

Island Biosecurity SOP Best Practice Manual

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Introduction

This document is a collection of the best known techniques and methods for effectively protecting islands from biosecurity risks. It is divided into sections which roughly follow the other parts of the Island Biosecurity SOP, e.g, Quarantine, Surveillance and Contingency, with added sections on Methods and how People And Islands interact.

This document is a synthesis of existing best practice which was mostly targeted towards mainland and pest control situations. Better methodology for island biosecurity than those presented in this SOP may exist. If you have any, please report them to the [SOP co-ordinator](#) and other users so that those standards can be applied to other relevant situations.

The following points set the context for the advice contained in the rest of this document:

- Doing the job right every time is vital.
- Quarantine equipment should be well-maintained and in good condition at all times.
- Keeping procedures simple is much better than the best equipment money can buy if checked infrequently and poorly maintained.
- Island management requires using the most suitable current best practice which meets the minimum standards.
- The range of pests, threats and operational situations for island quarantine and contingency work is very diverse. This is reflected in best practice also being drawn from a very diverse range of sources and situations.
- There is an order of importance of items for island biosecurity. Highest is having a quarantine store or secure quarantine practice. Having secure transport is the next most important and other items such as traps and surveillance equipment is lower.

Use your existing Quarantine Plan, the [Island Biosecurity SOP](#), the [Biosecurity Plan Template](#); the [Southland Worked Example](#); and this manual to put current best practice into operations in your conservancy or area.

1

Methods

1.1 Pest control and detection methods

Always question what you are planning to do, and how you are planning to do it.

1.1.1 Determine objectives

Is the operation about [quarantine](#), [contingency](#) or [surveillance](#)?

- *Each of these procedures requires slightly different objectives and methods. Being clear about which activity you are doing will make it easier to determine which methods are appropriate.*
 - *The objective of effective quarantine is about containing or killing the target pest before it reaches the island.*
 - *The objective of effective contingency operations is about containing or killing the target pest after it has arrived on the island.*
 - *The objective of effective surveillance is about determining the presence or absence of a target pest either on the mainland, in transit or on the island. Containing or killing it is not the objective.*
 - *It is often necessary to prove that the report of the pest is correct in the first place. i.e. a body is needed. This is a form of surveillance.*
-

1.1.2 Determine methods

Methods must be effective while posing minimal risk to non-target species.

- *There is no point in using a method that will not provide any answer, however there also no point in using a method so effective that you kill a significant proportion of non-target, native species.*
 - *Consider.*
 - ◆ *What is/are the target species?*
 - ◆ *Is the site on or off the island?*
 - ◆ *What are the non-target issues?*
 - ◆ *Is trapping or poisoning most likely to be most effective?*
 - ◆ *What types of covers or bait stations are needed?*
 - ◆ *How long will the trap or bait last between checks and still guarantee a kill?*
-

1.2 Mammals and birds

1.2.1 Target species

Methods

- *The following table provides methods and advice effective for all mammalian pests (e.g. rodents, mustelids, hedgehogs, possums, wallaby, cat, rabbits, hares, pigs, goats, deer, chamois, etc) plus some birds pests e.g. weka.*
-

Method	Technique
Search with a trained dog	Record route and number of dog hours spent searching.
Detection of sign	Footprints; droppings, prey remains, chews, wallows, rooting, feathers, etc.
Non-toxic indicators	Gnaw sticks (dressed heart timber pegs soaked in cooking/linseed oil and driven into the ground), plain wax candles, bars of soap, chocolate, vegetable or fruit baits.
Tracking tunnels	Details on using tracking tunnels to monitor rodents and other small mammals are given by Gillies & Williams (2001). HAMRO-20232 .
Sticky hair tunnels	Similar to tracking tunnels but with a sticky surface e.g., double-sided tape, glue board adhesive or Velcro on the sides of the tunnel to catch loose hairs from the animal. (Hairs can be identified under a microscope to determine the species.)
Tracking pits	Damp sand or fine substrate to collect imprints; or tracking pads (hard smooth boards e.g. plywood with chalk dust). Should be protected from rain and strong winds.
Trapping	Snap-traps see Cunningham & Moors 1996. For every 100 ha of island set at least 15 traps per night and run for at least 3 nights. Cage or leg hold, Fenn or Timms traps.
Spotlighting	Open areas and forest margins.
Detecting weka	Playing taped weka calls. Placement of hens eggs at regular intervals under dense vegetation is often a good presence / absence indicator, but the eggs may also be taken by rats, stoats or other predator if present. Weka usually do not carry the egg far if at all, and will leave characteristic feeding sign.

