including e-mails, phone calls, posters, mail box drops, face to face meetings and newspaper publications. Maps and key information regarding the operation have been provided. Please refer to the Communications Plan and communications register for more detail on DOC-6689454.

Warning signage is in place at all likely points of entry to the operational area. Records of these are available on the DOC GIS Pesticide App and in the following folder: S:\Biodiversity\Assets\Dotterels\2021-22\Warning signs

The majority of the bait stations will not be visible from walking tracks, however, any bait station along a walking track will have a small class 6 white diamond skull and crossbones sticker attached.

Kill traps will be present along the walking tracks up Mount Rakeahua and Rocky Mountain in chimney/submarine trap boxes. These boxes will be labelled with the text “Danger – Do Not Touch” and a logo of a hand with a circle and slash through it to depict that it should not be touched.

Information sheets will be made available at the Rakeahua and Freshwater public huts to describe the work being done and the safety precautions that visitors should adhere to.

20. Bait, storage and transport

20 x 10kg plastic buckets with sealed lids containing both 0.1% 1080 fishmeal pellets, 1 x 2kg pack of 80-100g/kg alpha-chloralose and 20 x 10kg plastic buckets with sealed lids containing 0.02g/kg brodifacoum rodent blocks will be transported from 6(d), 9(2)(g)(ii) [redacted] in Bluff using 6(d), 9(2)(g)(ii) [redacted] will transfer the toxin to Rakiura main wharf using 6(d), 9(2)(g)(ii) [redacted] will then transfer the consignment to the Rakiura Pesticide Store where it will be signed in on the relevant HSNO tracking sheets.

The toxin will be transferred from the Rakiura Pesticide Store to locked metal bins (secondary containment) for field storage during the breeding season and then driven to 6(d), 9(2)(g)(ii) [redacted] using a flat-bed truck with a loader crane or multiple trips using a DOC vehicle.

The bins will be flown as internal and underslung loads from 6(d), 9(2)(g)(ii) [redacted] to the following locations:

Flight 1

6(d), 9(2)(g)(ii) [redacted]

Flight 2

6(d), 9(2)(g)(ii) [redacted]

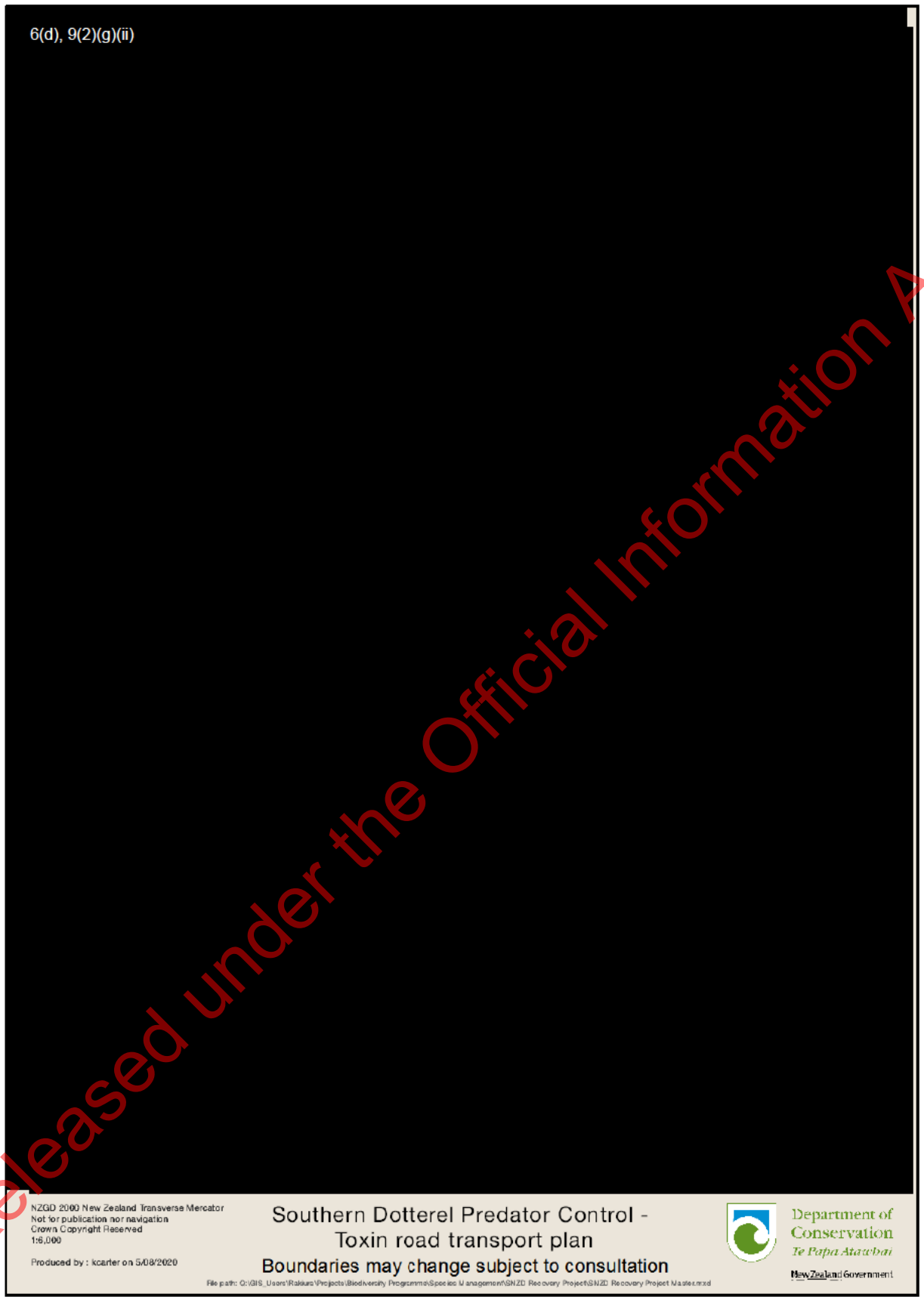
All bins will display the product labels, a class 6 toxic white diamond warning sticker and an orange and black striped dangerous goods sticker (see example photo). This will ensure that all toxin field storage will be within the operational area which includes warning signage at key entry points.

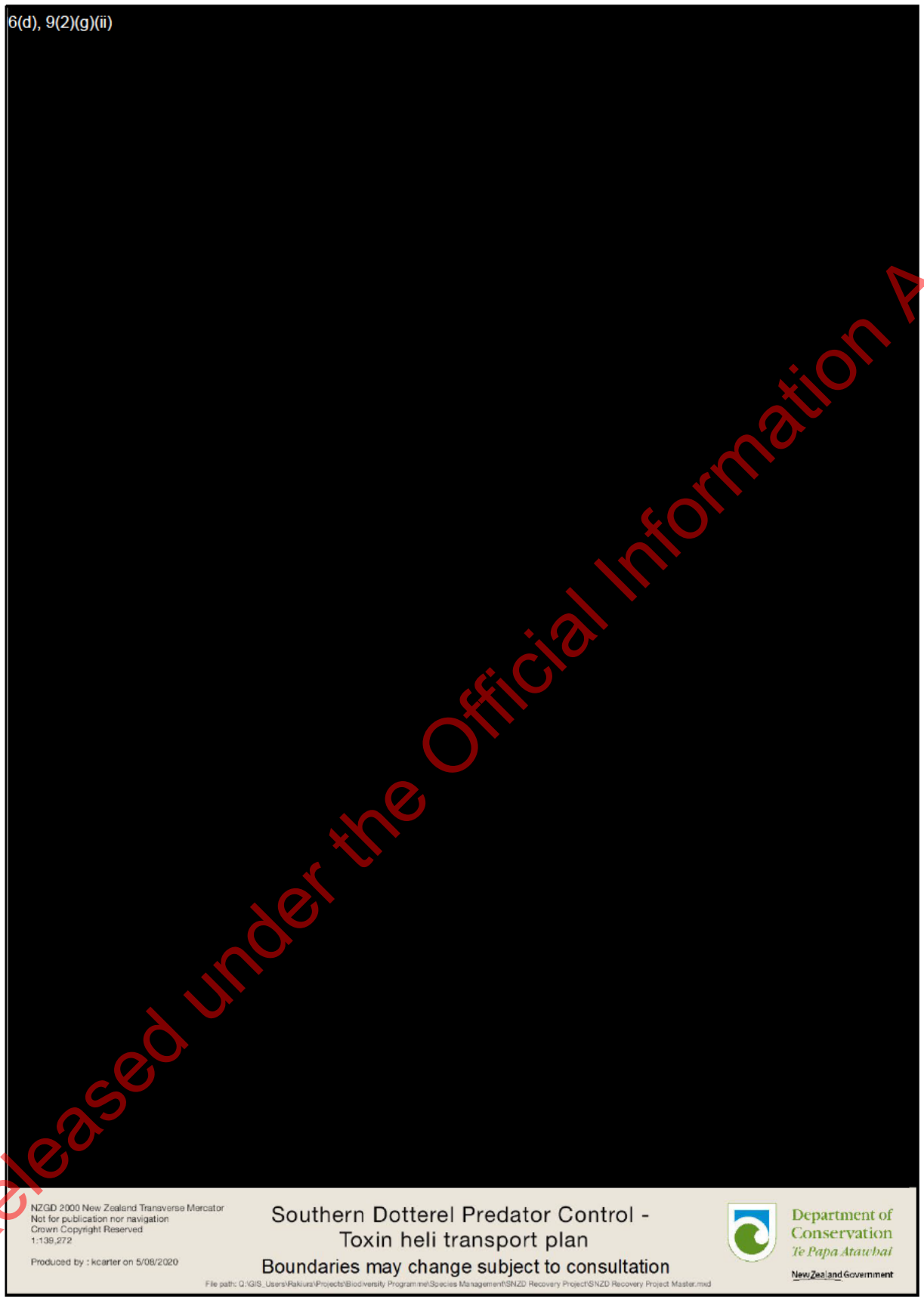
Any toxin removed from bait stations during the operational period will be returned to the nearest metal bin and secured with two security key padlocks. At the end of the season all bins will be returned to 6(d), 9(2)(g)(ii) [redacted] using internal and underslung loads. These will be transported using the flat-deck truck with loader crane and returned to the Rakiura Pesticide Store where it will be signed in on the relevant HSNO tracking sheets and stored until disposal has been arranged.

A transport safety plan with full details is available on DOC-6689478.

The Rakiura Pesticide Store has been granted a location test certificate available on DOC-6440614.

Secure field storage for toxin.





21. Incidents and emergencies

A safety plan has been prepared using Risk Manager which covers the normal emergency procedures. Pesticide related incidents will be managed using the relevant Safe Handling Sheet from the Safe Handling of Pesticides SOP.

Transport emergencies are covered by the toxin transport safety plan on DOC-6689478.

Emergencies at the Rakiura Office work site will be managed using the relevant sections of the office location emergency response plan.

A spill response emergency drill will be run at random during the induction period of new staff and include existing staff. This will be scheduled after a programme briefing scheduled in early-August which will cover emergency response procedures.

22. Decision making on the day of bait application

Not applicable for this operation.

23. Demobilisation

Field operations will begin demobilisation in the week starting 17 January 2022. All remaining toxin will be retrieved from bait stations and returned to the metal bins/field storage ready for transport back to the Fern Gully hangar as per the toxin transport safety plan on DOC-6689478.

All kill traps will be unset and live capture traps removed from the field for storage and maintenance back at the Rakiura Office.

Bait stations and kill traps will be left on site for future operations.

Warning signage will be checked prior to departure from the field.

Bait and carcass monitoring will be initiated if required by the DOC/EPA permission.

Rubbish and any remaining food will be packaged for removal via helicopter.

Public Health South will be notified that the toxin operation has been completed.

