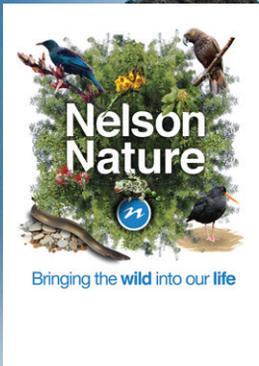


# NELSON HALO PREDATOR TRAPPING GUIDE

A guide to  
planning  
predator  
trapping  
projects in  
the Nelson  
Halo and  
beyond



This report was prepared by Wildlife Management International Limited (WMIL) for Nelson Nature, Nelson City Council.

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**Cover image:** Kākā (*Nestor meridionalis*). Image courtesy of Dan Burgin.



Photo: Linda Laing

# CONTENTS

<b>GUIDE PURPOSE</b>	<b>5</b>	Trail Cameras	34
<b>GROUP DETAILS</b>	<b>7</b>	Monitoring Set-Up	35
<b>PROJECT SITE(S)</b>	<b>8</b>	Monitoring Unit Placement	37
Large Blocks (> 50 ha)	10	Monitoring Frequency	37
Medium Blocks (5–50 ha)	12	Signage	38
Small Blocks (< 5 ha)	14	Maps	38
Riparian	15	Data	38
Coastlines	17	Maintenance Activities	38
Wetlands/Estuaries	19	<b>Outcome Monitoring</b>	<b>40</b>
Suburban Areas	21	Bird Diversity via eBird	
<b>PREDATOR TRAPPING PLAN</b>	<b>24</b>	Checklists	40
Trapping Methods	24	Nocturnal Counts	41
Weka-proof Traps	27	Citizen Science	42
Remote Trapping	27	Monitoring Cryptic Species	42
Trap Placement	28	Five-Minute Bird Counts	46
Checking Traps	29	Wētā Hotels	46
Possum Traps	30	<b>HEALTH &amp; SAFETY PLAN</b>	<b>47</b>
Bait Types	30	Hazards	47
Signage	30	Safety Officer	48
Maps	30	Training	48
Catch Data	30	Personal Protective Equipment	
Maintenance Activities	30	(PPE) and first aid	48
<b>MONITORING PLAN</b>	<b>31</b>	Check-in Procedure	48
<b>Predator Monitoring</b>	<b>31</b>	Incident Reporting /	
Species-Specific Methods	31	Management	48
Wax Blocks	32	<b>REVIEW PLAN</b>	<b>50</b>
Tracking Tunnels	34	<b>APPENDIX A: NELSON HALO</b>	
Chew Cards	34	<b>PROJECT PLAN TEMPLATE</b>	<b>51</b>
		<b>REFERENCES</b>	<b>59</b>

# GUIDE PURPOSE

In 2017 introduced mammals were eradicated within the predator-proof fenced Brook Waimārama Sanctuary in Nelson City. As birds disperse from the sanctuary, there is huge potential to further enhance these and other native bird populations around the city and contribute towards the purpose of the Nelson Biodiversity Strategy: “to create a biologically rich and sustainable future for Nelson through aligned action on biodiversity”.<sup>1</sup> Nelson City Council’s (NCC) Nelson Nature programme is working with the sanctuary, the Department of Conservation (DOC), community groups and private landowners to coordinate predator control and habitat restoration in an area called the ‘Nelson Halo’. The Nelson Halo (Figure 1) includes major areas within the Nelson/Whakatū region where predator control and habitat enhancement will best benefit birds.

This guide provides technical guidance for community trapping groups and landowners to develop an effective plan for predator trapping projects within the Nelson Halo and at other sites in the Nelson region. It builds on the guidance provided in NCC’s *Nelson Wildlife Halo: Operational Plan*<sup>2</sup>, and DOC’s *Predator Free 2050: A Practical Guide to Trapping*<sup>3</sup> (referred to hereafter as ‘DOC’s guide to trapping’) and provides additional guidance for small sites and specific habitats within the Nelson/Whakatū region.

This guide has been prepared for the Nelson Halo and assumes the goal of your project is to protect native forest birds, and therefore, stoats, rats and possums are the key predators to target for control. If your predator control is outside of the Nelson Halo area (Figure 1) or you are trying to protect species other than native forest birds, we recommend following DOC’s guide to trapping and undertaking predator monitoring first to clarify what predators are present in your area and which to target.

This guide will help you develop a predator trapping plan specific to your project site. Developing a project plan will help you clarify what you want to achieve and how you’re going to get there, essential steps in a successful project. Your project plan will also enable you to communicate your project to others in your group, your neighbours, potential funders, and newly recruited group members.

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1 <http://www.nelson.govt.nz/council/plans-strategies-policies/strategies-plans-policies-reports-and-studies-a-z/nelson-biodiversity-strategy-2/>

2 <http://www.nelson.govt.nz/assets/Environment/Nelson-Nature/resources/Nelson-Nature-Halo-Halo-Operational-Plan-Final-June-19.pdf>

3 <https://www.doc.govt.nz/pf2050-trapping-guide>

**Figure 1: Nelson Halo operational area**



This map is an appropriate representation only and must not be used to determine the location or size of areas shown, or to identify legal boundaries. To the extent permitted by law, the Nelson City Council, its employees, agents and contractors will not be liable for any costs, damages or loss suffered as a result of the data or plans, and no warranty of any kind is given as to the accuracy or completeness of the information represented. Nelson City Council information is licensed under a Creative Commons Attribution 4.0 International License, and the use of any data or plan or any information downloaded must be in accordance with the terms of that license. For more information please contact us. Cadastral information derived from Land Information New Zealand. CROWN COPYRIGHT RESERVED.

**Nelson Halo Operational Area**

 <p>Nelson City Council te kaunihera o whakatū</p>	<p><b>Legend</b></p> <p><b>Halo Operational Areas</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid pink; margin-right: 5px;"></span> Core</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid orange; margin-right: 5px;"></span> City</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid blue; margin-right: 5px;"></span> North</li> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px solid green; margin-right: 5px;"></span> Hinterland</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; border: 1px dashed blue; margin-right: 5px;"></span> Brook Waimarama Sanctuary</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: #c8e6c9; margin-right: 5px;"></span> Council Reserve</li> </ul>	<p>0 1 2 km</p> <p>Scale 1:110,000</p>	<p>N</p> 
	<p> te kaunihera o whakatū</p>			<p>January 2020</p>

PO Box 645 Nelson 7040 New Zealand PH 03 5460200 nelson.govt.nz

File Ref: 0329018  
 NSP: Original map size A4.

This guide is split into six coloured sections (Figure 2). Go through each of these sections and use the guidance to fill out the template provided to form your project plan. Each section represents a key component to consider when planning your project, so please don't leave any of them out.

**Figure 2: Project plan components**



Once you're underway with your project, your project plan will serve as a reference point to help you measure your success. The details you list in your first plan aren't set in stone, and are likely to change, particularly if you are breaking down your plan into several phases over a period of years. Your project plan should be a dynamic document that will likely be revised during the annual review process.

If you need help along the way, including a review of your plan once you have finished drafting it, contact us at [nelson.nature@ncc.govt.nz](mailto:nelson.nature@ncc.govt.nz).



# GROUP DETAILS

Describing your group's details and purpose is essential, both to ensure a clear understanding within your group and also for communicating this to the public, landowners, potential funders etc. Details such as group name, desired outcomes, group size, location, and activities present at the site are all key components captured in this section and can be filled in using the prompts in the template.

Creating a clear and up-to-date map that shows the boundaries of your project area over a satellite or aerial image is an important and simple task. You can use Top of the South Maps,<sup>4</sup> Google Maps© or Google Earth© to create a map (see Figure 3). These mapping tools also allow you to calculate the area of your project.

**Figure 3: Example project location map to be included in an operation plan**



<sup>4</sup> <https://www.topofthesouthmaps.co.nz/app/>



# PROJECT SITE(S)

The size and type of habitat(s) within your project site will influence how you set up your predator trapping project. A key first step is establishing the type and size of the site(s) within your project. This will determine how you set up your trapping grid(s) and lines. We have grouped project sites into key types below (Table 1). We recommend you use these types in your project's operational plan.

Additional components to detail in your plan are:

- the total size of the project site(s)
- the type of terrain within your project site and the level of access
- additional features such as significant natural areas (SNAs), heritage buildings and sites.

**Table 1: Types of sites and their associated characteristics**

Project Site Type	Characteristics
<b>Large Blocks</b>	Includes large tracts of native or exotic forest, mixed forest, scrub, private bush/lifestyle blocks or farmland upwards from 50 hectares in size
<b>Medium Blocks</b>	Includes medium-sized tracts of native or exotic forest, mixed forest, scrub, private bush/lifestyle blocks or farmland from 5 to 50 hectares in size
<b>Small Blocks</b>	Includes small tracts of native or exotic forest, mixed forest, scrub or urban parkland up to 5 hectares in size
<b>Riparian</b>	Includes rivers and streams; sites vary greatly in size
<b>Coastlines</b>	Includes sand and pebble beaches and boulder banks/beaches, as well as rocky outcrops
<b>Wetlands/Estuaries</b>	Includes estuaries, and therefore both freshwater and saline ecosystems with possible tidal systems
<b>Suburban Areas</b>	Includes a variety of sizes, vegetation types and human activities, including backyards, schools and urban parks

For each of these types of site there is a minimum density of traps to ensure the best chance of controlling the target species. For all sites within the Nelson Halo, the target species at a minimum will be rats, stoats and possums. DOC's guide to trapping provides recommendations for larger sites, which we have replicated here under 'Large Blocks'. In addition, we have provided additional guidance for small to medium-sized sites and specific habitat types to better meet the objectives of NCC's Nelson Wildlife Halo Operational Plan.