1.3

Invertebrates

Take advantage of expert staff or external researchers, contractors or other experts with invertebrate knowledge. Invertebrate control and surveillance will usually require expert advice.

1.3.1 *Detection of sign*

Nest holes, damage etc.

1.3.2 *Nest searching*

Mark route and record nests per person hour searching

1.3.3 *Sticky baits*

e.g. jam and peanut butter for Argentine Ants

1.3.4 *Sticky pads*

Walk-through pads at key sites.

1.3.5 *Light traps*

Depends on target species.

1.3.6 *Pheromone traps*

Damp sand or fine substrate to collect imprints; or tracking pads (hard smooth boards e.g. plywood with chalk dust).

Should be protected from rain and strong winds.

1.3.7 *Invertebrate awareness “... take no*

Awareness and careful inspection are the most important things for invertebrate biosecurity. It comes down to being aware that invertebrates could be a problem and that everything needs to be inspected closely to ensure there are no free-loading passengers.

prisoners; squash first; ask questions later!”

Ensure that no food sources, which may attract things like ants are in or around the gear store. Water-tight plastic barrels are excellent, as they will be insect-proof as well as waterproof. (These should also largely prevent post-packing infestation.) A clean store area is also important, as this makes it much easier to detect any new arrivals. Pest control should be in operation around the perimeter of the building and should prevent ants establishing inside however, it cannot be relied upon entirely; there is always the need for inspection as well.

Inspecting and packing gear in a clean, open, indoor area is really important. Any pest that pops out is easily seen and can be dealt to quickly, before it escapes. The inspection area should be large enough to allow tents to be unfolded away from the already inspected gear, so that any discovered pest cannot escape into the inspected gear pile. Make sure that the inspection area is clean: if you cannot see an ant on the floor before you begin, then you won't know whether your inspection was successful, neither will you be able to prevent it jumping right back into the inspected gear!

When undertaking the inspection, most invertebrates will be dislodged by shaking or sharply tapping the gear with a timber pole or something similar.

- For things like tents, the more eyes looking the better. If Argentine ant or a similar threat is present, it should make itself very obvious when shaken or tapped but you have to look to see it!
- Most invertebrates will be hiding in folds in material or against the seams, so check these high-risk areas carefully.
- Any holes or recesses in gear should be tapped/hit up-side down, e.g., check for ants in a spade handle. (If you pick up two spades and bang them together while looking for things the size of ants, you will see them straight away.)
- Check any areas where invertebrate frass is found.
- Ants are good to concentrate on, as the thing to look for, because they are likely to be the smallest invertebrate present.

Clearly, if something does fall out then a closer inspection is warranted and possibly the use of an insecticide spray. Permethrin-based sprays should be used as they have a residual effect, and will kill bugs that walk over the treated surface for up to a couple of months, depending on exposure to weather, etc. Pyrethroid (pyrethrum) based products are knock-down only, and have no residual life beyond about an hour.

In particularly high risk sites (where Argentine ants, etc. may be present), keeping a can of fly-spray handy when packing gear, is an excellent idea. This way, any invertebrates that fall out can be sprayed immediately, as opposed to trying to squash a-thousand ants running in every direction when a nest is discovered.

With bigger items like the boat itself, bang the hull, pontoon, whatever and look. Do this in several places as invertebrates generally hate foreign noise, and will attempt to move, away from it. Slow-moving things like slugs and snails are the exception rather than the rule. For them, it comes down to careful inspection. On charter boats, increasing awareness is important. Most staff are getting the idea about rodents, but also need to be vigilant for insects as well. “Take no prisoners” is the rule, squash first and ask questions later!

Adapted from correspondence from Chris Greene,

1.4 Weeds

Seeds stowing away on large items of machinery, equipment or containers, has been the mode of entry for some weeds becoming established on islands in the past.