Section C Project Task List

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Preparing Phase already completed in previous years – this is an annualised programme.					
Planning	July 2021	Ensure Rakiura Pesticide Store has current location test certificate	9(2)(g)(ii)	NA	Complete
	July 2021	Consultation on effects initiated	9(2)(g)(ii)	NA	Complete
	July 2021	Consent applications lodged	9(2)(g)(ii)	NA	Complete
Pre-Operational	July 2021	Confirm Operational Plan	9(2)(g)(ii)	NA	Complete
	9 – 20 August 2021	Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated	9(2)(g)(ii) [redacted]	NA	Upcoming
	2 August 2021	Stakeholder, Partner notification	9(2)(g)(ii)	NA	Upcoming
	9 August 2021	24-hour notice (if required)	9(2)(g)(ii)	NA	Upcoming
Operational	9 August 2021	Field logistics set up • Bivvy supply runs • Toxin transferred to field storage • Warning signage confirmed	9(2)(g)(ii) [redacted]		Upcoming

APF phase	Target date	Task	Delegated to	Task Assignment	Status
		• Complete rodent bait station deployment • Complete feral cat bait station maintenance • Complete kill trap deployment Initiation of ground control • 1080 and brodifacoum deployed in bait stations • Kill traps activated • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Live capture traps activated Initiation of dotterel monitoring • Determine presence/absence of adults • Determine pre-breeding/breeding behaviour • Record and monitor any early nesting attempts	9(2)(g)(ii) [redacted] 9(2)(g)(ii) [redacted]	DOC-6399490 DOC-6390934 DOC-6399490 DOC-6390934	
	September 2021	Continuation of ground-control • Reapply 1080 treatment to bait station network every week on Hill 511, Rocky Mountain and Mount Rakeahua.	9(2)(g)(ii) [redacted]	DOC-6399490 DOC-6390934	

APF phase	Target date	Task	Delegated to	Task Assignment	Status
	October 2021	• Reapply 1080 treatment to bait station network every two weeks on Tin Range • Apply brodifacoum to rodent bait stations at a rate determined by bait take so that palatable blocks are always present • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Check and rebait kill traps weekly on Hill 511, Rocky Mountain (including access track) and Mount Rakeahua (including access track) • Check and rebait kill traps every two weeks on the Tin Range • Undertake live capture trapping on weekly on the Tin Range	9(2)(g)(ii)	DOC-6399490 DOC-6390934	
	November 2021		9(2)(g)(ii)	DOC-6399490 DOC-6390934	
	December 2021		9(2)(g)(ii)	DOC-6399490 DOC-6390934	
	January 2022	Continuation of dotterel monitoring • Grid search for nests weekly in all breeding areas • Record all banded bird re-sightings and pairing information • Place nest cameras on all nests • Review nest camera data to determine nest fate and hatching rate Pest monitoring • Record all target pest sightings • Place unused cameras on bait stations and traps to determine interaction rates • Collect feral cat genetic sample material	9(2)(g)(ii)	DOC-6399490 DOC-6390934	

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Post Operational	February 2022	Field season shut down Secure bivvies for winter period Remove toxin from field Complete data reporting and camera footage analysis Deploy bait and carcass monitoring End of field season debrief Initiate bird banding at flocking sites	9(2)(g)(ii)		
	April 2022	Outcome monitoring (flock counts) Bird banding continues	9(2)(g)(ii)	DOC-6629896	
	May 2022	Toxin disposal Review Operational Plan Bird banding finalised and report delivered Technical Advisory Group meeting	9(2)(g)(ii)	NA	
Reporting	June 2022	Toxin purchase PestLink reporting Annual reporting	9(2)(g)(ii)	NA	

Section D Task specifications

Task assignments have been issued instead of “task specifications” as the template is better suited to rangers undertaking multiple tasks over a longer timeframe (eg: multiple 10-day trips).

Task Assignments are kept in the following register – DOC-6665753

Department of Conservation
Te Papa Atawhai

Predator Control Operational Plan
Southern NZ Dotterel breeding habitat, Rakiura
2022-2023

Version History

Version	Reason for change	Date
13	Significant edits made to update operational plan to reflect a year round operation. Removal of 1080 and brodifacoum control methods, additional trapping and ground hunting methods added. Final edits.	19/10/22
12	Initial redrafting based on funding level change to permanent baseline. Refocus onto year-round feral cat suppression rather than interception during breeding season only.	12/07/22
11	Updated timings and references for 21/22 season. Added in southern black-backed gull control part of operation. Note Biodiversity Supervisor role still vacant at time of writing.	14/06/21
10	Updated CIMS chart with new staff. Linked in task assignment register to replace task specs section. Updated details around DOC permission assessment	01/09/20
9	Completed new sections required by updated template. Updated timings to reflect recruitment delays.	05/08/20
8	Brought information into new template and updated timings and references for 20/21 FY.	05/06/20
7	Updated acknowledgements, predator control history and 18/19 nest monitoring outcomes.	12/08/19
6	Updated maps and confirmed field season staff capacity for various tasks.	01/08/19
5	Updated timings and references for 19/20 season.	08/07/19
4	Made suggested amendments from peer review feedback. Updated delivery timeframes due to recruitment delays.	10/08/18
3	Added further relevant documents. Updated maps. Removed references to “core breeding areas” as no longer definitive term with expansion. Added nesting summary table.	20/06/18
2	Linking updated related documents. Removed PAPP references, amended annual timeframes. Included new barrel-set traps. Removed references to contingency ground-set leghold trapping, now a core proactive method (9(2)(g)(ii) Tech Advice).	12/06/18
1	Initial amendments to previous 17/18 operational plan	08/05/18

Contents

Section A Project management

1. Project scope

In scope

- Multi species target predator control programme with a primary focus on feral cats and Southern black-backed gulls and a secondary focus on spur-winged plover, Australasian harriers and white-tailed deer covering a 4-part area of key SNZD breeding habitat and surrounding buffer control including:
    1. Tin Range (2889ha)
    2. Hill 511 (624ha)
    3. Rakeahua (1572ha)
    4. Rocky Mountain (880ha)
    5. Southern 511 (10ha) – southern black-backed gull colony

- Predator reduction achieved through a combination of alpha-chloralose, kill and live trapping and ground hunting.

- October/November 2022 ongoing

Out of scope

- Multi-purpose monitoring programme including adult colour banding, nest fate monitoring, disease screening, genetic sampling and annual flock counts.
- Long term species recovery planning/strategy

2. Summary table of key documents

Document	Reference	Purpose
Project home page	DOCDM-1117452	A quick reference collation of documents created for or relevant to this project
Communication plan	DOC-7131311	Plan covering the consultation and notification of stakeholders and visitors about the operation which also serves as a record of those consulted and/or notified.
Compliance register	DOC-7154968	Register of conditions and performance standards to be met by the project;

3. Objectives and targets

Long-term conservation goal

Increase current population growth of the southern New Zealand dotterel (SNZD) to achieve increased security against extinction with a population size of at least 300 individuals by 2035.

Outcome target

2023 flock count indicates that the SNZD population size is of 157 birds or greater (the average annual increase required over thirteen years to achieve the long-term goal).

Result targets

Feral cats

- Feral cat captures decline to 1 cat per 1000 trap nights for traps set in SNZD breeding habitat.

Southern black-backed gull

- 100% kill of all resident nesting gulls and their eggs

Spur-winged plover

- Resident spur-winged plover are removed from the management area so that no further sightings are made for the remainder of the breeding season.

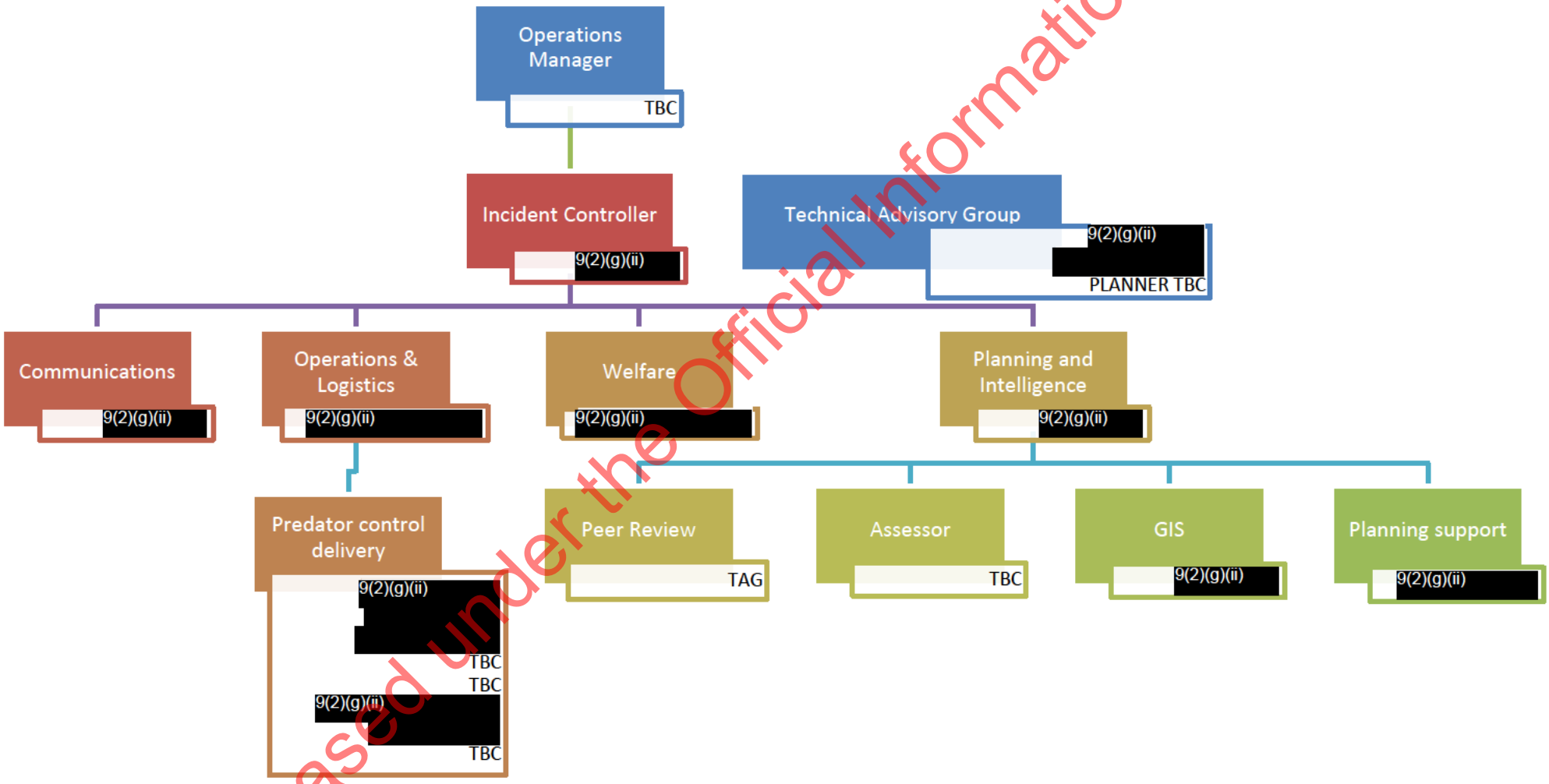
White-tailed deer

- White-tailed deer encounters decline to 1 sighting per 10 field days in the Northern Tin Range and Hill 511 dotterel breeding habitat.

Australasian harrier

- Australasian harrier are removed from the management area so that no further sighting are made for the remainder of the breeding season.

4. Project team



Key Roles and Responsibilities

Title	Role	Responsibilities
Incident Controller 9(2)(g)(ii)	Take charge and lead the project	Ensure Task Assignment is fulfilled as agreed to deliver project outcomes. Liaise with Technical Advisory Group to help guide planning and delivery. Be accountable to the Operations Manager for delivery to standard.
Planning 9(2)(g)(ii)	Ensure project is planned to DOC SOP standards	Plans, manages and reports on operation using Operational Planning for Pest Operations SOP docdm-1488532.
Communications 9(2)(g)(ii)	Supervise consultation and notification to DOC SOP standards	Plans, manages and records all consultation and notification tasks identified in the project communication plan.
Operations 9(2)(g)(ii)	Supervise implementation	Manage tasks identified, specified and delegated in operational plan.
Logistics 9(2)(g)(ii)	Provide logistical supplies requested.	Manage logistical tasks identified, specified and delegated in operational plan
GIS 9(2)(g)(ii)	Provide mapping services to support the planning and delivery of the project	GIS mapping required during planning and implementation. Support and mentoring for correct use of Pesticides App.
Peer Reviewer **TBC**	To support the operational planner with independent comments and questions early in the process, when there is still flexibility for significant changes if necessary.	Provides a written independent review of the operational plan in Planning phase Step 3 before consents are obtained.
Readiness checker **TBC**	To independently review all planning to assess readiness for the Operational phase.	Reviews the operational plan and associated documents in Pre-Operational phase Step 7 in order to identify non-compliance, gaps and risks. Works with the operational planner to develop a plan to remedy the priority issues before the operation goes ahead.

Title	Role	Responsibilities
Assessor TBC	To support the DOC consent provider through meeting the requirements of the Assessing applications for DOC consent SOP	Reviews the application against SOP standards and prepares a recommendation for consent provider.
Planning support 9(2)(g)(ii) [redacted]	Support Planning and Intelligence lead	Consider information gathered from monitoring and fieldwork activities and relay to Planning Lead.
Predator control delivery 9(2)(g)(ii) [redacted] TBC TBC TBC	Implement predator control activities	Complete task assignments. Report back to Operations lead on any issues arising. Provide suggestions to Operations lead for improvements in field delivery and operation as a whole.
Welfare 9(2)(g)(ii) [redacted]	Ensure processes and systems are in place to monitor and implement health, safety and wellbeing of team.	Monitor operations to ensure standard health and safety protocols are implemented. Capture and report incidents in Risk Manager. Share relevant lessons with wider team to ensure shared learning. Demand a immediate cessation of operations if dangerous practices or unmanaged risks noted until suitably dealt with.

5. Contracts

Helicopter contractors will be engaged as the primary method of field transport. Services will be secured through DOC's revised Heli Order process selecting operators from the national supplier panel. As this is a logistics contract, it will be supervised by the Operations/Logistics Lead (9(2)(g)(ii) [redacted]).

Water taxi suppliers may also be engaged as a back-up contingency when constraints prevent use of DOC dinghies. No formal contract is in place with these service suppliers.