Use this information in conjunction with species-specific information in DOC's guide to trapping. The terrain of your project site will determine the way your lines and grid are able to be placed, and this may only become apparent as you begin to set them. For example, within larger blocks, you may encounter ridges, spurs and valleys, as well as human structures such as roads, buildings and walking tracks, which won't allow you to follow the grids exactly as outlined here. Mammalian predators often use some of these features, both natural and man-made, to move across a landscape, so you can use these to your advantage in your trap layout to increase the chances of predators encountering your trap. As a bonus, it will also make it easier for you to access your traps.

The more planning you can undertake using desktop tools such as Top of the South Maps and aerial satellite imagery, the less time and resources will be lost, and the more successful you'll be in targeting and trapping mammalian predators. Plotting your locations before you go into the field saves a lot of time and further issues. Things can look different on a map than on the ground, and you may need to change the exact location of your trap when you go to put it out. Be sure to mark your locations using a GPS device and update them when changes occur. Within all of the project site types, make sure your traps and monitoring devices are placed on level surfaces and not in open areas or where they are likely to be continually submerged (e.g. tidal areas). This will prolong the life of your traps and also better target environments utilised by mammalian predators.

The pages that follow outline the minimum trap layout that we recommend to reduce predator densities to a level that will allow native wildlife to flourish. If you have more resources available, whether that be funding or people-power, then you can increase the density and frequency of your trap layout.

If you are unsure, don't be afraid to get in touch with us for further clarification at [nelson.nature@ncc.govt.nz](mailto:nelson.nature@ncc.govt.nz).

# LARGE BLOCKS (> 50 HA)

Large blocks may include continuous areas of native or exotic forest, mixed forest, scrub, farmland or a mixture of these from 50 hectares in size. For these sites, we recommend the trapping network guidelines provided in DOC's guide to trapping.

Table 2 shows the minimum recommended density of traps to target the three key predator species.

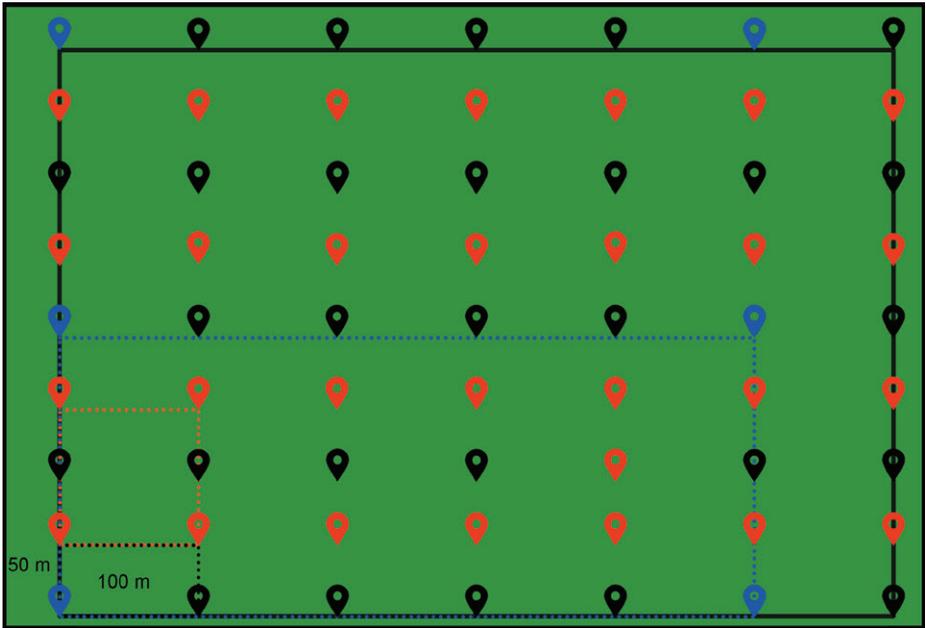
**Table 2: Minimum recommended density of traps for large blocks**

<b>Rats</b>	<ul style="list-style-type: none"><li>• Set traps at 50 m spacing on lines 100 m apart.</li><li>• For high-intensity trapping, increase this to 25 m spacing on lines 100 m apart.</li></ul>
<b>Possums</b>	<ul style="list-style-type: none"><li>• Set traps at 100 m spacing (or less) on lines 100 m (or less) apart.</li></ul>
<b>Stoats</b>	<ul style="list-style-type: none"><li>• Set traps at 200 m spacing on lines no further than 500 m apart (for single traps) or 800 m apart (for double traps) staggered between possum and rat trap stations.</li><li>• For high-intensity trapping, increase this to 100 m spacing on lines 500 m apart (for either single or double traps).</li></ul>

Figure 4 shows this trapping grid overlay targeting rats, possums and stoats.



Figure 4: Large block trap overlay



**Legend**

-  Rat trap
-  Rat & possum trap
-  Rat & stoat trap
-  Rat 100 × 50 m grid outline
-  Possum 100 × 100 m grid outline
-  Stoat 500 × 200 m grid outline
-  Group operational boundary



*The trap spacing recommended in the DOC guide to trapping can be followed for large blocks like the Grampians Reserve*

## MEDIUM BLOCKS (5–50 HA)

Medium-sized blocks will have higher re-invasion of predators from the surrounding area, so we recommend a more intensive network of traps for Halo areas than suggested in DOC's guide to trapping, which was prepared with larger blocks in mind. The site may include continuous tracts of native or exotic forest, mixed forest, scrub, farmland or urban parkland from 5 to 50 hectares in size.

Table 3 shows the **minimum** recommended density of traps to target the three key predator species.

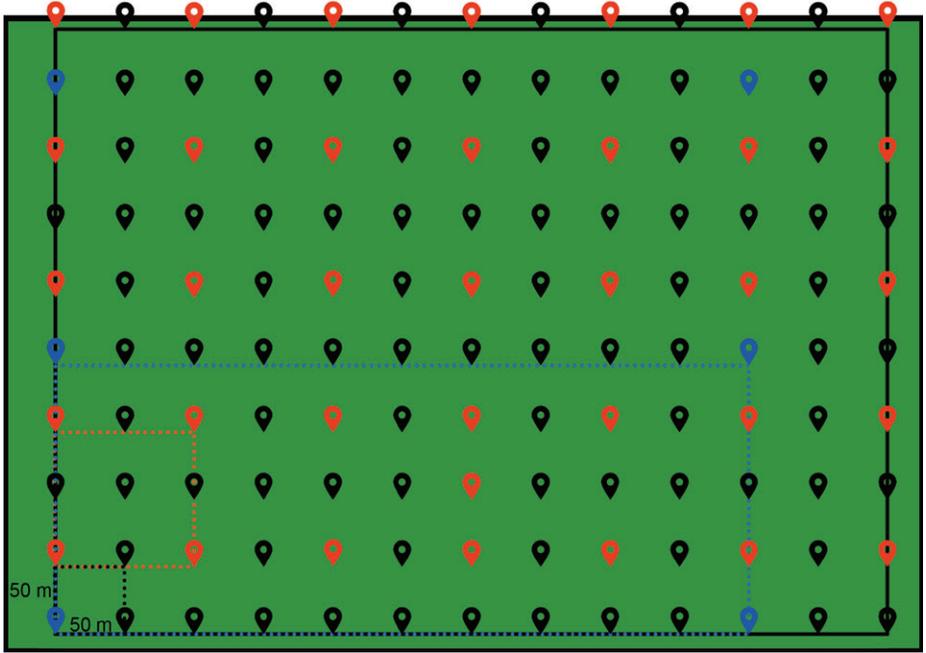
**Table 3: Minimum recommended density of traps for medium blocks**

<b>Rats</b>	<ul style="list-style-type: none"><li>• Set traps at 50 m spacing on lines 50 m apart.</li><li>• For high-intensity trapping, this can be increased to 25 m spacing on lines 25 m apart.</li></ul>
<b>Possums</b>	<ul style="list-style-type: none"><li>• Set traps at no less than 100 m spacing on lines 100 m (or less) apart.</li></ul>
<b>Stoats</b>	<ul style="list-style-type: none"><li>• Set traps at 200 m spacing on lines no further than 500 m apart (for either single or double traps), staggered between possum and rat trap stations.</li><li>• For high-intensity trapping, increase this to 100 m spacing on lines 500 m apart (for either single or double traps).</li></ul>

Figure 5 shows this trapping grid overlay targeting rats, possums and stoats.



Figure 5: Medium block trap overlay



**Legend**

 Rat trap

 Rat & possum trap

 Rat & stoat trap

 Rat 50 × 50 m grid outline

 Possum 100 × 100 m grid outline

 Stoat 500 × 200 m grid outline

 Group operational boundary

## SMALL BLOCKS (< 5 HA)

Small blocks will have a very high amount of re-invasion of predators from the surrounding area, so we recommend a more intensive network of traps for Nelson Halo areas than suggested in DOC's guide to trapping, which was prepared with larger blocks in mind. The site can include continuous tracts of native or exotic forest, mixed forest, scrub, farmland or urban parkland up to 5 hectares in size.

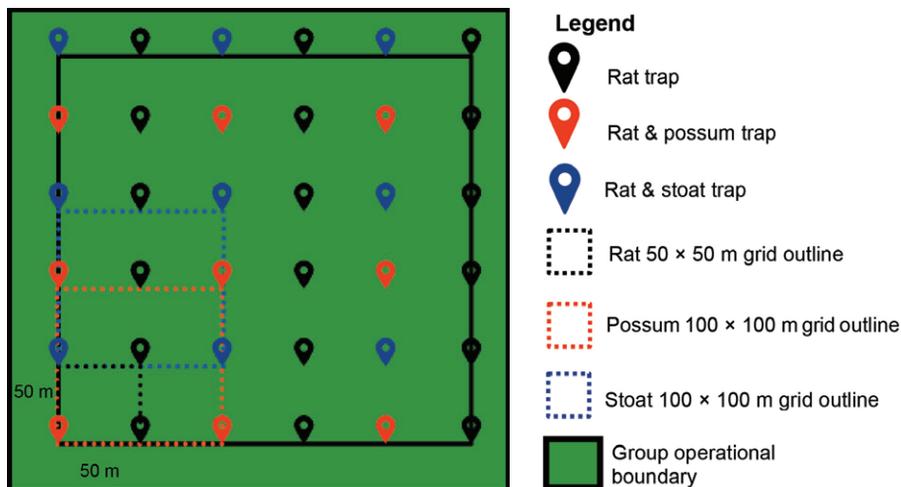
Table 4 shows the minimum recommended density of traps to target the three key predator species.