- 1.4.1**
Check gear for seeds Check any large items of gear for seeds and clean off any dirt on equipment or containers to be taken to an island.

1.5 Diseases and micro-organisms

Disease surveillance will often be issue or event driven and only instigated in the event of a disease outbreak that is a potential threat to the conservation values of an island.

- 1.5.1**
Report For any disease-related abnormalities, consult with DOC wildlife disease expert ([Kate McInnes](#); VPN 5094) in the first instance.

Be prepared to instigate a contingency response, if necessary.

- 1.5.2**
Handling species When planning to handle species consider the need to collect samples to establish disease baselines.

Also, possibly the need for Animal Ethics Committee approval and Wildlife Act 1953 permits. (For example, these are required for any work that involves banding or marking individuals protected by the Wildlife Act.)

1.6 Bait stations, traps, tracking tunnels, indicators, etc.

The following are generic directions for setting out bait stations, trapping, tracking tunnels, and other indicators, whether they are permanent, temporary, for [quarantine](#), [surveillance](#) or [contingency](#).

1.6.1 ***Location and layout***

For pest detection after a report of a pest has been received coverage needs to include areas where the pest may have reached given the time elapsed since the reported sighting.

Start point of the line (grid reference, GPS reference, marked point) and its direction.

Length of the line, distance sites are apart, the number of traps/tunnels etc at each site; the total number of sites (should be >10).

Number the lines (A, B, C, etc) and sites (1, 2, etc).

Prepare a map of all lines and sites.

If dogs are being used on the island, they will generally have been trained to be bait-averse however, it is still good practice to place any poisons etc. in situations where they can not get to them.

1.6.2 ***Checking lines and sites***

Specify equipment used, including bait when applicable.

Frequency of checking the line and how often bait should be changed so that it still remains attractive to pests.

Detail any periods when bait should be removed or stations closed.

Detail how each station is set up (e.g., facing away from prevailing weather, debris or other water, etc).

Describe how to check stations and data sheets (e.g. record any rodent sign on recording sheet, separately bag any bait with unidentifiable damage, etc.).

Any pest damaged bait or bait with damage that is not clearly identifiable will be kept separate from other bait and placed in a plastic bag with the bait stations number, location and date recorded on the outside of the bag. To be sent to an expert as soon as possible, for identification.

1.7 Other best practice manuals

1.7.1 ***Animal pest control***

Title:	DME Number
Kill trapping for rat control	HAMRO-62306
Bait stations using 1080 cereal baits – rat control.**	HAMRO-62490
2 nd Generation anti-coagulants in bait stations for rat control.	HAMRO-62378
Kill trapping for stoat & weasel control	HAMRO-61188

** Note: 1080 (sodium monofluoroacetate) should not be used for rodent control on islands.

Kill trapping for ferret control	HAMRO-61526
Kill trapping for control of feral cats	HAMRO-61508
Leg hold trapping for feral cat control	HAMRO-61488
Cage trapping for feral cat control	HAMRO-61498

2

Quarantine

2.1 Setting up and managing a quarantine store

2.1.1 *Size*

There should be adequate space in the store for:

- storage and maintenance of equipment used on islands;
 - checking and packing supplies needed for the programmes on the islands;
 - cleaning and checking items returned from the islands.
-

2.1.2 *Requirements*

The store must be well lit with no dark corners.

All removable items need to be taken out and the entire store checked for any gaps and sign of pest damage.

For rodent proofing all entrances and holes > 5 mm must be securely sealed, including; under doors (e.g. by using a metal “lip”), around holes for drainpipes or wiring, around windows etc.

For invertebrate proofing all gaps must be sealed, however this will be impractical and other invertebrate detection and control will be required.

All windows and doors must shut securely. (vents or fly-screen mesh may be required).

Floor should be sealed (painted) to enable easier cleaning.

2.1.3 *Access*

Key holders and others with access to the store should be kept to an absolute minimum.

2.1.4 *Cleaning*

The store must be tidy, with floor space kept clear and clean.

Rubbish must be removed from the store daily.

Do not store rubbish in the store.

Perishable foods must not be kept in the store unless it has been packed in pest-proof containers.

Non-perishable foods must be checked carefully before re-packing.

A spring-clean must occur at least once annually, where all items are removed from where they are stored and cleaned, and floors are thoroughly cleaned (e.g., with bleach).