6. Consents required

1. Landowner or occupier consent (The operation is contained within the Rakiura National Park)	Not required
2. Resource consent	Not required (DOC-2837856)
3. Public health permission (Public Health South)	☐ **No (PHP not required for alpha-chloralose**
4. DOC permission (Provider: TBC – Acting Operations Manager, Rakiura) (Assessor: SSI Pesticide Permissions process)	☒ **Yes (operation involves traps and pesticides that require permission)**
5. EPA permission	Not required

7. Consultation

This is an ongoing annual predator control programme and so local residents, iwi and key stakeholders are well acquainted with the nature of this work. This is an adaptive programme, however, and so we treat each year as an independent operation. We go through standard consultation processes accordingly.

The main drive of the consultation plan is listed in the Communications Plan (DOC-7131311). This document also contains a running communications log which contains data from previous years as well, reflective of the on-going, annual nature of the recovery programme.

Iwi

Treaty Partners are prioritised for consultation and so we aim to initiate refreshed discussion with each of the four local rūnaka before approaching other stakeholders on an annual basis. This ensures that we have a "no surprises" approach to Treaty Partner engagement. Kāi Tahu look to papatipu runaka to engage with the department on pest control matters and this is formally done through the Kaitaiki Rōpu ki Murihiku framework. A presentation regarding the mid to long-term future of the recovery programme was offered to a Kaitiaki Rōpu in November 2019. Iwi remained supportive of the programme and indicated support for a move to increasing control to landscape scales. Further to this, we have directly contacted the four local papatipu runaka annually, most recently in September 2022.

Adjoining landowners/occupiers

Not required as the operation is completely within the Rakiura National Park.

Key stakeholder groups

The following groups have been identified for proactive consultation as per the Communications Plan:

- New Zealand Deerstalkers Association – Southland Branch
- New Zealand Deerstalkers Association – National Office
- Predator Free Rakiura
- Ornithological Society of New Zealand/Birds NZ – Southland Branch
- Southland Conservation Board
- Rakiura residents
- Stewart Island District Nurse
- NZ Police – Oban
- Halfmoon Bay School

The records of this consultation are recorded in the communications plan (DOC-7131311).

8. Monitoring

Non target impacts

Non-target captures in all traps (kill and live-capture) will be recorded in Trap NZ and reported through to our Technical Advisory Group and form part of the annual report and Pestlink report.

Southern black-backed gulls

Active monitoring of the southern black-backed gull alpha-chloralose operation will take place during the delivery to ascertain effectiveness against the result target set. This will also allow us to monitor non-target bait uptake and provide rangers on the ground an opportunity to attempt revival.

Feral cats

Feral cat density won't be monitored independently, however, we will be able to estimate trends over time through trap catch data. This will be broken down by trap type and configuration and expressed as catches per active trap night.

White-tailed deer, spur-winged plover and Australasian harrier

Presence/absence will be estimated by recording all sightings of these species in the operational area. White-tailed deer sightings will allow us to assess our result target performance.

9. Timeline and Milestones

Note that the 2022/23 timeline will differ to the ongoing cycle as this is our set up year following the programme revision and changes in budget. The delays this year reflect funding certainty challenges and significant increases in the administration and approval work required for recruitment. Accordingly, two timelines are presented here.

2022/23 season

July 2022	Initial operational scoping to reflect new programme priorities • Year-round cat control • Cessation of 1080 and brodifacoum control • Refocus onto live capture trapping in preferred feral cat habitat • Remove nest monitoring work • Appoint permanent staff Set up data management system (Trap NZ) Baseline servicing of existing kill traps on Tin Range, Hill 511, Rocky Mountain and Mount Rakeahua Scope new bivvy/camp requirements
August 2022	Detailed operational planning Redrafting operational plan document SNZD TAG advice on approach for feral cats Planning consultation Staff recruitment Baseline servicing of existing kill traps on Tin Range, Hill 511, Rocky Mountain and Mount Rakeahua
September 2022	Initiate consultation on effects Finalise operational plan Iwi, stakeholder and community notification step Baseline servicing of existing kill traps on Tin Range, Hill 511, Rocky Mountain and Mount Rakeahua Field recce new trap line tracks
October November 2022	24-hour notice (if required) Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated • Firearms competency sign offs Field logistics set up • Bivvy supply runs • Set up Moonlight and Tolson camps • Complete kill trap deployment • Complete live capture trap deployment Initiation of additional ground control • Kill traps activated • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Live capture traps activated

November 2022	Continuation of ground-control and pest monitoring as per normal cycle Undertake Hill 511 Southern black-backed gull control operation (one-off)
December 2022	Continuation of ground control and pest monitoring as per normal cycle Holiday break period
January 2023	Continuation of ground control and pest monitoring as per normal cycle
February 2023	Continuation of ground control and pest monitoring as per normal cycle Breeding season debrief
March 2023	Continuation of ground control and pest monitoring as per normal cycle Initiate bird banding at flocking sites
April 2023	Continuation of ground control and pest monitoring as per normal cycle Outcome monitoring (flock counts) Bird banding continues
May 2023	Continuation of ground control and pest monitoring as per normal cycle Toxin disposal (if required – alpha-chloralose) Technical Advisory Group annual meeting Review Operational Plan Bird banding finalised and report delivered
June 2023	Continuation of ground control and pest monitoring as per normal cycle Adjust operational plan if required PestLink reporting Annual reporting Annual team operational meeting to review year

Annual schedule - ongoing

July	Continuation of ground control and pest monitoring as per normal cycle Team briefing on revised operational plan (if required)
August	Continuation of ground control and pest monitoring as per normal cycle
September	Continuation of ground control and pest monitoring as per normal cycle
October	Continuation of ground control and pest monitoring as per normal cycle
November	Continuation of ground control and pest monitoring as per normal cycle
December	Continuation of ground control and pest monitoring as per normal cycle Holiday break period
January	Continuation of ground control and pest monitoring as per normal cycle
February	Continuation of ground control and pest monitoring as per normal cycle Breeding season debrief
March	Continuation of ground control and pest monitoring as per normal cycle Initiate bird banding at flocking sites
April	Continuation of ground control and pest monitoring as per normal cycle Outcome monitoring (flock counts) Bird banding continues
May	Continuation of ground control and pest monitoring as per normal cycle Toxin disposal (if required – alpha-chloralose) Technical Advisory Group annual meeting Review Operational Plan Bird banding finalised and report delivered
June	Continuation of ground control and pest monitoring as per normal cycle PestLink reporting Annual reporting Annual team operational meeting to review year

Normal work cycle

	Ranger 1 B	Ranger 2 C	Ranger 3 B	Ranger 4 B	Ranger 5 B	
	Every week				Week 1	Week 2
Mon	Rakeahua loop (live capture set)	Office day	Freshwater (live capture set + kill traps)	Hill 511 traverse (live capture set + kill traps)	Tin Range (live and kill trapping, ground hunting)	Rocky Mt summit (live and kill trapping) & Hill 511 (live and kill trapping, ground hunting)
Tue	Rakeahua loop (live capture set)	Rakeahua loop (live capture check/unset)	Freshwater (live capture check/unset)	Hill 511 traverse (live capture check/unset)		
Wed	Rakeahua loop (live capture set)	Rakeahua loop (live capture check/unset)	Moonlight (live capture set + kill traps)	River Loop (live capture set + kill traps)		
Thu	Rakeahua summit (kill traps)	Rakeahua loop (live capture check/unset)	Moonlight (live capture check/unset)	River Loop (live capture check/unset)		
Fri	Pack down/ debrief	Pack down/ debrief	Pack down/ debrief	Pack down/ debrief		

10. Project risks and mitigation

The primary risk in this operation is that the planned activities do not achieve the outcomes sought as the SNZD population is critically endangered and face a high risk of extinction. We aim to mitigate this by investing in a robust outcome monitoring programme that maintains visibility on population trends over time. Bird banding and resightings will help provide data required for more in depth population modelling to provide further assurance (or not) that the project is successfully protecting and facilitating increases in the SNZD population.

The ground-setting of leghold traps targeting feral cats raises the risk of the non-target capture of kiwi. Discussions have been held between local operations staff, technical advisors in the Kiwi Recovery Group (KRG) and DOC's wildlife vet with the aim of understanding how this can be best mitigated and managed. Technical advice informing the SNZD recovery programme has strongly recommended the use of this control method as it's generally accepted to be the most effective method of feral cat control. It's crucial that the best methods possible are employed to provide the SNZD population with the best chance of avoiding extinction. While the KRG recognised the conundrum the local district faces in terms of balancing the risk of trapping vs the risk of inaction, they highlighted that their primary function is to advocate solely for the interests of kiwi and so could not endorse ground-set trapping in any form or context. Operations staff were seeking advice on an acceptable level of kiwi by-catch which would not have a population level effect. This would allow the establishment of a by-catch limit whereby ground-set trapping would cease for the season if reached. The lack of advice has meant that there is currently no identified limit and the local Operations Manager will need to decide when to cease ground-set trapping. The non-target capture of a kiwi would likely pose public perception risk to the programme because kiwi are a valued, iconic species while the endangered southern dotterel is obscured and little known by the general public. Furthermore, current advice from the DOC wildlife vet is to euthanise all kiwi caught in a leghold trap, irrespective of any perceived lack of injury. This is because there may damage done that is not immediately noticeable and would take effect later. Reporting on kiwi euthanasia would result in poor public relations and a loss of project support.

11. Project debrief and reporting

October	NFPL reporting	9(2)(g)(ii)
February	Breeding season debrief	9(2)(g)(ii)
March	NFPL reporting	9(2)(g)(ii)
April	Banding report Annual flock counts	9(2)(g)(ii)
June	NFPL reporting Annual report PestLink reporting Technical Advisory Group meeting Annual project team debrief	9(2)(g)(ii)
Monthly	Financial reporting	9(2)(g)(ii)
Weekly/Fortnightly	Task assignment/trip reporting/debriefing	9(2)(g)(ii)

12. Project Compliance register

Please find the compliance register on DOC-7154968

Section B Operational

13.Site description

Conservation Values

Locations

This operational plan covers four main areas focussing on capturing a large portion of the SNZD breeding habitat and adjacent buffer areas of preferred cat den habitat. These include the northern part of the Tin Range and surrounding forest, Mt Rakeahua and surrounding forested slopes, Rocky Mountain including southern and north-western slopes and Hill 511 including northern slope (Figure 1).

Vegetation

Northern Tin Range

The lower slopes are covered in mixed podocarp forest including kamahi, southern rata, rimu, miro and totara among others.

The upper elevations of the management area is mostly dense montane scrub and shrub-tussock-land with a range of native species values. Alpine ecosystems too harsh for forest are found on the Tin Range. They comprise dense, low and often wind-affected shrublands and herb moors, which have been referred to as 'tundra-like' communities because of their waterlogged nature and often ponded appearance. Herb bogs and cushion-fields are two distinctive expressions of 'tundra-like' communities.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- WL9 (*Oreobolus* cushionfield)
- WL6 (Wire rush, tangle fern, restiad rushland-fernland)
- AL8 (Stewart Island snow tussockland-shrubland)
- BR4 (Bare rock, including sandstone pavements associated with coal measures)

Mt Rakeahua

The summit vegetation class is essentially the same as the Northern Tin Range although the overall aspect of the land differs. Mt Rakeahua is more or less conical rather than flat and there are fewer tarns and minor waterways. The summit is comparatively more boulder strewn than the other management areas.

The lower slopes are covered in mixed podocarp forest including kamahi, southern rata, rimu, miro and totara among others. The southern slopes are wetter and colder and considered less productive overall than the northern facing slopes. The western slopes of Rakiura face into the prevailing winds are likely to be affected by salt, sand and other marine influences more so than the other slopes.

A dense band of sub-alpine scrub separates the forested lower slopes from the open alpine zone.

- CF9 (Kaimahi, Southern rata, podocarp forest)
- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Hill 511

The summit of Hill 511 is vegetatively similar in broad terms to other open alpine hill tops of Rakiura. There are some minor altitudinal changes throughout but the area is essentially flat and generally wet with a series of tarns and waterways. This open area is surrounded by a sub-alpine scrub layer at a lower altitude before reaching forested slopes which extend down to sea level. The main aspect of the forested slope is North-West facing and so is generally considered warm and productive. The areas closet to sea level are moist and can be prone to flooding.

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

Rocky Mountain

Rocky Mountain summit is somewhat similar to the other open hill tops of Rakiura, however the area is more fragmented and interspersed with sub-alpine scrub areas. There are some areas of rock near the summit itself while the rest of the area is roughly flat and therefore can get quite wet following rainfall. There is a band of sub-alpine scrub surrounding these areas and extending downhill before it gives way to forested slopes of mixed podocarp, including southern rata, kamahi, miro and rimu.