**Table 4: Minimum recommended density of traps for small blocks**

<b>Rats</b>	<ul style="list-style-type: none"> <li>Set traps at 50 m spacing on lines 50 m apart.</li> <li>For high-intensity trapping, this can be increased to 25 m spacing on lines 25 m apart.</li> </ul>
<b>Possums</b>	<ul style="list-style-type: none"> <li>Set traps at no less than 100 m spacing on lines 100 m (or less) apart.</li> </ul>
<b>Stoats</b>	<ul style="list-style-type: none"> <li>Set traps at 100 m spacing on lines no further than 100 m apart (for either single or double traps), evenly staggered between possum and rat trap stations.</li> </ul>

Figure 6 shows this grid overlay.

**Figure 6: Small block trap overlay**



# RIPARIAN

Sites alongside rivers and streams should use a network of traps that follow the course of the river. Small blocks will have a very high amount of re-invasion of predators from the surrounding area, so we recommend a more intensive network of traps for Nelson Halo areas than suggested in DOC's guide to trapping, which was prepared with larger blocks in mind.

A key component of laying traps in river environments is to keep them close to the river's course whilst ensuring that they won't be too near to the flood zone and therefore in danger of being submerged. This is a balancing act, as rivers naturally flood and contain drainage areas. Setting traps either side of the water is essential because predators such as stoats and rats use these features to travel through a landscape. By placing traps either side and following the river's natural course, you can better target predators following that route. There is scope to add additional traps if habitat exists beyond **50m** of the riverside (as shown in Figure 7).

For rivers that are within large or medium forest habitat blocks, trapping grids for large or medium blocks should be used, and traps should be moved according to the river's course to avoid having trap points fall in the river.

Table 5 shows the **minimum** recommended density of traps to target the three key predator species.

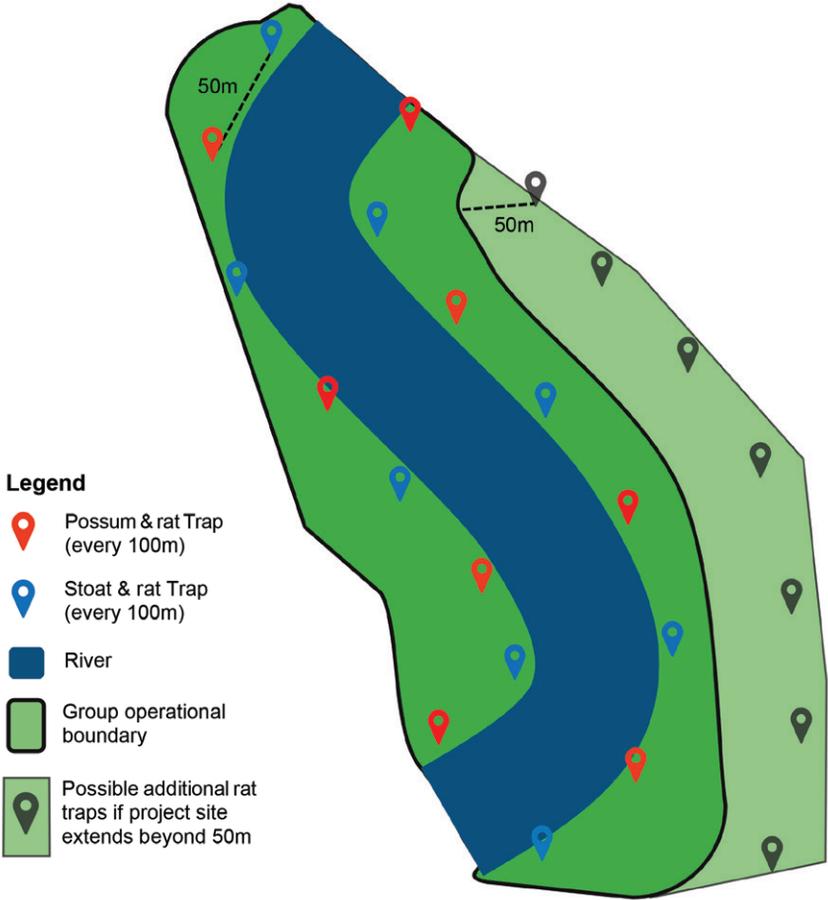
**Table 5: Minimum recommended density of traps for riparian habitat**

<b>Rats</b>	<ul style="list-style-type: none"><li>• Set traps every 50 m.</li></ul>
<b>Possums &amp; Stoats</b>	<ul style="list-style-type: none"><li>• Set traps every 100 m (staggered between each other to avoid having more than two different traps at 50 m points).</li></ul>



*Traps set alongside rivers and streams should follow the course of the river*

Figure 7: Riparian trap layout



# COASTLINES

Nelson has a variety of coastal environments, including boulder, sand, and pebble beaches, small islets and rocky outcrops. The same methods outlined for riparian sites are applicable regarding placing traps along the contour of this landscape feature. Additionally, it is essential that traps are placed up off the beach, outside the tidal zone to avoid traps being lost into the water. The aim here is to capture mammalian predators as they move from the neighbouring habitat to the beach, and therefore intercept their natural movements. Note that the trap layout recommended here assumes your target predators are stoats, rats and possums. If these are not the key predators of the species you are aiming to protect, you will need to adjust the trap network so you are targeting the right predators (e.g. hedgehogs are key predators of banded dotterel in Wellington).

Table 6 shows the **minimum** recommended density of traps to target the three key predator species.

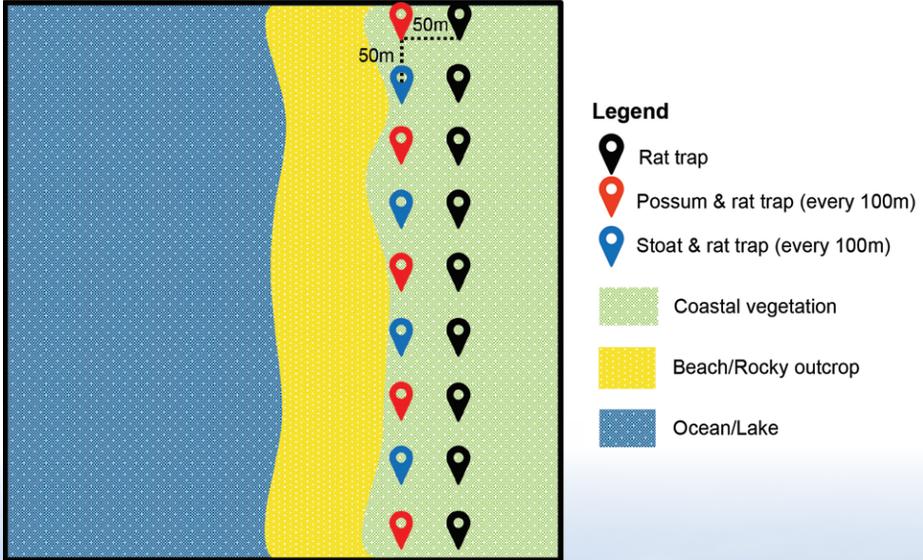
**Table 6: Minimum recommended density of traps for coastlines**

Rats	<ul style="list-style-type: none"><li>• Set traps every 50 m.</li></ul>
Possums & Stoats	<ul style="list-style-type: none"><li>• Set traps every 100 m (staggered between each other to avoid having more than two different traps at 50 m points).</li></ul>

Figure 8 illustrates how, if there is enough habitat behind the beach or rocky outcrop, an additional line can be set 50m further back from the first line. If no vegetation is present on your coastal site (e.g. the Nelson Boulder Bank), place your traps on the boulders/beach that exists above the tidal range and make sure they are secure. Using metal rods to provide an anchor point for your traps can be beneficial here.



**Figure 8: Coastal trap layout**



*Traplines in the coastal environment should follow the coastline*

# WETLANDS/ESTUARIES

Wetlands and estuaries are very dynamic and variable sites. Traps should be laid around the perimeter of wetland/estuary area, as well as in a grid pattern within any dry areas that exist in the boundary. In the same vein as previous project site types, your trap lines should follow the natural contours of the landscape that mammalian predators are likely to follow, thereby increasing your likelihood of catching them. Figure 9 illustrates this, including an additional rat trap in a central dry portion where space has permitted. The size of additional surrounding dry areas may then be overlaid with an appropriately sized grid – for example, there may well be enough space for four additional traps in a dry area.

Table 7 shows the **minimum** recommended density of traps to target the three key predator species.