2.1.5 *Pest control*

Rodent control must be maintained within and around the perimeter of the store.

Periodic rodent [surveillance](#) should be planned and carried out (e.g., traps, gnaw sticks, tracking tunnels).

Insect control – insect “glue traps” or residual insecticide sprays (as recommended by

local insect control contractors) applied at likely access points within the store.

The entire store building should be fumigated (the number of times per year will vary depending on local risks).

2.1.6 ***Example quarantine store: Te Anau Area Office***

The Te Anau Area Office (Southland Conservancy) quarantine store was built by converting an already existing double-garage for approximately \$4,000. One room was made fully pest proof, and the other is a rodent-proof garage, which is used for final packing and unpacking stores for a trip, and storing bulk or dirty gear.

The pest-proof room is approximately 10 m × 15 m, has a smooth painted concrete floor, thick walls (comprising 10-12 mm medium density fibreboard), sealed doors (with a metal lip), and large cupboards with securely fitting doors. It is well lit by fluorescent lighting.

Bait stations are placed in the store, as well as in the adjacent garage, and the store is periodically fumigated.

2.2 Pest-proof rooms

2.2.1 ***Pest-proof rooms in huts***

A pest-proof room is an ideal last barrier to prevent pest establishment if pests have got onto an island with stores. Every hut on an island should have a pest-proof room for checking stores and equipment in. Managers may choose to make the whole hut pest-proof. There are two approaches to this, each has its merits. Either the whole hut is pest-proof or a single room is pest-proof.

The reasons for not having the whole hut pest-proof are that huts are generally attractive sites to the pests that can invade islands. Therefore the hut(s) can act as a bait station or a pest indicator site. When staff arrive on an island the first place that is checked is the hut and if pests are present in hut it is fairly obvious.

In general:

- All huts should be wholly pest proof if at all possible.
 - If the hut comprises only one room or is open plan, then the whole hut must be made pest-proof.
 - If a new hut is being built, it should be made pest-proof.
 - If there is more than one building at the site, then the other buildings will serve the role of a pest indicator station and the whole hut should be made pest proof.
 - In an existing hut, at least the room where stores first arrive must be made pest proof.
-

2.2.2 *Requirements for pest-proof rooms*

There must be sufficient room to handle the volume of stores that would arrive in the largest annual servicing.

If some pest species are already on the island, the room must be proofed against these.

The room must be well lit and have no dark corners.

All windows and doors must shut securely. (Vents or fly-screen mesh may be required).

For rodent proofing, all entrances and holes >5 mm must be securely sealed, including:

- gaps under doors (e.g. by using a metal “lip”),
- gaps around holes for drainpipes or wiring, and
- around windows, etc.

For invertebrate proofing all gaps must be sealed, however this may be impractical, therefore other invertebrate detection and control will be required.

Floor should be sealed (painted) to enable easy cleaning.

Traps should be maintained inside the room when checking stores.

2.2.3 *Chasing rats and mice around rooms can be difficult.*

Rodent “bolt holes” should be placed into the corners of pest-proof rooms. They are a simple box trap placed along the wall in the room (usually in the corner). Most rodents will run along the edge of the wall and will run into a box trap. The door should be shut quickly to avoid the rodent escaping. An Elliot trap may have the same effect.

2.2.4 *Maintenance of pest-proof rooms*

All easily removable items need to be taken out and the entire room checked for any gaps and sign of pest damage.

Make a list of all problems that need fixing.

Fix them and the check off the list.

2.3 Pest proof containers

2.3.1 *Plastic containers*

High Density *Stacka Nesta* bins in sizes of 32, 45, or 68 litres, and a range of other plastic bins or barrels, etc.

Available from: Stowers Containment Solutions Ltd,
Auckland or Christchurch. sales@stowersltd.co.nz

2.3.2 *Maintenance*

Containers should always be stored and packed in pest proof storerooms. Plastic containers should be kept as thoroughly clean as possible.

2.3.4 *Cleaning*

Use anti-graffiti solvent to remove all markings and tape residue. Steam cleaning, scrubbing with cleaner or disinfected (e.g. with [Virkon™ biocide](#)).