- CF13(*Olearia, pseudopanax, dracophyllum* scrub.
- AL8 (Stewart Island snow tussockland-shrubland)

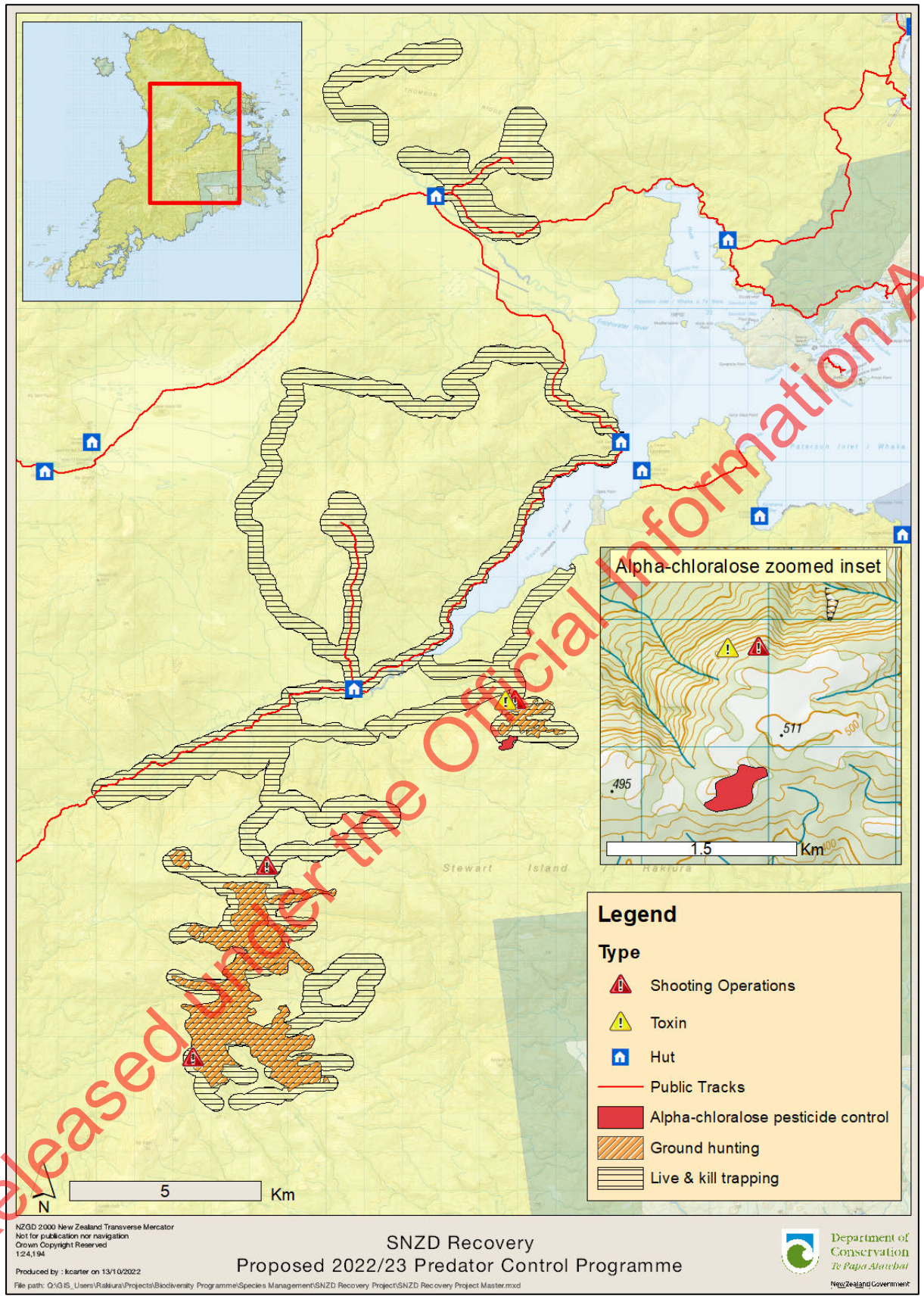


Figure 1. Operational map showing the areas being covered by different control methods.

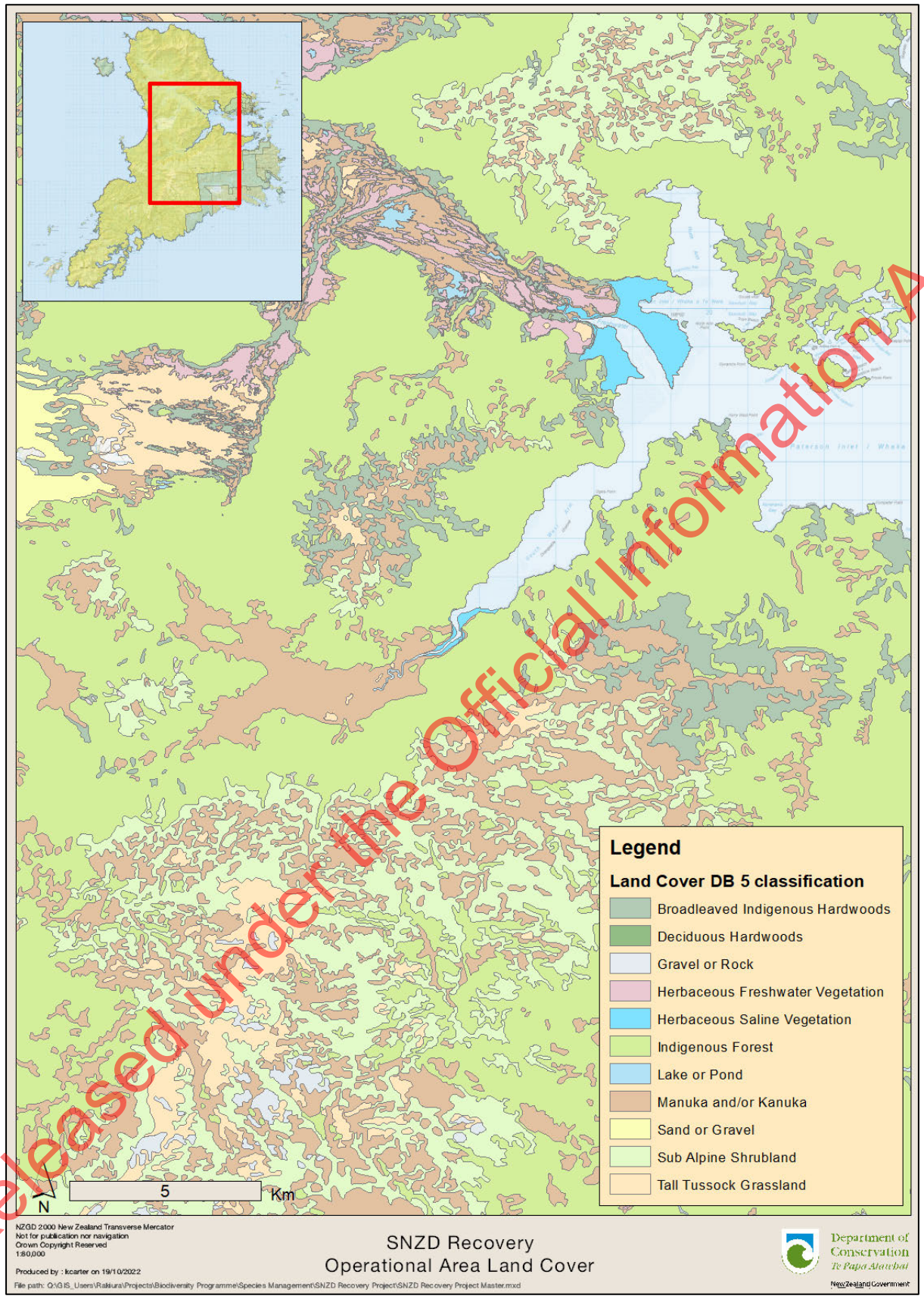


Figure 2. Land cover classes over the operational area.

Fauna values within management area

- Southern New Zealand dotterel – *Nationally Critical*
- Harlequin gecko – *Nationally Vulnerable*
- Stewart Island brown kiwi (tokoeka) – *Nationally Endangered*
- South Island kaka – *Nationally Vulnerable*
- Tin Range chafer beetle – *Naturally Uncommon*
- Small-eared skink – *Naturally Uncommon*
- Stewart Island fernbird – *Declining*

Bioclimatic zone	Sub-alpine
Rainfall	1600 mm
Temperature	Summer average - 16.0C
	Winter average - 8.0C
Snow level	0 m
Altitudinal range	40 - 716 m

Threats

Predators

- KNOWN - Feral cats – estimated density of 0.2/km^2. Sign and footage captured on breeding grounds. Considered major predator threat based on expert advice and previous management.
- POSSIBLE - Possums – very low density (mostly absent) on open tops, greater density in sub-alpine scrub and greater again in mixed podocarp forest. Northern forested slopes have received possum control in 2015/16 with a post RTC of 4.2% (700mm raised sets).
- POSSIBLE - Rats – relative densities likely follow same zonation pattern as possums – no formal monitoring has occurred. Potentially both Norway and Ship rats present, kiore are unlikely to be present.
- KNOWN - White-tailed deer – tend to be moving through the open tops and maintain a greater density in the forested areas. No accurate density data for this area.
- KNOWN - Spur-winged plover – present in low numbers. One to two pairs for each site (464, 511 etc).
- KNOWN - Australasian harriers – occasionally seen in the operation area and footage of SNZD predation events on monitored nests.
- LIKELY – Southern black backed gulls – colony present south of Hill 511.

Disease

Disease screening has been undertaken in the past alongside general health checks during banding work. These checks included blood slides and cloacal swabs to check for infections and parasite loading. While sample sizes were small no major issues were identified.

Periodic health checks of a sample of handled birds will allow us to maintain a degree of surveillance for this possible threat.

Loss of genetic diversity

This is a postulated but unquantified threat. Loss of diversity may have impacts on breeding success and survivorship of individuals. This may be further exacerbated by a possible sex ratio imbalance.

Issues

In the past, some hunters have challenged the validity of white-tailed deer impacts on the southern dotterel. The belief is that the trail camera video captures an isolated event and is not reflective of white-tailed deer generally despite a range of published literature describing their impacts on ground-nesting birds in their native range in North America.

Feral cat control remains essentially limited in spatial and temporal coverage despite a 36% increase in overall funding from previous years. Scoping of a landscape scale aerial pest control operation was completed, however, 1080 label restrictions prevent the use of 0.15% cereal baits for the intentional secondary poisoning of feral cats. Theoretically this would be a very effective method of achieving a high level of knock down over a wide area at relatively low cost. Possum focussed control is unlikely to be prioritised for funding through Tiakina Nga Manu or Core Operations avenues and so we remain limited to localised ground-based feral cat control.

Ongoing funding is likely but not confirmed. Should funding not be reallocated in future years the project would be at significant risk as no other funding options are currently available.

Other management at the site

Some of trapping work will take place in the vicinity of public walking tracks as follows:

- Rocky Mountain summit track
- Mt Rakeahua summit track
- Fred's Camp to Rakeahua hut track
- Rakeahua to Doughboy track

These tracks and associated huts are all classed as backcountry facilities and so only receive minimal management from DOC.

No other management is undertaken in these areas.

14. Control Design

Feral cats and southern black-backed gulls are the primary predator targets. Spur-winged plover, Australasian harrier and white-tailed deer are all considered secondary targets.

Feral cats

A variety of trapping and hunting methods are proposed to reduce overall feral cat numbers in dotterel breeding habitat and adjacent areas of preferred cat habitat. Preference has been given to frequent servicing of live and kill traps of a looser grid to maintain a greater trapping pressure through time. Shorter reservicing intervals have been selected as opposed to device saturation. This means that each trap will need to be set to the highest quality as there is minimal device redundancy per home range. It is believed that doing this year-round will help mitigate the effects of reinvasion which is considered rapid. The overarching goal is to maintain a continual harvest of feral cats to reduce density in the highest risk areas that overlap with southern dotterel breeding habitat while accounting for reinvasion from neighbouring home ranges. This work will be ongoing.

Australasian harrier

Australasian harrier are present in low density in areas overlapping with southern dotterel breeding habitat. Despite this they pose a significant threat due to actively patrolling the skies over dotterel nesting and chick raising areas providing many opportunities for successful predation.

We believe that once these "resident" birds are removed, re-establishment from replacement harrier will be slow, allowing dotterel to hatch their eggs and raise chicks through to fledge.

Raised set live capture trapping, ground set live capture cage traps and ground hunting with shotguns are proposed methods to be deployed in breeding areas on the open tops only.

New individuals appear to re-establish in southern dotterel breeding areas each year and so this work will need to be done each season.

Spur-winged plover

Spur-winged plover generally overlap with southern dotterel breeding habitat and season. The larger plovers are territorial and aggressive, breaking eggs and killing chicks. It has been noted in previous years that killing one of the pair often results in the surviving pair bird leaving the area.

Spur-winged plover are thought to be naïve to ground hunting initially but learn quickly after the first attempted shot. Therefore, it is imperative that shots are only taken when the shooter has high confidence and the chances of success are high.

We anticipate that less than five breeding pairs will require removal. These can be shot with either a shotgun or rifle from a greater distance.

This will occur opportunistically but as soon as possible during the southern dotterel breeding season and be confined to southern dotterel breeding habitat.

New pairs appear to re-establish each year and so this work will need to occur each season.

Southern black-backed gulls

There is a single nesting colony immediately adjacent to the southern dotterel breeding site, Hill 511. Adult gulls are seen patrolling the skies above the southern dotterel nesting areas and so there are many opportunities for successful predation.

Removing the gull breeding adults using alpha-chloralose baits and pricking the remaining eggs will not only eliminate the threat directly but it is believed that gulls will remain absent from this site for many years before possible re-establishment.