**Table 7: Minimum recommended density of traps for wetlands/estuaries**

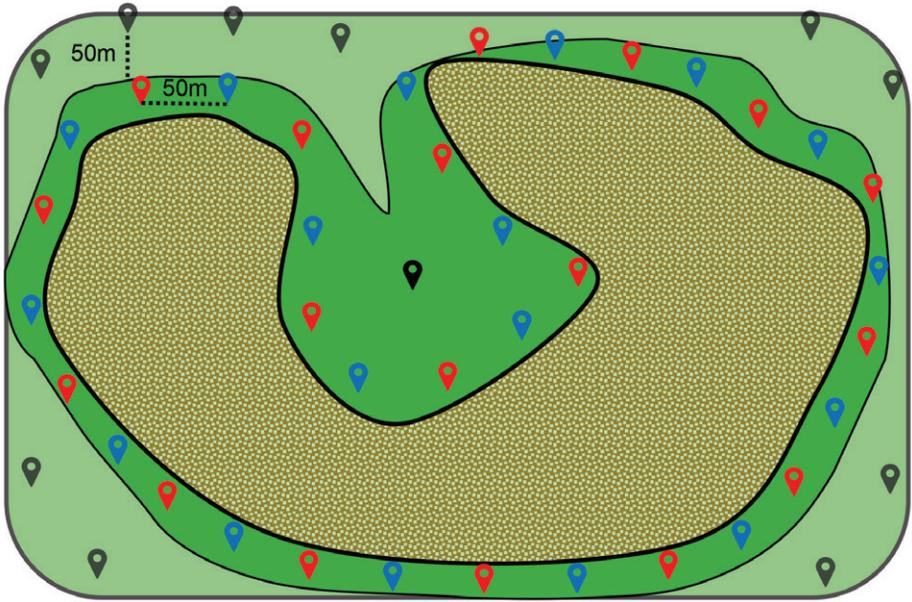
<b>Rats</b>	<ul style="list-style-type: none"><li>• Set traps every 50 m.</li></ul>
<b>Possums &amp; Stoats</b>	<ul style="list-style-type: none"><li>• Set traps every 100 m (staggered between each other to avoid having more than two different traps at 50 m points).</li></ul>

Make sure your traps won't be too near to the water and therefore in danger of being submerged. This is a balancing act, as wetlands and tidal areas naturally flood.



*Traps should be laid out in drier areas along the perimeter of wetlands and estuaries*

**Figure 9: Wetland trap layout**



**Legend**

-  Possum & rat trap (every 100m)
-  Stoat & rat trap (every 100m)
-  Rat trap
-  Wetland
-  Group operational boundary
-  Possible additional rat traps if project site extends beyond 50m

# SUBURBAN AREAS

Nelson suburbs include a variety of different habitat types including urban areas, backyards, parks and patches of native bush. Figure 11 shows the best places for traps in a backyard. The information given in DOC's guide to trapping should also be used when placing traps in suburban and urban environments. Rats preferentially move along edges, so placing rat traps along a fenceline is a good idea, as is by possible food sources such as compost bins and chicken coops. Stoats move through a landscape in a similar fashion but are agile climbers and can live in trees. Possums are arboreal (live in trees) and especially love habitat margins where forest meets pasture, so you should place possum traps on trees, their branches or even fence posts.

If your project site(s) exist over a group of backyards, we recommend getting as many of those residents on-board to put traps in their backyard. If people are keen to have possum, stoat and rat traps in their garden, and if you have the resources, there is no harm in having lots of traps. However, resources are likely to be limited, and it is likely some residents won't be willing to have traps in their backyard. There will also be varying densities of housing in different parts of the region. With this in mind, we encourage groups to establish a **minimum** network as shown in Table 8 and Figure 10.

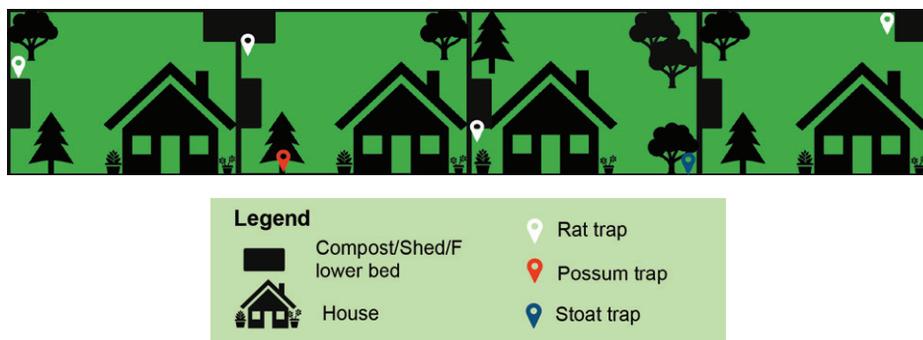


*Nelson suburbs include a variety of habitats*

**Table 8: Minimum recommended density of traps for suburban areas**

Medium/High-density housing (average of 600 m <sup>2</sup> sections and less)	
<b>Rats</b>	<ul style="list-style-type: none"> <li>Set 1 trap in every 4 backyards.</li> <li>For high-intensity trapping, we recommend 1 in every backyard.</li> </ul>
<b>Possums &amp; Stoats</b>	<ul style="list-style-type: none"> <li>Set 1 trap in every 10 backyards.</li> <li>For high-intensity trapping, we recommend 1 in every 5 backyards.</li> </ul>
Low-density housing (average of more than 600 m <sup>2</sup> sections)	
<b>Rats</b>	<ul style="list-style-type: none"> <li>Set 1 trap in every 2 backyards.</li> <li>For high-intensity trapping, we recommend 1 in every backyard.</li> </ul>
<b>Possums</b>	<ul style="list-style-type: none"> <li>Set 1 trap in every 5 backyards.</li> <li>For high-intensity trapping, we recommend 1 in every 2 backyards.</li> </ul>
<b>Stoats</b>	<ul style="list-style-type: none"> <li>Set 1 trap in every 5 backyards.</li> <li>For high-intensity trapping, we recommend 1 in every 2 backyards.</li> </ul>

**Figure 10: High-intensity trapping in medium/high-density housing**



Please be aware that these are the absolute minimum. We recommend more intense trapping efforts and would encourage groups to aim for higher densities of traps than these. Working with residents and keeping them engaged is essential, particularly raising awareness in the local neighbourhood to let everyone know of the trapping efforts present. This can also lead onto discussions with cat owners about domestic cats. Cats are a significant predator of native birds and keeping cats indoors, particularly at night, can drastically reduce bird predation. You will also be able to reassure them the traps are not targeting their pet.

**Figure 11: Recommended trap placement in a backyard**



*A good spot for a backyard rat trap is beside your compost bin*



# PREDATOR TRAPPING PLAN

With your project site(s) and trapping network clarified, you now need to select the appropriate traps and establish what bait you will use and how frequently you need to check your traps. DOC's guide to trapping outlines all of the key information and methods for trapping specific species, and the best recognised methods for undertaking that work. Please refer to Section 6 of DOC's guide to trapping for additional information. The Predator Free NZ Trust has good resources on purchasing, setting and locating traps in your backyard, as well as also providing a variety of options for purchasing different baits<sup>5</sup>.

As stated at the beginning of this document, if your trapping extends beyond the Nelson Halo operational area (Figure 1), we strongly recommend you follow DOC's guide to trapping, and clarify what predators are present through tracking methods, before you begin to trap.

## TRAPPING METHODS

Selecting the right trap for your target species is critical. Table 9 is an adapted version of DOC's guidance on trap type for target species, with a green tick indicating the appropriate trap type we recommend for each species, and which has passed National Animal Welfare Advisory Committee (NAWAC) testing guidelines. The lack of a symbol in Table 9 indicates that trap is not suitable, advocated for, or marketed in New Zealand for this pest species. We implore everyone to use best practice to ensure the humane treatment of target animals and to avoid non-target by-catch. The NAWAC test results reported below apply to the currently available and, importantly, unmodified trap as sold. The tests relate to the welfare performance of the traps ONLY and not their capture efficiency,

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<sup>5</sup> <https://predatorfreeenz.org/resources/>

cost of use, user-friendliness, and non-target animal safety. Consult DOC's guide to trapping for further information.

**Table 9: Appropriate trap type for target species**

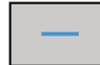
TRAP TYPE	POSSUM	SHIPRAT	NORWAY RAT	STOAT	FERRET	WEASEL	HEDGEHOG
<i>DOC 150</i>		—	✓	✓		✓*	✓
<i>DOC 200</i>		✓	✓	✓	✗	✓*	✓
<i>DOC 250</i>		✓	✓	✓	✓	✓*	✓
<i>Victor Rat Traps (in Tunnel)†</i>		✓	✗	✓		✓*	
<i>T Rex/Tomcat</i>		✓	✗				
<i>Sentinel</i>	✓						
<i>Warrior</i>	✓				✗		
<i>Trapinator</i>	✓						
<i>Goodnature A12</i>	✓						
<i>Goodnature A24</i>		✓	—	✓		✓*	



NAWAC approved and a recommended trap choice.



Failed NAWAC testing and therefore not a recommended trap choice for this pest species.



Trap has not been NAWAC tested for this species.



Trap tested as humane for stoats with the assumption that it would be humane for a lighter species of mustelid, such as weasel.

Note that Timms traps have not been included in this list as they have not passed NAWAC testing guidelines for possums. We therefore do not endorse their use.

If you're unsure what trap is suitable for your project, get in touch at [nelson.nature@ncc.govt.nz](mailto:nelson.nature@ncc.govt.nz).

† To meet with NAWAC testing guidelines, the modified Victor must be used inside a wooden, corflute or plastic pipe tunnel system (DOC 2019).



*Traps in Nelson need to be in weka-proof boxes or raised 1 m off the ground to protect inquisitive weka*

# WEKA-PROOF TRAPS

Weka are present throughout the Nelson region, so all traps on the ground or traps mounted on trees < 1.3m above the ground must be weka-proof. For traps that sit in tunnels (e.g. DOC 150s, Victors), the tunnels can be made longer to exclude weka. Traps attached to trees (e.g. Sentinel, A24s), must be mounted higher than 1.3m off the ground. Predator Free NZ Trust and DOC have custom-made weka-proof wooden trap tunnels available for purchase. If you want to make your own weka-proof trap tunnel, the dimensions for DOC 200,<sup>6</sup> DOC 250<sup>7</sup> and Victor rat trap tunnels<sup>8</sup> are provided in Table 10 below. These can be used for creating appropriately sized wooden boxes.

**Table 10: Weka-proof trap dimensions**

<b>Weka-proof single-set DOC 200 tunnel</b>	The tunnel length is 525 mm, the distance from the end mesh to the internal mesh increases from 130 mm to 255 mm.
<b>Weka-proof double-set DOC 200 tunnel</b>	The tunnel length is 950 mm, the distance from the end mesh to the internal mesh increases from 130 mm to 255 mm
<b>Weka-proof single-set DOC 250 tunnel</b>	The tunnel length is 535 mm, the distance from the end mesh to the internal mesh increases from 130 mm to 255 mm.
<b>Weka-proof Victor rat tunnel</b>	The dimensions (L x W x H) for the wooden tunnel are: Lid 490 x 150 x 25 mm Sides 530 x 147 x 25 mm Base 510 x 150 x 25 mm Mesh 170 x 130 mm

## REMOTE TRAPPING

In large blocks it can be difficult regularly checking a trapping network effectively. Advances in technology have allowed various remote trapping operations to be viable options to groups and councils. For more information, see <https://predatorfreenz.org/resources/recording-monitoring-options/remote-monitoring-traps/>.

6 <https://www.doc.govt.nz/Documents/conservation/threats-and-impacts/animal-pests/doc200-predator-trap.pdf>

7 <https://www.doc.govt.nz/Documents/conservation/threats-and-impacts/animal-pests/doc250-predator-trap.pdf>

8 <https://www.doc.govt.nz/get-involved/conservation-activities/build-a-backyard-trapping-tunnel/>

# TRAP PLACEMENT

When placing your traps, there are some important points to remember:

- In difficult terrain, to achieve the necessary spacing you may need to set possum and stoat traps down ridges, spurs and landscape contours
- Place traps along forest edges, farming boundaries and under scrub cover as opposed to open areas.
- Rats particularly like to run along features, so do not place traps in the open without any cover (open fields, beaches, etc.). Ensure you place the trap where you think a rat would like to live or walk by. If you have open fields, we recommend placing traps under any fences present, or in any vegetation cover, as this is far better than out in the open.
- Place traps along rock walls or coastal features and under cover. If you have buildings or other structures, then target these areas too, such as under or behind sheds and derelict buildings.
- When placing your trap, make sure it is on reasonably level ground or a solid tree and firmly secured. Using rocks or metal poles to secure traps to the ground can also be effective.
- Regularly clear any obstructions from trap openings.
- Save the GPS location information for all your tracks and traps – GPS devices can be borrowed from NCC.
- Label traps clearly. If traps are off a track, place an indicator marker near the track to help volunteers locate them in future.



*Place traps undercover rather than out in the open if you are targeting rats*

- Register your trap locations into the Trap.NZ database ([www.trap.nz](http://www.trap.nz)).
- To prevent potential removal/damage, make sure residents in the area know the location and nature of the traps used.
- When placing traps in suburban project sites, particularly backyards, don't be afraid to move traps if you aren't getting any success. However, be aware that rats, stoats and possums can be subject to neophobia, whereby something new is off-putting. Having one trap that you move around between a compost heap, shed and native bushes on a monthly basis can be a great method, as can three individual traps at these locations.

## CHECKING TRAPS

Traps should be checked, rebaited and cleared regularly. The frequency of checks on traps is determined by a number of factors, including trap type, project site type, size, and the density of predators you are targeting. Refer to DOC's guide to trapping to establish what is required for your specific trap network:

Traps should be checked, rebaited or cleared every week within a smaller block, and for medium to large blocks every fortnight should be the minimum. For backyard traps, check and rebait them regularly (at least once or twice a week). The more predators you are catching in your traps, the more frequently you will need to check them.



*Traps should be checked weekly in small sites or where there is enough people power. Photo: Martin Heine*

## POSSUM TRAPS

Possom traps should be moved to new adjacent locations every 4 months as possums like to investigate new things. If this is not possible (for instance, in small blocks and suburban areas), just continue to change your bait, or lure, regularly.

## BAIT TYPES

Various types of baits are available and applicable to a variety of species. DOC's guide to trapping gives a basic overview of bait types that work for target species.

## SIGNAGE

If there is public access to your site, it is essential you have simple and clear signs in and around your project site to let the public know of traps in that area.

## MAPS

Accurate, up-to-date maps showing all your trap locations are an important resource for all of your group's members. Uploading the locations to Trap.NZ provides a clear overview of your trapping network, and having handheld laminated maps and GPS units with the trapping locations marked provides efficient means for your members to navigate during trap checks.

## CATCH DATA

Make sure that you and your volunteers record accurate information each time a trap is visited. We recommend you input your data Trap.NZ.

## MAINTENANCE ACTIVITIES

Cleaning out traps while doing your trap line is often overlooked. Schedule in a regular effort to clean traps of dust, dirt and decaying matter, as well as clearing entrances of any obstacles. This will help to make sure the traps are easily accessible to your target predators and the trap mechanisms are working properly. Over time, traps will begin to lose efficiency if they are not properly maintained, so an annual check is recommended. Refer to DOC's guide to trapping for details on how and when to undertake trap maintenance.



# MONITORING PLAN

Understanding the changes that occur to predators and native wildlife after you begin and throughout your predator control is essential to determining how your trapping efforts are contributing to improvements in the ecology of your area. We have split monitoring into two types: predator monitoring (also known as 'results monitoring') and outcome monitoring.

## PREDATOR MONITORING

Monitoring the number of predators remaining at your site (as opposed to the number of predators you are catching) provides valuable information to assess the success of your project. This can have a direct impact on your trapping efforts, for example you might choose to change your bait or trap placement if your predator monitoring shows there are a lot more predators at your site than are being caught in your traps.

Commonly used methods to monitor predators are tracking tunnels, wax blocks, chew cards and, increasingly, trail cameras. In light of global plastic pollution, we highly encourage the use of plastic-free options where best available, to reduce the amount of single-use plastics needlessly going into the environment. For example, using batch-made wax blocks as opposed to single-use plastic tracking tunnels and chew cards can be an effective method of reducing plastic use whilst still providing an effective means of monitoring mammalian predators.

## SPECIES-SPECIFIC METHODS

Different species require different monitoring methods. Table 11 details which methods are most effective for certain species. Make sure you can monitor all of the predator species you are targeting (e.g. rats, possums and stoats) with your methods. DOC's guide to trapping ('results monitoring') has further detail on some of these methods for tracking specific predators.

**Table 11: Monitoring unit effectiveness for specific species**

Monitoring Unit	Possum	Ship Rat	Norway Rat	Stoat	Ferret	Weasel	Hedgehog
Wax blocks	✓✓✓	✓✓✓	✓✓✓	✗*	✗*	✗*	✓✓
Tracking tunnels	✗**	✓✓✓	✓✓✓	✓ ✓	✓*	✓✓	✓✓
Trail camera	✓✓✓	✓✓✓	✓✓✓	✓**	✓**	✓**	✓✓✓
Chew cards	✓✓	✓✓	✓✓	✗	✗	✗	✓

✓✓✓ – Very Good

✓✓ – Good

✓ – Average

✗ – Not Good

✗\* – Not suitable but possible if wax blocks are made up with fish oil or meat juices

✗\*\* – Possums generally don't fit, although you can use tracking plates externally (outside of a tunnel) and get tracks along tree branches, or make a larger tunnel

✓\* – Possible as ferrets usually don't fit through, but can be recorded

✓\*\* – Good but will require a high-speed trail camera to capture them

## WAX BLOCKS

Flavoured wax blocks are simple and effective monitoring tools that can be used to detect rodents and other species. Wax is melted down, flavoured, and once solid, a hole is drilled into it to attach a wire, as shown in Figure 12. These can then be placed in various locations (tree trunks, roots etc.) within your trapping area. The moulds are checked regularly (every week) and provide evidence of chew marks, which can then be analysed to clarify which species has been chewing on the wax blocks. Details on how to make wax blocks are available in Wildlife Management International Limited's (WMIL) wax block guidelines (WMIL 2019)<sup>9</sup>, including how to analyse teeth marks.

<sup>9</sup> [www.wmil.co.nz/themes/main/assets/files/WMIL-2020-Wax-Block-Guide.pdf](http://www.wmil.co.nz/themes/main/assets/files/WMIL-2020-Wax-Block-Guide.pdf)

These flavoured wax blocks help give an indication of the presence or absence of target mammalian predators (especially rats and possums). Wax blocks can also be monitored using trail cameras.

For backyard environments, we recommend placing wax blocks along fencelines, under shrubs, in old shed buildings or near compost heaps.

**Figure 12: Three ‘flavoured’ wax blocks** *(image courtesy of WMIL)*



## TRACKING TUNNELS

Tracking tunnels and cards can be purchased from several places, the Predator Free NZ Trust website has a list. When placing your tracking tunnel, make sure it is on reasonably level ground and firmly pegged into position, and clear any obstructions from tunnel ends. Within backyard environments, we recommend placing tunnels along fencelines, under shrubs, in old shed buildings or near compost heaps.

## CHEW CARDS

To reduce the amount of unnecessary plastic waste entering the environment, we discourage the use of single-use plastic chew cards. Additionally, chew cards have been shown to have mixed success, so we advocate for the use of home-made wax blocks as a far more valuable and environmentally sustainable alternative.

## TRAIL CAMERAS

Trail cameras are a more expensive option for monitoring. Despite not being as effective as other methods, they can still provide predator presence/absence and a great insight into their behaviour. The video or images captured can also help rally volunteer effort and give a motive to ramp up trapping work if a predator is captured on camera in and around traps/monitoring units. However, do bear in mind that it can be a significant amount of effort to view and interpret the captured images and video. Cameras should be set up along well-used animal tracks or at points like traps, wax blocks and tracking tunnels to capture target species movements. These can also be useful when native bird species' nest locations are known, to gather information about potential predator interactions.