White-tailed deer

White-tailed deer are seen occasionally in the southern dotterel breeding habitat. Their presence appears to coincide with the flowering period of alpine plants. They are in low density and likely transitory and so our approach is to maintain minimal pressure through opportunistic hunting. Removal of these few individuals may provide significant protection to nesting dotterel nearby if these deer have a learned behaviour of eating eggs and/or if the innate behaviour of any white-tail includes a strong instinct of ground nest predation.

15. Method(s)

Kill trapping for feral cats

125 x double-set Belisle Super X220 kill traps in chimney/submarine boxes and 50 x Steve Allan Kat Trap 2 on running boards will be placed near key breeding areas, targeting areas of known feral cat presence and traditional patrol routes. These sets will also be placed on access tracks to Mount Rakeahua, Rocky Mountain and Hill 511 which are known to be frequented by feral cats moving to those breeding areas. Kill traps will be baited using salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Kill trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29437). Kill traps will be rechecked on a fortnightly cycle.

Live capture trapping for feral cats

Hav-a-hart cage traps will be deployed on trap lines, access tracks and areas of known feral cat presence and traditional patrol routes and checked daily. These traps will be baited with salted rabbit meat, tinned cat food or other meat/fish available (eg: possum). Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Cage trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29441).

Victor 1.5 soft catch traps will be used in hazed ground-sets, raised with running boards and on up-turned barrels to create a platform that feral cats will jump onto to reach the bait/lure. Trap locations will vary and target linear landscape features such as contours, areas of known feral cat presence including traditional patrol routes, access tracks and areas including a high number of dotterel nests. Trapping will conform to the standards laid out in the Currently Agreed Best Practice "Leg hold trapping for feral cat control" (DOCDM-29439).

Live Capture trapping for Australasian harrier

Australasian harrier will be targeted using Victor 1.5 soft catch traps raised on platforms at least 1m in height and calibrated to a heavier trigger weight (500g) to exclude non target capture (SNZD mean weight is approx. 160g). Active traps will be monitored daily and caught individuals euthanised by either a sharp blow to the head or being shot with a firearm.

Live capture cage traps will also be used as these have been noted to catch Australasian harrier in other projects. Baiting and rechecking will by synergistic with feral cat cage trapping as meat and visual lures are likely effective for both targets.

Ground hunting

White-tailed deer will be shot on sight as practical using a .223 or greater calibre rifle. White-tailed deer hunting will follow the "Ground shooting of deer – best practice for human pest animal control" standards (DOCDM-642613).

Spur-winged plover will be shot on sight as practical using a .22 or greater calibre rifle. Australasian harrier will be shot on sight as practical using a shotgun.

Thermal scope and spotlights will be used in combination during night hunting work in strictly defined boundaries in key breeding habitat. This will primarily target feral cat nocturnal activity but opportunities to remove white-tailed deer, spur-winged plover and possums will be taken advantage of using this methodology. This work is subject to approval from the Operations Manager and has stringent health and safety procedures to further mitigate any risks on top of the existing New Zealand Firearms Safety Code.

The Managerial authorisation prescribes set personnel of proven hunting experience, set locations as identified on the map used in public consultation, specifies the locations of warning signage and best practice standards required, safety briefing procedures and a 16 hour minimum notification of intended operation to allow contact with stakeholders and transport operators to identify any people in the area. A secondary verbal approval is then required before commencement and this will only be issued if there's a high degree of confidence that no people are in the shooting area.

An example of the approval and conditions is available on DOC-6048511. A similar approval will be sought for the 2022/2023 season.

Alpha-chloralose

Southern black-backed gulls will be targeted using alpha-chloralose baits during the estimated peak of their nesting season at their breeding colony south of the Hill 511 dotterel breeding site. SBBG eggs will be pricked following the death of the adult birds.

Pesticide application will be considered after four to six rounds of prefeeding if a "feeding frenzy" has been achieved. This is defined as adults rapidly settling on baits after leaving the site (within 5 minutes). Please see below for decision points.

This work, including prefeeding, will be timed for peak gull nesting in November.

The operation will conform to the standards laid out in the Currently Agreed Best Practice "Handlaying of alpha-chloralose baits for black-backed gull control" (DOCDM-1100178).

Bait quantity will be determined by estimating the number of adult gulls and nests in the colony and using the formulae in the alpha-chloralose calculator (DOCDM-1088863). This aims to present each bird or nest with five to six baits and the rate is the same for both prefeed and pesticide applied baits.

If surviving adults are noted the day after pesticide delivery, a second round of poisoned baits will be applied the day after, adjusted for the number of survivors.

16. Block and treatment area boundaries

The treatment area broadly covers four main areas as follows:

- Northern Tin Range and northern slope
- Mount Rakeahua summit and surrounding slopes
- Hill 511 and northern slope
- Rocky Mountain, southern slope and north-western slope

A separate alpha-chloralose area covers 10 hectares immediately south of the Hill 511 breeding site (see Pesticides App Treatment block "Southern Dotterel Predator Control – Alphachloralose).

These sites are entirely contained within the Rakiura National Park and so there are no boundaries with other landowners/occupiers. Kill trapping is planned to overlap with public track going up Mount Rakeahua and Rocky Mountain and along a section of the Southern Circuit from near the Tolson swing bridge to Rakeahua public hut (see map below).

All GIS data is stored on the following Q Drive folder: Q:\GIS_Users\Rakiura\Projects\Biodiversity Programme\Species Management\SNZD Recovery Project.

17. Loading sites & other set up

There is no loading site required as this is a ground-based operation.

18. Security

No operational site or transport stage security is planned for this operation.

Alpha-chloralose will be stored in the Rakiura Pesticide Store until it is required in the field.

6(d) [redacted]

Alpha-chloralose will be held by a Certified Handler at all times when not in the pesticide store.

6(d) 

19. Public safety

The general public, identified stakeholders, interest groups and Treaty Partners have been consulted with regarding this operation using a variety of mechanisms including e-mails, phone calls, posters, mail box drops, face to face meetings and newspaper publications. Maps and key information regarding the operation have been provided. Please refer to the Communications Plan and communications register for more detail on DOC-7131311.

Kill traps will be present along the walking tracks up Mount Rakeahua and Rocky Mountain in chimney/submarine trap boxes. These boxes will be labelled with the text “Danger – Do Not Touch” and a logo of a hand with a circle and slash through it to depict that it should not be touched.

Information sheets will be made available at the Rakeahua and Freshwater public huts to describe the work being done and the safety precautions that visitors should adhere to.

20. Bait, storage and transport (alpha-chloralose)

Bait type

Alpha-chloralose baits are produced by mixing the narcotic powder with margarine and spreading this onto small squares of bread (12 per slice). A bread lid is placed on the bait to create a “sandwich”.

Baits will be prepared on site at Hill 511 following successful prefeeding with margarine-only bread sandwiches.

Storage and transport

Bait making supplies will be transported from the Rakiura pesticide store in a locked metal bin with required HSNO signage and product label information. It will be driven from the Rakiura Pesticide Store to [redacted]. This is a small bin that can be transported to site in an internal helicopter load.

Left over supplies will be returned to this locked bin and transported [redacted] and driven back to the Rakiura Pesticide Store.

21. Incidents and emergencies

A safety plan has been prepared using Risk Manager which covers the normal emergency procedures. Pesticide related incidents will be managed using the relevant Safe Handling Sheet from the Safe Handling of Pesticides SOP.

Transport emergencies are covered by the toxin transport safety plan on DOC-6689478.

Emergencies at the Rakiura Office work site will be managed using the relevant sections of the office location emergency response plan.

A spill response emergency drill will be run at random during the induction period of new staff and include existing staff. This will be scheduled after a programme briefing scheduled in early-November which will cover emergency response procedures.

22. Decision making on the day of bait application (alpha-chloralose)

Pesticide delivery green light to proceed

As per the performance standards for Southern black-backed gull control using alpha-chloralose, the pesticide delivery will only take place if prefeeding work has resulted in a “feeding frenzy” where adult gulls are seen settling on baits within 5 minutes of the ranger leaving the site. This assessment and decision will be made by the ranger in charge of the operation on site.

Deferring pesticide delivery

Once prefeeding has successfully facilitated a "feeding frenzy" consideration will also need to be given to the forecasted temperature overnight. If this is predicted/likely to be very warm it could reduce the kill rate. In this instance a decision may be made to continue prefeeding until a colder overnight temperature is forecast.

The operation will be deferred if there are high winds during or predicted after pesticide delivery to prevent poisoned birds being blown long distances away from the operational area.

23. Bait spreading (alpha-chloralose)

Pre-feeding

Non-toxic prefeed baits will be applied at a rate of six per nest/adult. This will be done initially two days apart, then daily for four to six iterations.

This is to be done in the late afternoon.

Successful prefeeding is defined as birds showing a feeding frenzy (see above definition) during the last two prefeeds.

The final prefeed rate will be reduced by half to ensure that birds are not overfed prior to the delivery of the toxic baits.

There are no sensitive boundaries for prefeeding.

Toxic Baiting

Toxic baits will be applied at a rate of six per nest/adult following a successful prefeed. Remaining baits will be spread throughout the remaining roosting sites.

Any surviving birds found on the day following will be humanely euthanised with a sharp blow to the head.

If there are surviving birds that cannot be caught then a second toxic round will be delivered the evening following the initial toxic baiting with a secondary survivor mop up the day following that.

There are no sensitive boundaries for the toxic baiting.

Carcasses will be left on site as it is not practical to remove them from this remote site.

Bait loading

Not required for this operation.

Data capture

GPS waypoints will be taken for each nest or roost site controlled. Track logs will be recorded for the pathway walked through the colony. This data will be stored on the Q:\ GIS drive and loaded into the Pesticide GIS system.

24. Demobilisation

Any remaining bait ingredients will be returned to the locked metal bin and transferred to a helicopter to fly from Hill 511 to the Fern Gully hangar. A DOC ute will be used to transport the bin back to Rakiura base where it will be placed in the locked Rakiura Pesticide Store. All transport steps will be overseen by a Certified Handler with the appropriate agrichemical endorsement. Transfers and use will be recorded on the HSNO tracking sheets. Excess and expired alpha-chloralose supplies will be disposed of through hazardous substance collection services.

Section C Project Task List

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Preparing Phase already completed in previous years – this is an annualised programme.					
Planning	July & August 2022	Confirm funding allocation. High level operational re-design	9(2)(g)(ii)	NA	Complete
	July & August 2022	Recruitment of 4 x permanent roles	9(2)(g)(ii)	NA	Nearly complete
	September 2022	Consultation on effects	9(2)(g)(ii)	NA	Complete
	September 2022	Detailed operational planning	9(2)(g)	NA	Pending review commentary
	September 2022	DOC permission application lodged	9(2)(g)(ii)	NA	Underway
Pre-Operational	October 2022	Confirm Operational Plan	9(2)(g)(ii)	NA	Underway
	October 2022	Stakeholder notification	9(2)(g)(ii)	NA	Upcoming
	17 – 21 October 2022	Field staff induction/re-induction • Health and safety planning • Gear issue • Training needs identified • Task specs/Task Assignments allocated • Competency assessments done	9(2)(g)(ii)	NA	Deferred due to recruitment delays
	October 2022	24-hour notice (if required)	9(2)(g)(ii)	NA	Upcoming

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Operational	November 2022	Field logistics set up • Bivvy supply runs • Establish new campsites near Moonlight Point and Upper Tolsons sites • Mark out new trap lines • Minimal trap line cutting as required. • Trap deployment and hazing built for leg holds	9(2)(g)(ii) [redacted]	NA	Upcoming
	November 2022	Initiation of ground control • Kill traps activated • Live capture traps activated and monitored • Spur-winged plover, Australasian harrier, white-tailed deer identified and removed • Alpha-chloralose operation including sign installation	9(2)(g)(ii) [redacted] Field Team (TBC)	NA	Upcoming
	December 2022 onwards	Continuation of ground control • Delivery of prescribed trap checking schedule • Continue ground hunting	9(2)(g)(ii) [redacted] Field Team (TBC)	NA	Upcoming
	April 2023	Outcome monitoring (flock counts) Bird banding continues	9(2)(g)(ii) [redacted]	DOC-6629896	Upcoming
	May 2023	Review Operational Plan Bird banding finalised and report delivered Annual Technical Advisory Group meeting	9(2)(g)(ii) [redacted]	NA	Upcoming

APF phase	Target date	Task	Delegated to	Task Assignment	Status
Reporting	June 2023	PestLink reporting Annual reporting	9(2)(g)(ii)	NA	Upcoming

25.Section D Task specifications

Task specification	**[Feral cat kill trapping]**	
Operation: SNZD predator control	**Dates:** Fortnightly – ongoing	
This task is delegated to:	**SNZD rangers**	
Crew	**Phone**	**Radio Ch**
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1
(Supervisor)		1
9(2)(g)(ii) (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Feral cat kill trapping is one of the control methods under the SNZD Predator Control Operational Plan. Two main types of kill traps are used, Belisle 220 Super X in chimney (submarine) boxes and raised SA Kat Trap 2 on running boards. There are also a small number of raised Timms traps still under operation.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Setting up new kill trap sets
- Servicing existing kill trap sets
- Non-target capture
- Baiting
- Trap maintenance
- Data capture

Outside Scope

- Trialling different trap types
- Live capture trapping with cage traps or leg hold sets
- Feral cat euthanasia
- Ground hunting of feral cats

Standards

General tasking and safety

- ❑ Ensure you fully understand how the traps work and how to optimise their efficacy before beginning field work
- ❑ Fully understand safety procedures with each trap type to minimise injury risk
- ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task
- ❑ Complete debrief with Supervisor for each Task Assignment

Kill trapping

- ❑ Baits/lures must be changed frequently enough to maintain quality and palatability
- ❑ All kill traps must be checked, rebaited and serviced as required at least once a fortnight year round
- ❑ Trap boxes must be kept clean to ensure that trap mechanisms will trigger effectively
- ❑ Trap placement must be adjusted to maximise likelihood of feral cat capture (move up to 50m from planned location as required)
- ❑ Bait and lures will be varied as we need to experiment to find the most effective options for this project

Non target catch

- ❑ All non-target catches must be recorded and entered into the Trap NZ database
- ❑ Native non-target catch must also be reported to the Senior Ranger, Biodiversity so that the appropriate internal reporting can be completed

Data management

- ❑ Record trap servicing and catch data directly into the Trap NZ app on your work phone or write down the equivalent data in your field notebook using the same data fields so you can enter it into the Trap NZ database as soon as possible.
    - Date
    - Location (Northings, Eastings)
    - Time
    - Trap name/tag/code
    - Trap type
    - Trap status
        - Still set bait intact
        - Still set bait degraded
        - Still set bait gone
        - Sprung bait intact
        - Sprung bait degraded
        - Sprung bait gone
        - Feral cat caught
        - Other species caught
    - Resetting/rebaiting lure used
    - Service and maintenance notes
    - Edge features
- ❑ Record GPS track logs of trap lines completed and save into the database as per your Task Assignment

Equipment

❑ Belisle 220 Super X double sets in chimney boxes	❑ Bait bag
❑ SA Kat Trap 2 raised sets on running boards	❑ Wire brush
❑ Raised Timms traps	❑ Fish oil
	❑ Spare hex head screws

❑ Belisle setting tool ❑ Work phone with Trap NZ app AND/OR ❑ Waterproof notebook and pencil ❑ Yellow plastic triangles to mark trap sets ❑ Pink plastic triangles to mark trap lines	❑ Hex driver/spanner ❑ Allflex Tag Pen ❑ PPE listed in your Task Assignment ❑ General field gear listed in your Task Assignment

Attachments

- Generic Task Assignment (these will be customised during briefings)
- Currently Agreed Best Practice "Kill trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29437)

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	[Feral cat live capture trapping]	
Operation: SNZD predator control		**Dates:** Weekly – ongoing
This task is delegated to:		**SNZD rangers**

Crew	Phone	Radio Ch
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1
Supervisor)		1
9(2)(g)(ii) (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Feral cat live capture trapping is one of the control methods under the SNZD Predator Control Operational Plan. Two main types of live capture traps are used, Havahart cage traps and Victor #1.5 soft-jaw legholds either ground-set and hazed or raised with running boards (ramps).

Ground-set leghold trapping is considered the most effective control method for feral cats and so forms the majority of control work planned for this project. There is increased risk of non-target capture, especially with ground-set traps, and so effective mitigation through hazing is critical. There are only a low density of leghold traps being used in any given area which minimizes exposure risk to non-targets as well as feral cats. Therefore the quality of each set is paramount.

Training on setting leghold traps will be provided and you will be signed off once you have reached a satisfactory level of competence in both setting the trap and the hazing surrounding it.

Live caught animals will need to be euthanised humanely. Live capture traps must be checked daily when active to ensure animal welfare standards are met.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Setting up new live capture trap sets
- Servicing existing live capture trap sets
- Non-target capture
- Baiting
- Euthanasia
- Firearm use
- Trap maintenance
- Data capture

Outside Scope

- Trialling different trap types
- Kill trapping for feral cats
- Ground hunting of feral cats

Standards
General tasking and safety ❑ Ensure you fully understand how the traps work and how to optimise their efficacy before beginning field work ❑ Fully understand safety procedures with each trap type to minimise injury risk ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task ❑ Complete debrief with Supervisor for each Task Assignment Non target catch ❑ All non-target catches must be recorded and entered into the Trap NZ database ❑ Native non-target catch must also be reported to the Senior Ranger, Biodiversity so that the appropriate internal reporting can be completed ❑ Non-target animals must be euthanised humanely by either a sharp blow to the head or being shot through the head using a .22 firearm. This includes native non-targets ❑ If a native non target has only been caught with minor injuries (eg: caught only by a toe rather than a leg) then release without euthanasia is permitted Live trapping ❑ Baits/lures must be refreshed each time live capture traps are set/activated ❑ Existing perishable baits must be removed when live capture traps are deactivated ❑ Live capture traps must be checked within 12 hours of sun rise on the day after the trap was set (unless the trap is remotely monitored). Exceptions can only be made due to serious safety concerns or truly extenuating circumstances. ❑ Deactivate live capture traps when there is no scheduled recheck the next day ❑ Leghold sets must be either raised 700mm from ground level with a running board (ramp) or effectively hazed according to the standards provided during training if being set on the ground. ❑ Trap placement must be adjusted to maximise likelihood of feral cat capture (move up to 50m from planned location as required) • Try for dry areas, animal trails, ridge lines • Cats prefer warmer, sunnier aspects • Look for areas with lots of cat sign and target these • Edge features ❑ Bait and lures will be varied as we need to experiment to find the most effective options for this project including scent, audio and visual lures ❑ Consideration of trap placement will be more important initially. Once sets are already in place the focus shifts onto keeping traps active for as long as possible with high quality bait/lures and maintained trap mechanisms ❑ Moving sets to new locations after they've been set up initially will be required in some cases to maximise efficacy ❑ Ensure leghold traps are secured to prevent escape with trap still attached to animal ❑ Bungy cord loops can be used to cushion any pulling on the trap to minimise escapes (provides less resistance to pull against) ❑ Ensure trap sets can trigger effectively to catch feral cats.

- Springs need to be kept free of obstructions.
- Ensure other debris won't get caught between the jaws
- Ensure rubber padding on jaws is intact
- "Dog" and notch on trigger plate are not too heavily worn
- Chain, staple and tracing wire are in good condition

Euthanasia

- ❑ All feral cats caught are to be euthanised humanely by either a sharp blow to the head to initially stun the animal, followed by a second below to confirm kill or by head shot using a .22 firearm.
- ❑ See also euthanasia for non-target captures above.

Firearms

- ❑ Ensure standards set in DOC Firearms SOP are met
- ❑ Only staff with a current NZ Firearms Licence and a signed off DOC competency assessment on firearms will be authorised to use them.
- ❑ This task specification only covers firearms use for the purpose of euthanasia. Please see ground hunting task specs for other uses of firearms as a control method.

Data management

- ❑ Record trap servicing and catch data directly into the Trap NZ app on your work phone or write down the equivalent data in your field notebook using the same data fields so you can enter it into the Trap NZ database as soon as possible. I
    - Date
    - Location (Northings, Eastings)
    - Time
    - Trap name/tag/code
    - Trap type
    - Trap status
        - Still set bait intact
        - Still set bait degraded
        - Still set bait gone
        - Sprung bait intact
        - Sprung bait degraded
        - Sprung bait gone
        - Feral cat caught
        - Other species caught
    - Resetting/rebaiting lure used
    - Service and maintenance notes
- ❑ Record GPS track logs of trap lines completed and save into the database as per your Task Assignment

Equipment	
❑ Havahart cage traps	❑ Bait bag

❑ Victor #1.5 soft jaw leghold traps ❑ Tracing wire ❑ Pliers ❑ Fencing staples ❑ Hammer ❑ .22 firearm ❑ .22 subsonic ammo ❑ Hard case for firearms transport ❑ Work phone with Trap NZ app AND/OR ❑ Waterproof notebook and pencil ❑ Yellow plastic triangles to mark trap sets ❑ Pink plastic triangles to mark trap lines	❑ Wire brush ❑ Fish oil ❑ Spare hex head screws ❑ Hex driver/spanner ❑ Allflex Tag Pen ❑ PPE listed in your Task Assignment ❑ General field gear listed in your Task Assignment

Attachments

- Generic Task Assignment (these will be customised during briefings)
- Currently Agreed Best Practice "Cage trapping for feral cat control" and treated as "supplementary trapping" (DOCDM-29441)
- Currently Agreed Best Practice "Leg hold trapping for feral cat control" (DOCDM-29439)
- Firearms SOP (DOC-5960893)

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification [Feral cat ground hunting]		
Operation: SNZD predator control	**Dates:** Fortnightly – ongoing	
This task is delegated to:	**SNZD rangers – authorised for firearms**	

Crew	Phone	Radio Ch
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1
Supervisor)		1
9(2)(g)(ii) (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Ground hunting for feral cats is included in the operational plan as an alternative to trapping methods. This will be primarily done through night shooting using a thermal scope and/or spotlight. The night shooting operational area is restricted to areas of very low public use. Approvals to night shoot are contingent on secondary safety checks to minimise risk further. This work is approved through exemption from spotlighting rules on Public Conservation Land.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Areas of operation
- Approvals required
- Firearms
- Thermal scope
- Data capture

Outside Scope

- Other control methods for feral cats
- Use of shot guns for ground hunting Australasian harriers
- Ground hunting of white-tailed deer and spur-winged plover including night shooting

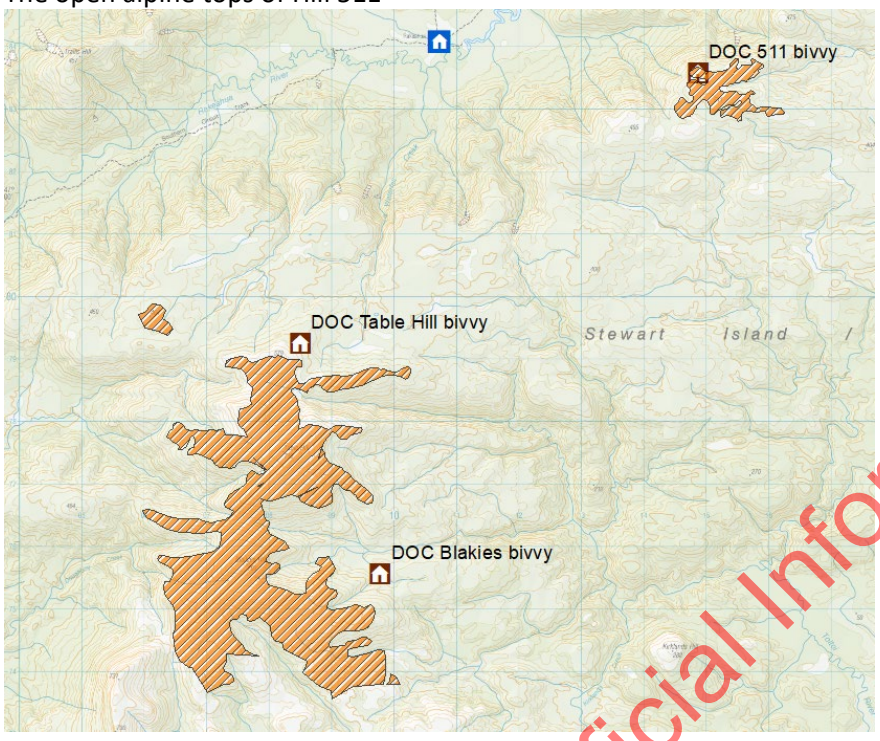
Standards

General tasking and safety

- ❑ Firearms use competency assessment must be passed before you are authorised to use firearms
- ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task
- ❑ Complete debrief with Supervisor for each Task Assignment
- ❑ Always rest up prior to night shooting. Fatigue is a serious risk and could be a fatal hazard. NEVER work a full day and then proceed to night shoot.
- ❑ Always confirm direction and distance of Table Hill or Hill 511 bivvies and ensure these huts aren't at risk from your shot
- ❑ All staff not involved in the night shooting are to remain at the bivvies until the hunters return or confirm that hunting has ceased.

Approved areas of operation (orange hash on map)

- ❑ The open alpine tops of the Northern Tin Range from “home paddock” to Mt Allen
- ❑ The open alpine tops of Hill 511



Approvals required

- ❑ Current NZ Firearms Licence
- ❑ DOC Competency Assessment for Firearms use
- ❑ Director approval to use firearms for work purposes
- ❑ Secondary project approval to proceed with night operation (see DOC-6048511)

Firearms

- ❑ Always follow NZ Arms Code standards
- ❑ Ensure standards set in DOC Firearms SOP are met
- ❑ .22 or higher calibre to be used
- ❑ Use of sub-sonic ammunition is preferred
- ❑ A thermal scope is available to aid detection of possible targets but target ID must always be made with a spotlight.
- ❑ You are **not** authorised to confirm target ID with the thermal scope only
- ❑ Ensure firearms are stored securely in provided gun-safes or locked hard cases
- ❑ Soft cases can be used if required for aircraft travel
- ❑ Follow process for secure storage of gun and ammunition safe keys
- ❑ Ensure warning signage of shooting operations is in place at the following locations:
    - Table Hill access track
    - Mt Allen route ridge line (southern edge of operational area)
    - Hill 511 access track

❑ Work in pairs while night shooting, one as the shooter and the other to hold the spotlight and confirm target ID.