Trail cameras are a valuable tool to give a better indication of the species present within small or even larger sites to help tailor specific trapping techniques. We recommend Bushnell, Browning and Little Acorn cameras, and we also suggest purchasing rechargeable batteries and solar panels to help increase their battery life. Make sure SD memory cards are retrieved regularly (once a week) and that batteries are checked and replaced when necessary. Cameras can be borrowed from NCC for short periods if need be.

Camera placement depends upon the habitat and target species:

- In forest/bush, affix the unit to a tree facing the track or trap/wax block.
- In riparian/coastal/wetland areas, create a stone wall around the units to keep them secure and less visible.

In all settings, make sure any grass or branches in front of the unit are cleared. This is because their movement will constantly trigger the motion sensor, even if it is only slightly windy, giving you thousands of photos or video clips where no predators are present, using up valuable memory card space and battery life. Consider whether you wish to capture photos or video of your target species. Both have their advantages and disadvantages – photos can help with purely tracking individuals, but video can provide better indications of behaviour around monitoring units or traps. Remember that the longer the video clip length or the higher the photo quality selected, the quicker you will use up memory card space. This isn't an issue if you plan to regularly check your cameras, and it will provide greater quality footage to share with the rest of your group and members of the public. Photos and video clips can also be used for funding applications for the group's work. For rats and possums, entry level cameras are fantastic at capturing these species. However, if stoats are the target, consider investing in higher speed cameras to capture the rapid movements of these mustelids. Table 12 shows recommended camera settings for monitoring the three key target species.

**Table 12: Recommended species-specific camera settings**

Target Species	Camera Recommendation	Video Length	Sensitivity	Resolution	Trigger Speed
Rat	Basic remote camera unit	> 10 seconds	High	Highest	High
Possum	Basic remote camera unit	> 10 seconds	High	Highest	High
Stoat	High speed remote camera unit	> 10 seconds	High	Highest	Highest

## MONITORING SET-UP

The number of monitoring units (i.e. tracking tunnels, wax blocks, chew cards or trail cameras) you need to adequately monitor target predators at your site depends on the size and type of your site. The DOC guide to trapping has good information on how to set up predator monitoring for large sites (>50 ha). Table 13 describes how to set up predator monitoring in the different types of project sites likely to be encountered in the Nelson Halo.

**Table 13: Minimum requirements for predator monitoring**

Project Site Type	Predator Monitoring Required
<b>Large Blocks</b> (> 50 ha)	The minimum monitoring required by DOC's guide to trapping is one monitoring line per 50 ha. On each line, 10 units (whether wax blocks or tunnels) are placed 50 m apart. Make sure they're placed away from your trap lines.
<b>Medium Blocks</b> (5–50 ha)	The minimum monitoring we recommend is placing two monitoring lines within your site. On each line, 10 units (whether wax blocks or tunnels) are placed 50 m apart. Make sure they're placed away from your trap lines.
<b>Small Blocks</b> (< 5 ha)	The minimum monitoring we recommend is placing one monitoring line within your site. On the line, place as many units as possible (whether wax blocks or tunnels) 50 m apart. Make sure they're placed away from your trap lines. If your site is very small, you may only have room for several units, which is absolutely fine. Place as many as you can 50 m apart from each other in your project site(s).
<b>Riparian</b>	Monitoring should cover a linear feature. Using DOC's guide to trapping, we recommend placing two monitoring lines – one each side of the river. On each line, 10 units (whether wax blocks or tunnels) are placed 50 m apart. Make sure they're placed away from your trap lines.
<b>Coastlines</b>	Monitoring should cover a linear feature. Using DOC's guide to trapping, we recommend placing the monitoring line parallel to your trap line. If sufficient habitat exists (no less than 100 m) behind the beach area, then an additional line can also be placed. On each line, 10 units (whether wax blocks or tunnels) are placed 50 m apart. Make sure they're placed away from your trap lines.
<b>Wetlands / Estuaries</b>	Monitoring should follow the perimeter of this feature, similar to your trap line. We recommend placing the monitoring line parallel to your trap line. If sufficient habitat exists (no less than 100 m) behind the wetland/estuarine area, then an additional line can also be placed. On each line, 10 units (whether wax blocks or tunnels) are placed 50 m apart. Make sure they're placed away from your trap lines.
<b>Suburban Areas</b>	Similar to the trapping guidelines, for medium/high-density housing areas, we recommend, at a minimum, one monitoring unit per four backyards. In low-density housing, we recommend, at a minimum, one monitoring unit per two backyards.

# MONITORING UNIT PLACEMENT

Once you are clear on your minimum monitoring set-up required for your project site(s), you can use this as a basis for your monitoring unit placement. When placing your units, remember:

- Rats like to run along features, so do not place monitoring in the open without any cover (open fields, beaches, etc.). Make sure you place the unit where you think a rat would like to live or walk by. If you have open fields, we recommend placing units under any fences present or in any vegetation cover, as this is far better than out in the open.
- Place units along rock walls or coastal features and under cover. If you have buildings or other structures, then target these areas too, such as sheds and derelict buildings.
- Make sure the unit is securely fastened to avoid it being blown away by wind, swept away by any flooding, or bumped out of place by walkers or livestock (if in a paddock).
- Save the GPS location information for all your tracks and units – GPS devices can be borrowed from NCC.
- Label monitoring units clearly. If they are placed off a track, place an indicator marker near the track to help volunteers locate them in future.
- Input your locations into the Trap.NZ database ([www.trap.nz](http://www.trap.nz)).
- To reduce potential removal/damage, make sure residents know the location and nature of the units used.
- Place monitoring units away from your trap line. If this is not possible, you may need to place units between traps. This is to see if rats, possums or stoats are avoiding the traps for whatever reason, or using a microhabitat that isn't being trapped.

# MONITORING FREQUENCY

Monitoring can be tailored to take place during key times of the year – for example, during bird breeding seasons, or before and after a control operation. Continual monitoring can be undertaken four times per year, or even once per month/two months. Further information can be found in Section 5 of DOC's guide to trapping.

## SIGNAGE

If there is public access to your site, it is essential that you have simple and clear signs to let the public know of tracking efforts so your monitoring units are not tampered with.

## MAPS

Accurate, up-to-date maps showing all your monitoring locations are an important resource for all of your group's members. Uploading the locations to Trap.NZ provides a clear overview of your monitoring network, and having handheld laminated maps and GPS units with the monitoring locations marked provides efficient means for your members to navigate during checks.

## DATA

Make sure that you and your volunteers record accurate information each time a monitoring unit is visited. Your data should be inputted into Trap.NZ and will likely be used by many people, so it is important that it is clear and easily accessible.

## MAINTENANCE ACTIVITIES

Continual checking of your wax blocks or tunnels will not only allow data to be collected on estimated numbers during your trapping programme, it will also help you to make sure wax blocks or tunnel ink papers are replaced regularly to reduce the likelihood of missing data.

Maintaining your signs and other infrastructure is also important for your project to be successful.



*Rats are a key predator to target in the Nelson Halo. Photo: Ngā Manu*



*Monitoring changes in the wildlife you are trying to protect is an important part of your project. Photo: Eva Mairoll*

# OUTCOME MONITORING

We highly encourage community trapping groups to undertake outcome monitoring so they can document biodiversity changes as a result of their trapping activities. Community-led biodiversity restoration projects are long-term endeavours with long-term goals that are only likely to be realised over decades or even longer. All groups and their members should therefore be investing time in monitoring the wildlife that all of their efforts go into protecting. On top of this, you'll be providing valuable data for local, regional and national level environmental reporting.

The following recommendations and guidelines for outcome monitoring will complement data on biodiversity surveys undertaken by NCC and their contractors. The size of your project site(s) will impact how representative your data is of the Nelson Halo. For example, small sites (1–2 ha in size) are unlikely to be representative of the wider Nelson area. However, pooling the data from these small areas with the data collected by NCC can provide more representative monitoring for the larger region. Managing a small area contributes to the whole – however, it can be difficult to achieve predator suppression with the threat of constant re-invasion. Collaborating on trapping and monitoring with neighbouring groups is vital in this instance, because overall your joint efforts will produce further-reaching benefits and more tangible results from your monitoring.

Regardless of the size of your project site(s), we encourage groups to undertake as much monitoring as resources allow, with larger sites requiring a wider area to be covered. Aim to cover the largest distribution of your site(s) as possible. The highest priority for your group is undertaking bird diversity checklists through eBird in order to effectively monitor the change in bird diversity and distribution as predator trapping increases across the Nelson region. Additional methods, as listed below, can then follow on from that.

## BIRD DIVERSITY VIA EBIRD CHECKLISTS

Undertaking checklists through eBird can provide supplementary data to the Nelson Nature bird counts, which will help target the arrival of native and endemic species that are expected to increase in number and distribution due to predator trapping. This data will help provide real-time information on how quickly native and endemic bird species are recolonising sites with predator control, which will ultimately answer two key questions:

- 1) Are native bird numbers increasing at each site?
- 2) Are more species of native birds being recorded at each site?

By undertaking regular checklists, this data can pick up these changes far more quickly than annual 5-minute bird counts. Whilst the data goes into a central online database and is accessible to researchers and ornithologists across the globe, groups can download all of the data for their site(s) to then analyse themselves. Data can be easily downloaded from the eBird website through your group's eBird account. It is therefore important you create a group eBird account for all members to share observations with to effectively collate them. The more data that is put in by your group, the more you as a group can then download and input into answering the above key questions for your project site(s). How you analyse your data is up to you and your group, and if any specialist advice is needed, please contact Nelson Nature for further support.