Data management

❑ Keep a log of active hunting with the following information:

- Personnel
- Area
- Dates
- Hours of actual hunting
- Number of targets sighted
- Number of attempts made
- Number of kills
- Firearm used
- Ammunition type and quantity used

❑ Enter hunting log data into hunting records on DOC-2901677

❑ Record GPS track logs areas searched and save into the database as per your Task Assignment

Equipment

❑ .22 calibre or greater firearm	❑ Snacks to keep energy up and stay alert
❑ Ammunition	❑ PPE listed in your Task Assignment
❑ Thermal scope	❑ General field gear listed in your Task Assignment
❑ Spotlight	❑ First Aid Kit
❑ Headtorch and spare batteries	❑ VHF radio
❑ Warm clothing	❑ PLB
❑ GPS and compass	
❑ Waterproof notebook and pencil	

Attachments

- DOC Firearms SOP (DOC-5960893)
- Local secondary approval for each night shooting event (DOC-6048511)

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	[White-tailed deer, spur winged plover ground hunting]	
Operation: SNZD predator control	**Dates:** Fortnightly – August to February	
This task is delegated to:	**SNZD rangers – authorised for firearms**	

Crew	Phone	Radio Ch
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1
Supervisor)		1
9(2)(g)(ii) (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Ground hunting for white-tailed deer and spur-winged plover is the control method for these two target species. Opportunistic hunting during daylight hours is permitted as well as organised hunts for spur-winged plover once their territories are confirmed. Thermal scope & spotlight work may be approved for these targets on a case by case basis but the preference is for daytime shooting as these species are active during this period.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Areas of operation
- Approvals required
- Firearms
- Thermal scope
- Data capture

Outside Scope

- Feral cat euthanasia
- Ground hunting of feral cats including night-shooting
- Ground hunting Australasian harrier

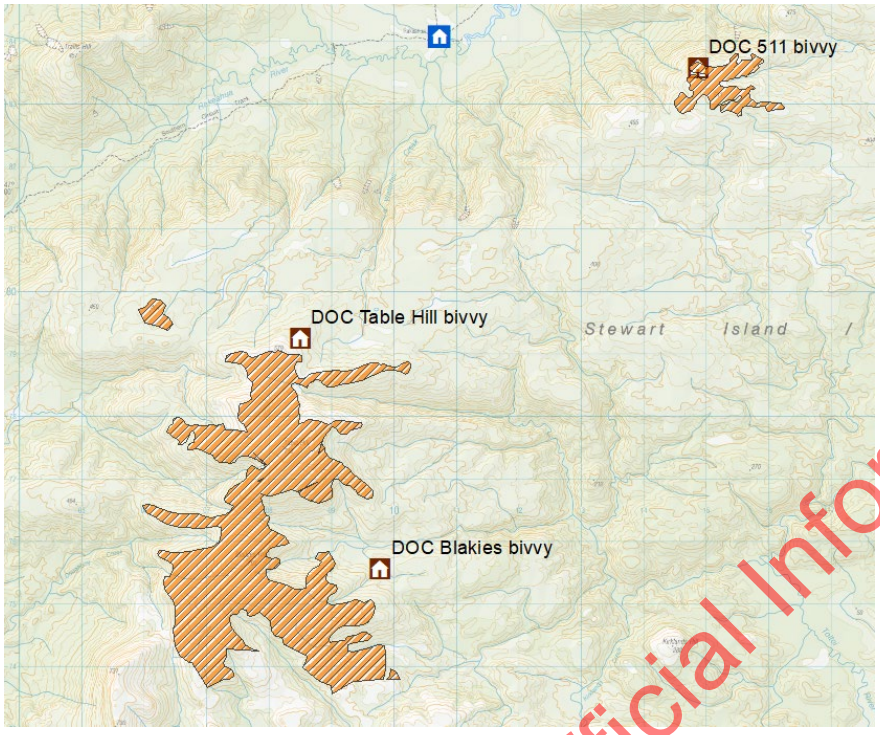
Standards

General tasking and safety

- ❑ Firearms use competency assessment must be passed before you are authorised to use firearms
- ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task
- ❑ Complete debrief with Supervisor for each Task Assignment
- ❑ Always confirm direction and distance of Table Hill or Hill 511 bivvies and ensure these huts aren't at risk from your shot
- ❑ Always rest up prior to night shooting. Fatigue is a serious risk and could be a fatal hazard. NEVER work a full day and then proceed to night shoot.
- ❑ All staff not involved in the night shooting are to remain at the bivvies until the hunters return or confirm that hunting has ceased.

Approved areas of operation (orange hash on map)

- ❑ The open alpine tops of the Northern Tin Range from “home paddock” to Mt Allen
- ❑ The open alpine tops of Hill 511



Approvals required

- ❑ Current NZ Firearms Licence
- ❑ DOC Competency Assessment for Firearms use
- ❑ Director approval to use firearms for work purposes
- ❑ Secondary project approval to proceed with night operation (see DOC-6048511)

Firearms

- ❑ Always follow NZ Arms Code standards
- ❑ Ensure standards set in DOC Firearms SOP are met
- ❑ .22 or higher calibre to be used for spur-winged plover
- ❑ .223 or higher calibre to be used for white-tailed deer
- ❑ A thermal scope is available to aid detection of possible targets but target ID must always be made with a spotlight.
- ❑ You are **not** authorised to confirm target ID with the thermal scope only
- ❑ Ensure firearms are stored securely in provided gun-safes or locked hard cases
- ❑ Soft cases can be used if required for aircraft travel
- ❑ Follow process for secure storage of gun and ammunition safe keys
- ❑ Ensure warning signage of shooting operations is in place at the following locations:
    - Table Hill access track
    - Mt Allen route ridge line (southern edge of operational area)
    - Hill 511 access track

❑ Work in pairs while night shooting, one as the shooter and the other to hold the spotlight and confirm target ID.

Data management

❑ Keep a log of active hunting with the following information:

- Personnel
- Area
- Dates
- Hours of actual hunting
- Number of targets sighted
- Number of attempts made
- Number of kills
- Firearm used
- Ammunition type and quantity used

❑ Enter hunting log data into hunting records on DOC-2901677

❑ Record GPS track logs areas searched and save into the database as per your Task Assignment

Equipment

❑ .22 calibre or greater firearm for spur-winged plover	❑ Snacks to keep energy up and stay alert
❑ .223 calibre or greater firearm for white-tailed deer	❑ PPE listed in your Task Assignment
❑ Ammunition	❑ General field gear listed in your Task Assignment
❑ Thermal scope	❑ First Aid Kit
❑ Spotlight	❑ VHF radio
❑ Headtorch and spare batteries	❑ PLB
❑ Warm clothing	
❑ GPS and compass	
❑ Waterproof notebook and pencil	

Attachments

- Generic Task Assignment (these will be customised during briefings)
- "Ground shooting of deer – best practice for human pest animal control" standards (DOCDM-642613).

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification [Australasian harrier ground hunting]		
Operation: SNZD predator control	**Dates:** Fortnightly – August to February	
This task is delegated to:	**SNZD rangers – authorised for firearms**	

Crew	Phone	Radio Ch
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1
Supervisor)		1
9(2)(g)(ii) (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Ground hunting for Australasian harrier can be undertaken using a shotgun if presence in an area is confirmed and regular. A bait carcass can be placed and staked out as a lure to draw the harrier in to reduce range and increase the likelihood of a successful kill shot.

Australasian harrier can also be shot on the wing (while in the air) using a shotgun provided the field of fire is clear of other bird species and the bird is within reasonable range for a shotgun.

Night shooting for Australasian harrier is not permitted.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Areas of operation
- Approvals required
- Firearms
- Data capture

Outside Scope

- Feral cat euthanasia
- Ground hunting of feral cats including night-shooting
- Ground hunting spur-wing plover and white-tailed deer including night shooting
- Live-capture trapping of Australasian harrier
- Night shooting of Australasian harrier

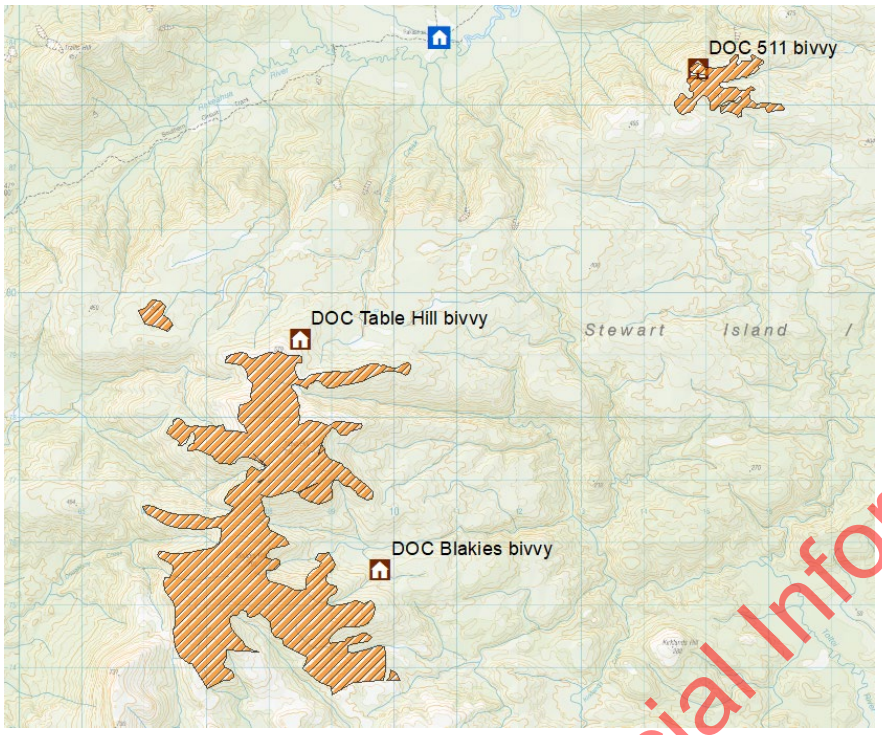
Standards

General tasking and safety

- ❑ Firearms use competency assessment must be passed before you are authorised to use firearms
- ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task
- ❑ Complete debrief with Supervisor for each Task Assignment
- ❑ Always confirm direction and distance of Table Hill or Hill 511 bivvies and ensure these huts aren't at risk from your shot

Approved areas of operation (orange hash on map)

- ❑ The open alpine tops of the Northern Tin Range from “home paddock” to Mt Allen
- ❑ The open alpine tops of Hill 511



Approvals required

- ❑ Current NZ Firearms Licence
- ❑ DOC Competency Assessment for Firearms use
- ❑ Director approval to use firearms for work purposes

Firearms

- ❑ Always follow NZ Arms Code standards
- ❑ Ensure standards set in DOC Firearms SOP are met
- ❑ .22 or higher calibre can be used for shooting target on the ground (eg: at a bait dump)
- ❑ Shotgun to be used for either shooting harrier on the wing/in the air or on the ground provided field of fire has no non-targets and the harrier is within reasonable range
- ❑ Ensure firearms are stored securely in provided gun-safes or locked hard cases
- ❑ Soft cases can be used if required for aircraft travel
- ❑ Follow process for secure storage of gun and ammunition safe keys
- ❑ Ensure warning signage of shooting operations is in place at the following locations:
    - Table Hill access track
    - Mt Allen route ridge line (southern edge of operational area)
    - Hill 511 access track

Data management

- ❑ Keep a log of active hunting with the following information:
  - Personnel
  - Area
  - Dates
  - Hours of actual hunting
  - Number of targets sighted
  - Number of attempts made
  - Number of kills
  - Firearm used
  - Ammunition type and quantity used
- ❑ Enter hunting log data into hunting records on DOC-2901677
- ❑ Record GPS track logs areas searched and save into the database as per your Task Assignment

Equipment

❑ .22 calibre or greater firearm for grounded targets	❑ PPE listed in your Task Assignment
❑ Shotgun for grounded or airborne targets	❑ General field gear listed in your Task Assignment
❑ Ammunition	❑ First Aid Kit
❑ GPS and compass	❑ VHF radio
❑ Waterproof notebook and pencil	❑ PLB

Attachments

- Generic Task Assignment (these will be customised during briefings)

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	[Australasian harrier live capture trapping]	
Operation: SNZD predator control		**Dates:** Fortnightly – August to February
This task is delegated to:		**SNZD rangers**

Crew	Phone	Radio Ch
9(2)(g)(ii) [redacted]	9(2)(a), 9(2)(g)(ii) [redacted]	1
[redacted]		1
[redacted]		1
[redacted] Supervisor)		1
9(2)(g)(ii) [redacted] (Senior Ranger)		1
SNZD Ranger 1	TBC	1
SNZD Ranger 2	TBC	1
SNZD Ranger 3	TBC	1
SNZD Ranger 4	TBC	1

Details of task

Live capture trapping for Australasian harrier can be undertaken using 1m raised Victor 1.5 soft jaw leghold traps on platforms or ground-set Hav-a-hart cage traps.

Caught harrier to be euthanised by either a sharp blow to the head or being shot. Non-target captures to be released if no injuries are noted. Euthanise non-targets with injuries that are likely to result in later death.