Guidelines for undertaking an eBird checklist are given in Figure 13. We recommend undertaking as many checklists as possible over the entire year and keeping a close eye on species that will be spilling out gradually from the Brook Waimārama Sanctuary, such as kererū and kākā. These native species are predicted to increase over the next decade across the region and so can be great indicators of change over time as you observe more and more of them.

You can submit observations either manually through the eBird online database, or through the eBird smartphone app. We advocate all groups and their members register for a free account and undertake as many checklists as possible, inputting them into eBird whilst out in their project site(s) or once back home. This can be done during trapping or other monitoring activities through the eBird smartphone app or by taking notes in a notebook and entering it once home into the online database. Checklists should be undertaken over a period of no less than 5 minutes and generally no more than an hour to increase the temporal resolution of the data. Counts may be either stationary, whereby an observer remains in the same position and counts every bird they see and hear, or travelling, whereby an observer walks a distance and counts every bird they see and hear. These can be done whilst checking trap lines.

## NOCTURNAL COUNTS

We strongly recommend undertaking nocturnal counts around your project site(s). Going out with your group and undertaking nocturnal eBird counts regularly can target under-counted species such as morepork and weka. These species will respond positively to predator trapping programmes across the Nelson region. The resident urban population of weka in Nelson is somewhat unique, so gaining

observations on their presence and absence from certain areas around the region is invaluable. You can use your smartphone or relatively inexpensive Bluetooth speakers to play calls to try to callback from the species targeted if need be. If using playback, we recommend choosing random locations in your project site(s) and establishing GPS points for each of the stations to facilitate repeat visits. Audio files of bird songs and calls can be downloaded from New Zealand Birds Online,<sup>10</sup> XenoCanto<sup>11</sup> or the DOC website.<sup>12</sup> Again, we encourage groups to be inputting this data into the eBird database and also to use playback sparingly (twice a year at the maximum). There is a risk of de-sensitising local birds if playback is used too frequently, so we caution on overuse.

## CITIZEN SCIENCE

We encourage groups to participate in citizen science projects both local and national. Examples include the New Zealand Bird Atlas scheme, the Great Kererū Count, and backyard bird surveys. We encourage groups to also contribute all their bird observations to eBird and additional species groups to iNaturalist as part of their monitoring too. The New Zealand Bird Atlas is a nationally significant citizen science scheme that we highly encourage all groups to be submitting their data to, as it will complement data and observations across local, regional and national scales to inform conservation policy and management.

## MONITORING CRYPTIC SPECIES

Monitoring can be targeted in certain areas of your project site(s) too, such as wetlands. This is useful when looking for more cryptic bird species such as fernbirds, crakes and rails. You can follow the audio playback method described above for 'Nocturnal Counts'. It is important to remember that these observations are very targeted and can only generate rough presence/relative abundance estimates, as the bird may be present but won't respond to playback. There is always a risk of de-sensitising local birds if playback is used too frequently, so we caution on overuse. Undertaking this very species-specific monitoring twice a year would give a basic outlook – however, it should be part of wider efforts to create complete eBird checklists throughout your project site(s).

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<sup>10</sup> <http://lnzbirdsonline.org.nz/>

<sup>11</sup> <https://www.xeno-canto.org/>

<sup>12</sup> <https://www.doc.govt.nz/nature/native-animals/birds/bird-songs-and-calls/>



*Tui. Photo: Sarah Allsopp*

## Figure 13: Guidelines for creating an eBird checklist (modified from the *New Zealand Bird Atlas Handbook* (2019))

Checklists can either be submitted as *stationary* or *travelling* counts, and observers are free to choose how long they spend surveying. We recommend spending **no less than 5 minutes and no longer than an hour per checklist**. For travelling counts we recommend splitting long distances into 1km sections.

A complete checklist in eBird is when an observer is reporting all the birds they were able to identify to the best of their ability by sight and sound. When submitting a complete checklist, eBird also requires you to specify your 'start time' (the time of day at which you began your checklist) and your 'duration' (how long you spent compiling your checklist). By submitting a complete checklist, you are not only reporting the birds that you encountered, but you're also reporting the birds you did NOT observe. This 'negative data' allows researchers to realise the full potential of eBird data and better inform bird occupancy models and species distribution maps. For more information on complete checklists, visit this eBird help page: <https://tinyurl.com/y5h9lw5c>. The eBird checklist requires the following information.

### **OBSERVER:**

Record the first and last name of the observer completing the checklist. If more than one observer is working together to compile a checklist, record the names of all observers in the 'checklist comments' field, or use eBird's checklist sharing tool to 'share' the checklist with all observers. We recommend creating a group eBird account that all checklists can be shared with. A volunteer can then create a checklist and share that data with the group account.

### **LOCATION:**

Record map coordinates for the location the checklist was started. This is done automatically when using the eBird smartphone app to collect data in the field. If using the eBird website, manually plot your location using the submit map tool on the eBird website or enter the coordinates from a GPS unit. **It's vital that you accurately record the location at which you collected your observations.**

### **DATE:**

Record the date the checklist was carried out (*dd/mm/yyyy*). This is done automatically when using the eBird smartphone app to collect data in the field.

## SURVEY PROTOCOL:

Record whether you completed a *stationary* count or a *travelling* count for each checklist. A stationary count is one where you completed your list from a fixed location, whereas a travelling count is where observations were collected while travelling over a specified distance. For each travelling checklist, the **total distance travelled** should be recorded to the nearest 0.1 km.

## START AND FINISH TIME:

Record the time you started and the time you finished your checklist.

## SPECIES:

The common names of all the individual species you see and hear while completing your checklist need to be recorded. It is important that you **record all of the bird species that you were able to identify by sight and sound** in your checklist. We also encourage you to record observations of any observed breeding activity (e.g. nest building, incubating eggs, feeding young).

## NUMBER:

For each checklist, record the **total number** of individuals encountered for each species. Observers don't need to differentiate between birds seen or heard. For large clusters or flocks of birds, an estimate of the number of birds seen or heard will be adequate. Visit this eBird help page for more information on recording total number of individuals and estimating counts (<https://tinyurl.com/y5phws3n>).

If you need any assistance using eBird or have questions then please contact the NZ Bird Atlas team at [nzbirdatlas@wmiil.co.nz](mailto:nzbirdatlas@wmiil.co.nz) or Nelson Nature a [nelson.nature@ncc.govt.nz](mailto:nelson.nature@ncc.govt.nz).

## FIVE-MINUTE BIRD COUNTS

Five-minute bird counts are commonly used by ornithologists and are a possibility for outcome monitoring, but specialist advice is needed to get scientifically rigorous methods and results. In light of this, we **discourage** using this tool due to the required expertise and scientific rigour. In the past, groups have often underestimated the number of stations and frequency of counts needed, on top of lacking the expertise for bird identification, thereby rendering their results inaccurate and not producing the data they wished for. Nelson Nature undertakes 5-minute bird count monitoring across the region with trained professionals, and so your group's outcome monitoring, utilising the listed methods above, can support and combine with that monitoring to give the best possible monitoring effort needed for the Nelson Halo project. If you and your group feel you have the resources and knowledge required to undertake 5-minute bird counts, or if you want further information and to get specialist advice, please contact Nelson Nature at [nelson.nature@ncc.govt.nz](mailto:nelson.nature@ncc.govt.nz).

## WĒTĀ HOTELS

Wētā exist in the Nelson region and will respond positively to predator trapping because they have a high rate of productivity. Wētā also require smaller areas to survive than vertebrates and can live in fragments of original habitat that still exist in the Nelson region. Creating wētā 'hotels' in small reserves is a great way to monitor their presence and absence from areas before, during and after predator trapping. They are relatively simple to build and inexpensive, providing a good tool to use to get feedback on your group's efforts. Details of how to construct one can be found at <https://www.doc.govt.nz/weta-motel>.



# HEALTH & SAFETY PLAN

Before any volunteer or member of your group goes out, it is essential you have a Health and Safety Plan in place to ensure everyone is safe throughout your group's operations. The Health and Safety at Work Act 2015 requires volunteers to take reasonable care of their own safety and not do anything that could harm another person. Your group may also have additional responsibilities under the Act, depending on how and where you are working.

For more information, see <https://worksafe.govt.nz/managing-health-and-safety/getting-started/understanding-the-law/volunteers/information-for-volunteers/>.

## HAZARDS

A hazard is identified as anything that may cause harm and includes a person's behaviour where that behaviour has the potential to cause death, injury or illness to a person.

Ensure you take time to identify hazards applicable to the work your group will undertake, and how you're going to manage against those hazards. You will need to make sure that all volunteers have read and are aware of all protocols and procedures. List all of your hazards in your Health and Safety Plan before you start work. This is to clearly identify and then clarify mitigation actions for each of the risks possible.

## SAFETY OFFICER

Within your group, delegate a Safety Officer to coordinate and manage all health and safety procedures and reporting. The Safety Officer needs to be available to all volunteers/members to receive incident reports, check-ins and other key components of the Health and Safety plan.

## TRAINING

Having efficient processes to train all new volunteers on your group's operations and procedures will save a lot of time and prevent potential incidents from occurring. All volunteers should be trained and competent in setting and clearing traps and in the use of GPS, 4WD (if applicable) and personal protective equipment (PPE).

## PERSONAL PROTECTIVE EQUIPMENT (PPE) AND FIRST AID

Are volunteers equipped with suitable PPE, such as Hi Vis vests, gloves and sturdy boots, if they need it? Having first aid available, including a first aid kit, is also important. Make sure everyone knows where all PPE and first aid is located.

## CHECK-IN PROCEDURE

When volunteers go out, it is important that they not only have a central contact (e.g. Safety Officer) to inform of their intentions, but also that they have a set period of time in which they need to check in by. Having a group chat on a social media application like WhatsApp or Facebook Messenger is a possibility for a small group to ensure everyone is aware of everyone's location. This is to ensure the quickest response if anything does occur whilst people are out checking traps. Describe your check-in and check-out procedure as clearly as possible. Begin by establishing your check-in method, whether it is a phone-in or a text message, and then a key contact.