Traps will be baited with a variety of scent (meat), audio and visual lures to determine what combination works best for this project.

This task specification does not replace your Task Assignment for your trip. It is intended to provide more operational detail focussed solely on the task of kill trapping feral cats. Your Task Assignment will detail broader information about trip logistics, budgets and more.

Included in scope

- Raised Victor 1.5 soft catch traps
- Ground set Hav-a-hart cage traps
- Approvals required
- Firearms
- Data capture

Outside Scope

- Feral cat euthanasia
- Ground hunting of feral cats including night-shooting
- Ground hunting spur-wing plover and white-tailed deer including night shooting
- Ground hunting of Australasian harrier

Standards

General tasking and safety

- ❑ Ensure you fully understand how the traps work and how to optimise their efficacy before beginning field work
- ❑ Fully understand safety procedures with each trap type to minimise injury risk
- ❑ Receive written Task Assignment and participate in briefing session so that you fully understand your field task
- ❑ Complete debrief with Supervisor for each Task Assignment

- ❑ Firearms use competency assessment must be passed before you are authorised to use firearms
- ❑ Always confirm direction and distance of Table Hill or Hill 511 bivvies and ensure these huts aren't at risk from your shot

Non target catch

- ❑ All non-target catches must be recorded and entered into the Trap NZ database
- ❑ Native non-target catch must also be reported to the Senior Ranger, Biodiversity so that the appropriate internal reporting can be completed
- ❑ Non-target animals must be euthanised humanely by either a sharp blow to the head or being shot through the head using a .22 firearm if their injuries are likely to later cause death (eg: broken leg or wing). This includes native non-targets.
- ❑ If a native non target has only been caught with minor injuries (eg: caught only by a toe rather than a leg) then release without euthanasia is permitted.

Live trapping

- ❑ Baits/lures must be refreshed each time live capture traps are set/activated
- ❑ Existing perishable baits must be removed when live capture traps are deactivated
- ❑ Live capture traps must be checked within 12 hours of sun rise on the day after the trap was set (unless the trap is remotely monitored). Exceptions can only be made due to serious safety concerns or truly extenuating circumstances.
- ❑ Deactivate live capture traps when there is no scheduled recheck the next day
- ❑ Leghold sets must be raised on platforms 1 metre above ground level.
- ❑ Leghold sets must be calibrated to trigger at a weight no less than 500g
- ❑ Bait and lures will be varied as we need to experiment to find the most effective options for this project including scent, audio and visual lures
- ❑ Moving sets to new locations after they've been set up initially will be required in some cases to maximise efficacy
- ❑ Ensure leghold traps are secured to prevent escape with trap still attached to animal
- ❑ Bungy cord loops can be used to cushion any pulling on the trap to minimise escapes (provides less resistance to pull against)
- ❑ Ensure trap sets can trigger effectively to catch Australasian harrier
    - Springs need to be kept free of obstructions.
    - Ensure other debris won't get caught between the jaws
    - Ensure rubber padding on jaws is intact
    - "Dog" and notch on trigger plate are not too heavily worn
    - Chain, staple and tracing wire are in good condition

Euthanasia

- ❑ All Australasian harrier caught are to be euthanised humanely by either a sharp blow to the head to initially stun the animal, followed by a second below to confirm kill or by kill shot using a .22 firearm.
- ❑ See also euthanasia for non-target captures above.

Firearms

- ❑ Ensure standards set in DOC Firearms SOP are met
- ❑ Only staff with a current NZ Firearms Licence and a signed off DOC competency assessment on firearms will be authorised to use them.
- ❑ This task specification only covers firearms use for the purpose of euthanasia. Please see ground hunting task specs for other uses of firearms as a control method.

Data management

- ❑ Record trap servicing and catch data directly into the Trap NZ app on your work phone or write down the equivalent data in your field notebook using the same data fields so you can enter it into the Trap NZ database as soon as possible.
    - Date
    - Location (Northings, Eastings)
    - Time
    - Trap name/tag/code
    - Trap type
    - Trap status
        - Still set bait intact
        - Still set bait degraded
        - Still set bait gone
        - Sprung bait intact
        - Sprung bait degraded
        - Sprung bait gone
        - Australasian harrier caught
        - Other species caught
    - Resetting/rebaiting lure used
    - Service and maintenance notes
- ❑ Record GPS track logs of trap lines completed and save into the database as per your Task Assignment

Equipment

- ❑ Havahart cage traps
- ❑ Victor #1.5 soft jaw leghold traps
- ❑ Tracing wire
- ❑ Pliers
- ❑ Fencing staples
- ❑ Hammer
- ❑ .22 firearm
- ❑ .22 subsonic ammo
- ❑ Hard case for firearms transport
- ❑ Soft gun case may be permitted if required by aircraft transport
- ❑ Work phone with Trap NZ app AND/OR
- ❑ Bait bag
- ❑ Wire brush
- ❑ Fish oil
- ❑ Spare hex head screws
- ❑ Hex driver/spanner
- ❑ Allflex Tag Pen
- ❑ PPE listed in your Task Assignment
- ❑ General field gear listed in your Task Assignment
- ❑ Yellow plastic triangles to mark trap sets
- ❑ Pink plastic triangles to mark trap lines
- ❑ Waterproof notebook and pencil

Attachments

• Generic Task Assignment (these will be customised during briefings)			
Contacts		**Phone**	**Radio Ch**
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	**[SBBG toxin operation – non-toxic prefeeding]**	
Operation: SNZD Predator Control	**Dates:** Mid November 2022	
This task is delegated to:	9(2)(g)(ii)	
Crew	**Phone**	**VHF ch**
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1

Details of task

Pre-feeding with non-toxic bread baits is required to establish a reliable learned behaviour of eating an unfamiliar food type to maximise the kill rate of the later toxic operation.

Between 4 and 6 pre-feeding events are required prior to delivering toxic baits. The first three to four pre-feeds should be spaced out every two days. The final two pre-feeds should be daily with the very final pre-feed only providing half the number of baits to encourage high bait take during the toxin operation.

Continue pre-feeding until a feeding frenzy is confirmed. This is defined as "gulls rapidly settle to feed on baits (i.e. within approximately 5 minutes of leaving the site)."

Included in scope

- Distributing non-toxic prefeed baits

Outside Scope

- Delivery of toxic baits

Standards

- ❑ 6 baits to be placed around edge of each identified nest
- ❑ 6 baits per bird to be placed around roost/non-breeder sites
- ❑ Space first 3 or 4 pre-feeding events out every 2 days
- ❑ The last 2 pre-feeds to be done daily
- ❑ The last prefeed must halve the bait quantity (3 baits per nest or bird)
- ❑ Confirm feeding frenzy has been achieved before moving to toxin delivery task
- ❑ Record track log of route walked and GPS waypoint nests and roost sites

Equipment

- ❑ Pre-prepared non-toxic bread baits
- ❑ 12kg Margarine (6 pre-feeds)
- ❑ 144 loaves of bread (6 pre-feeds)
- ❑ Small bait storage buckets/pails
- ❑ GPS and spare batteries
- ❑ Head torch and spare batteries

- ❑ Warm clothing
- ❑ First Aid Kit
- ❑ VHF radio and spare battery
- ❑ PPE listed in your Task Assignment
- ❑ General field gear listed in your Task Assignment

Attachments

Currently Agreed Best Practice "Handlaying of alpha-chloralose baits for black-backed gull control" (DOCDM-1100178).

Note that a standard Task Assignment will be issued that describes additional operational and logistical factors.

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	**[SBBG toxin operation – preparing toxic bread baits]**
Operation: SNZD predator control	**Dates:** Mid November 2022
This task is delegated to:	9(2)(g)(ii)

Crew	Phone	VHF ch
9(2)(g)(ii)	9(2)(a), 9(2)(g)(ii)	1
		1
		1

Details of task

Mixing toxic powder and preparing bread baits for toxin operation.

Included in scope

- Mixing alpha-chloralose technical grade powder (900-1000 g/kg) into margarine for applying to bread bait
- Preparing bread baits as per currently agreed best practice

Outside Scope

- Hand laying of toxic bread baits
- Non-toxic pre-feeding

Standards

Mixing toxic powder

❑ Alpha-chloralose/margarine must be following the steps below:

1. Weigh out 0.247kg of alpha-chloralose powder (900 – 1000 g/kg) from the package into the measuring container.
2. Weigh 1.353kg of margarine into the steel pot.
3. Warm the margarine until it is very soft, but not liquid.
4. Remove margarine from heat.
5. While stirring the margarine slowly, sieve the weighed out alpha-chloralose powder into the margarine.

6. Once all the alpha-chloralose has been added to the margarine continue to stir the mixture for 2-3 minutes to ensure the alpha-chloralose is completely mixed throughout the margarine.
7. Ladle margarine/alpha-chloralose mixture into small bowls for the bait preparation team to use.

- ❑ All relevant standards and PPE requirements as described in the attached Safe Handling sheet #10 must be met.
- ❑ The toxin tracking sheet must be completed.

Preparing bread baits

- ❑ Spread 8g (1.5 teaspoons) of the alpha-chloralose/ margarine mixture onto slices of plain bread and then sandwich two slices together.
- ❑ Cut each sandwich into 12 'bite sized' baits.
- ❑ Place loaf back into bread bag it came from
- ❑ Place in a fish bin with a labelled lid (toxic sticker)

Equipment

- ❑ 2kg Margarine
- ❑ 12 loaves of bread
- ❑ 0.5kg Alpha-chloralose technical grade powder (900-1000 g/kg).
- ❑ Spoon for alpha-chloralose powder
- ❑ Measuring scales
- ❑ Measuring container for weighing the alpha-chloralose powder
- ❑ Measuring container for weighing the margarine
- ❑ Large steel pot
- ❑ Gas ring and gas bottle
- ❑ Large spoon for stirring margarine
- ❑ Sieve
- ❑ 4 small bowls capable of holding 1 kg of the alpha-chloralose/margarine mixture
- ❑ PPE as per safe handling sheet #10 (docCM - Safe handling sheet 10)
- ❑ Toxin tracking sheet

Attachments

Key documents

Currently Agreed Best Practice "Handlaying of alpha-chloralose baits for black-backed gull control" (DOCDM-1100178).

Note that a standard Task Assignment will be issued that describes additional operational and logistical factors.

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1

Task specification	[SBBG toxin operation – distributing toxic bread baits & egg pricking]	
Operation: SNZD Predator Control	**Dates:** Mid November 2022	
This task is delegated to:	9(2)(g)(ii) [redacted]	

Crew	Phone	VHF ch
9(2)(g)(ii) [redacted]	9(2)(a), 9(2)(g)(ii) [redacted]	1
		1
		1

Details of task

Once a feeding frenzy has been confirmed (see SBBG pre-feeding task specification) toxic delivery can go ahead provided the overnight temperature doesn't exceed 20°C and wind-speed does not exceed XXXkts.

Toxic delivery should target late afternoon in anticipation of the overnight temperature drop which facilitates hypothermia, ultimately killing the targets.

If more than 10 survivors are found the following day – a repeat toxic delivery will be required.

Any partially anaesthetised gulls must be humanely euthanised with a sharp blow to the head.

Once adult birds are killed, ensure all SBBG eggs are pricked. Do not crush the eggs as any remaining incubating adults are likely to renest elsewhere.

Carcasses can be left on site but any remaining uneaten toxic baits must be collected and returned to the locked metal bin.

Included in scope

- Distributing baits
- Decision gates (green light/red light)
- Egg pricking

Outside Scope

- Cleaning up carcasses

Standards

- ❑ PPE as per safe handling sheet #10 (docCM - Safe handling sheet 10)
- ❑ 6 baits to be placed around edge of each identified nest
- ❑ 6 baits per bird to be placed around roost/non-breeder sites
- ❑ Only apply toxic baits if feeding frenzy has been achieved through pre-feeding
- ❑ Only apply toxic baits in late afternoon as close to nightfall as feasible.
- ❑ Only apply toxic baits if wind speed is less than XXXkts
- ❑ Only apply toxic baits if predicted overnight temperature is less than 20°C
- ❑ Repeat toxic bait application the evening after the first handlay if there are >10 adult SBBG survivors
- ❑ All SBBG eggs to be pricked (not crushed) to kill the eggs but prevent adult survivors from renesting elsewhere
- ❑ Any remaining baits present on the day after the final toxic application to be collected and stored in locked metal bin

Equipment
❑ Pre-prepared toxic bread baits ❑ Small bait storage buckets ❑ Kestrel ❑ PPE as per safe handling sheet #10 (docCM - Safe handling sheet 10) ❑ Needles to prick SBBG eggs ❑ General field gear listed in your Task Assignment ❑ PPE as listed in your Task Assignment ❑ Hammer ❑ Head torch and spare batteries ❑ VHF radio and spare battery ❑ First aid kit
Attachments
Currently Agreed Best Practice "Handlaying of alpha-chloralose baits for black-backed gull control" (DOCDM-1100178). Note that a standard Task Assignment will be issued that describes additional operational and logistical factors.

Contacts		Phone	Radio Ch
9(2)(g)(ii)	Senior Ranger, Biodiversity	9(2)(a), 9(2)(g)(ii)	1
9(2)(g)(ii)	Supervisor	9(2)(a), 9(2)(g)(ii)	1