## INCIDENT REPORTING/MANAGEMENT

Clear procedures for reporting and managing incidents should be in place. All accidents, incidents, injuries and near misses must be reported to, and accurately recorded by, the Safety Officer in the Accident Register. Clearly establishing how

quickly an incident needs to be reported is important too, such as within 8 hours of the incident occurring.

Managing any incidents is the next step. If an incident was unavoidable, clarify how the risk can be mitigated. If an incident was avoidable, clarify how the risk can be eliminated. Establishing a time frame for the Safety Officer to investigate an incident will allow them to clearly manage and mitigate the risk of future incidents occurring.



*It is important that everyone in your group has the Personal Protective Equipment (PPE) they need to operate safely, e.g. Hi Vis and gloves*



# REVIEW PLAN

At a minimum, you should review your group's plan annually.

Organise a team meeting to go through each section of your plan detailing and updating any changes that have occurred. Potential areas of change are highlighted in the template in the review section, and key questions are listed to initiate conversations around that topic. Please do go through each section succinctly and thoroughly to make sure all aspects of your community group's work are reviewed. This includes your own health and safety plan, which we highly recommend is also reviewed during this meeting. Make sure that the next meeting is committed to before the review finishes.



# APPENDIX A: NELSON HALO PROJECT PLAN TEMPLATE



South Island black morph Fantail/pī wakawaka  
(*Rhipidura fuliginosa*). Photo: Dan Burgin

# USING THIS DOCUMENT

This Project Plan template sits alongside the *Nelson Halo Predator Trapping Guide* (2019) and should be completed using the guidance given in that document. The purpose of this template is to help your group think about and capture all the factors that you need to consider when you are developing and undertaking a predator trapping project within the Nelson Halo or nearby areas.

Once you have completed the Project Plan for your group, you might want to add your group's logo and change the cover image to something meaningful for your group.



# GROUP DETAILS

GROUP DETAILS	Comments
Community group name	Name (e.g. Nelson Maitai Reserve Trapping Group)
Desired conservation outcome(s)	What are you trying to protect and what are your desired outcomes and goals?
Number of members and types (paid and voluntary)	For example, 25, 2 full-time staff, and 23 registered volunteers, and possibly split between trapping volunteers and funding, or administrative roles.
Project site location	The physical address of the site(s). Include a map, even if just a screenshot of Google Maps or Top of the South Maps with a clear project boundary, drawn to this plan.
What type of site(s) make up the project site?	Is it private property, a reserve, a combination of these or something else? Are you focusing on one or two patches, or the whole area?
Activities present	Are there recreational facilities there, or is it private, residential, commercial or something else?
Legal status on any of the property	For example, if private land, does it have a covenant? Are there any restrictions around what activities can take place there?
Landowner permissions granted?	Is it owned by Nelson City Council or DOC, or is it privately owned? Have you been granted access? You must always have landowner permission before starting pest control.
Funding	Do you know how you will fund the project? Will your funding cover all your costs (trapping, bait, monitoring etc)? Knowing where your funding is coming from for each phase (e.g. grants, direct council support, fundraising, volunteers' own donations etc) so the project can continue is essential.



# PROJECT SITE(S)

HABITAT	Comments
Project site(s) type	List all that apply within your project site(s) using the types listed in Table 1 of the <i>Nelson Halo Predator Trapping Guide</i> . List as much detail as possible – for example, any wetland areas, coastal broadleaved forest, mānuka scrub, native forest, exotic pine plantation, backyards, or estuary.
Project site size(s)	Total hectares that will be under predator trapping.
Terrain and access	Is it steep, flat or mixed? Are there easy access points? Are there streams/waterways to cross and are they susceptible to flooding? Are there tracks, paths or boardwalks in place, or do these need to be installed?
Maintenance	How frequently are you going to undertake maintenance of your tracks, paths, traps and other site areas?
Additional features	If there are known significant natural areas (SNAs), heritage sites and buildings, power stations, or other features, please list them here.



# PREDATOR TRAPPING PLAN

PREDATOR TRAPPING DETAILS	Comments
Target species	The minimum should be rats, possums and stoats in accordance with the Nelson Wildlife Halo Operational Plan. Additional target species should also be considered – for example, hedgehogs, weasels and feral cats. You can always adjust your list if you need to.
Priority target species	The Nelson Wildlife Halo Operational Plan has three focal species – rats, stoats and possums – so these are your priority.
Trapping methods	List these one by one for each target species. Refer to the 'Trapping Methods' section in the Nelson Halo Predator Trapping Guide, and detail: <ul style="list-style-type: none"><li>• Trap type(s) selected (weka proof?)</li><li>• Number of traps</li><li>• Grid layout based on project site(s) identified</li><li>• Number of trap lines</li><li>• Distance between traps</li><li>• Distance between trap lines</li><li>• How frequently will you be able to check the trap network?</li><li>• Bait/lure(s) to be used</li><li>• Signage locations and usage (do you have clear signs to let the public know?)</li></ul>
Maps	Have you created maps showing the locations of your traps? Are these maps available to your group members? Have you entered the trap locations to Trap.NZ?
Catch data	Where are you going to capture all of this data and how? Will volunteers need pads of paper, or are they going to use the Trap.NZ app? Have you created a profile for your group on Trap.NZ? Do you have a master spreadsheet for data to be inputted into as a backup? Who will update this?
Maintenance activities	Detail scheduled maintenance activities, frequency and methods to be used. For example, once every six months using scouring pads/wire brushes to clear built up fur in the trap, especially in the trap mechanism.



# MONITORING PLAN

MONITORING DETAILS	Comments
<b>Predator monitoring methods</b>	Monitoring the mammalian predators in your project site(s) is instrumental in successful trapping, as well as helping give results for funding applications and for promoting your group. Include: <ul style="list-style-type: none"><li>• Required monitoring as determined by project site(s) type(s)</li><li>• Methods to be used (wax blocks/tracking tunnels/trail cameras)</li></ul>
<b>Predator monitoring frequency</b>	How often are you going to check your units? If using different techniques, list each with your desired checking frequency, and who is going to check.
<b>Signage</b>	Have you created signs for the general public to let them know you have monitoring stations present?
<b>Maps</b>	Have you created maps showing the locations of your monitoring units? Are these maps available to your group members? Have you entered the monitoring unit locations to Trap.NZ?
<b>Data</b>	Are all your members clear on how they will collect and upload data from your monitoring?
<b>Maintenance activities</b>	Be sure to include regular checking of your signs to ensure they are still present and clear to read for the general public and your group members.
<b>Outcome monitoring</b>	List your methods of outcome monitoring for your project site(s). Who is going to undertake the monitoring and when? Who will oversee coordinating eBird data upload/download/analysis?



# HEALTH & SAFETY PLAN

HEALTH & SAFETY DETAILS	Comments
Health & Safety Plan	Have you identified anything that may cause harm within your project and how you will manage these? Have you completed a Health & Safety Plan for your project and has everyone in your group read it? You should attach your Health & Safety Plan to this Project Plan.
Safety Officer	Do you have a Safety Officer appointed for your group to coordinate and manage all Health & Safety procedures and reporting? If so, insert their contact details here.
Training	Do you have a process in place to train new volunteers on your group's operations and procedures? Record this here or in your Health & Safety Plan.
Personal Protective Equipment (PPE) and first aid	Are volunteers in your group equipped with suitable PPE, such as Hi Vis, gloves and sturdy boots, if they need it? Is a first aid available? Make sure everyone knows where all PPE and first aid kit is located.
Check-in procedure	Do you have a check-in and check-out procedure for volunteers in your group? Record this here or in your Health & Safety Plan.
Incident Reporting / Management	Do you have a procedure for reporting and managing incidents? Do you have a process for reviewing any incidents? Record this here or in your Health & Safety Plan.



# REVIEW PLAN

REVIEW DETAILS	Comments
Review frequency and dates	When is your first annual review set for? Lock in the date and confirm commitment to it. Who will undertake the review? Is there a core group of people who need to be present?
Group details	Is funding secured for next year? Have you lost or gained staff/volunteers? Have you changed locations? Do site maps need updating?
Project site(s)	Have any of your sites changed due to natural or anthropogenic disturbance? Have you increased your block size and therefore need to change the grid overlay and update your maps?
Predator Trapping Plan	Look at your catch rates. Are you capturing your target species? Do you need to change your trapping locations? Have you lost any traps, or are you in need of purchasing new traps? Have you got an up-to-date database of all your catch rate data, and is it uploaded to Trap.NZ?
Predator Monitoring Plan	Are there any additional monitoring methods you need to incorporate? Are all group members able to get involved? Can you increase your effort?
Outcome Monitoring Plan	Have you seen any tangible changes in the rate of detection of the key indicator species you selected?
Health & Safety Plan	Does your Health & Safety Plan need updating? Are there any new hazards? Do any major incidents need to be reviewed?
Review Plan	Have you got next year's review date committed to?

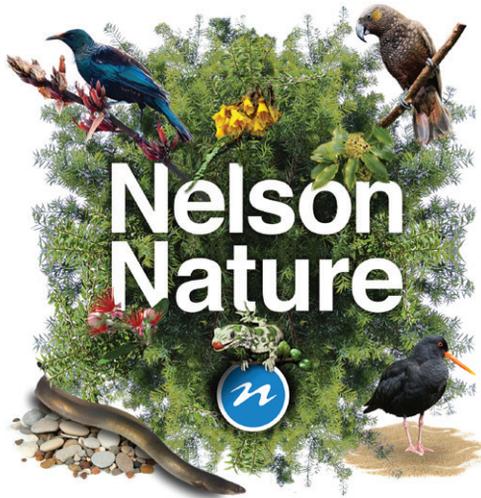
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