2.4

Native frog (*Leiopelma*) chytrid infection protocols

Draft protocols prepared to minimise risk of chytrid infection in island populations of *Leiopelma* spp.

2.4.1 *Leiopelma-chytrid* *protocol*

This draft protocol was prepared to minimise the risk of chytrid infection in island population of *Leiopelma* species. It guides actions that should be taken for:

- Maud,
- Stephens,
- Motuara and
- Great Barrier Islands.

The chytrid fungus is known to be present in some populations of the endemic frog *Leiopelma archeyi*.

In dealing with this poorly-known threat, the cautious approach is to assume that the fungus is not present on the four islands inhabited by endemic frogs and we should minimise the risk of it being introduced. As a precaution, we should act as if the fungus is already present in these populations and do what we can to avoid its spread between animals as a further safeguard.

Application of appropriate controls rely on the following:

- The fungus is reliant on damp conditions for transport and survival.
- There are no controls on public visits to Great Barrier and Motuara except that overnight stays on Motuara are subject to permit.
- The native frogs on all islands are fully protected and handling is authorised only for research or management.

Preventing direct infection of island populations

Equipment used for frog research on an island is to remain on that island and only be for the intended work on that island.

Minimising risk of disease arrival on Maud and Stevens islands

Access is by permit only and permits are clearly worded to indicate the following requirements:

- All visitors to Maud and Stephens Island are subject to a condition requiring all equipment, clothing and footwear to be clean and dry.
- This requirement applies equally to all departmental and public visitors.
- On those occasions where the certainty of dry footwear on leaving the mainland cannot be confirmed (rain or a wet landing), a footbath of fresh Virkon S™† virucidal disinfectant shall be provided.
- Large parties of visitors arriving on Maud (or those that cannot be relied on to all have had clean dry footwear on leaving the mainland) will be processed through a [Virkon™ footbath](#). This will occur on the jetty.
- All departmental plant and equipment arriving on Maud or Stephens will be treated to ensure it is clean and dry before shipping. If there is any doubt on arrival the material will be sprayed with Virkon™.
- Any new livestock will be treated with a Virkon™ footbath before shipping.
- Responsible: Resident officer on each island is responsible and accountable for these measures.

Great Barrier and Motuara Islands:

- On these islands all authorised frog handlers shall ensure footwear is clean and dry, and shall, in addition, disinfect footwear with Virkon™ on approaching the study area.
- On Motuara, persons other than authorised handlers shall be discouraged from approaching the study area.
- Responsible: Permit issuing officer, Science Research Unit staff and local staff as advised.

Minimising risk of introducing the disease to the populations or between frogs

Authority to handle native frogs on these islands is conditional on:

- a clean pair of disposable gloves used for each group of animals within a localised site (*c.* 10m²) animal. These gloves should be wet before handling the frogs to minimise the risk of skin damage;
- any equipment which comes in contact with a frog shall be cleaned by soaking in 70% alcohol for 30 seconds (or 100% alcohol and flamed) before being used on another animal;
- a new or sterilised scalpel blade (or scissors) to be used for each animal when being toe-clipped; and
- any wound should be closed with cyanoacrylate surgical glue.
- Responsible: Permit issuing officer and local staff as advised.

† Virkon™ footbaths consist of an absorbent mat inside a sealed plastic box. The mat is soaked in a solution of “Virkon S” so that island visitors can tread through the box which is then re-sealed. Each kit contains a stock of the concentrate, a container for mixing and full instructions. A pen and slate is provided to record the date of each fresh mixing of the solution. Kits are available on the vessel Te Hoiere, on the jetty at Maud, the landing at Stephens and with Danny Boulton at French Pass. An additional kit is stored in the hut on Motuara. All footbaths are maintained by Area staff. Additional supplies of Virkon™ are available from stock and station agents. While relatively safe for human contact, it should not be used on bare skin and splashes should be washed off immediately.

Review of conditions

Current conditions reflect the current state of knowledge of this disease and its distribution. These conditions may be reviewed as further research and delimitation surveys are carried out. These protocols should at least be reviewed at six monthly intervals to ensure their relevance and practicality. These conditions were last reviewed on 1 December 2001

2.5 Translocation and quarantine practice

Protocols and checklists for quarantine measures for native animal transfers within New Zealand are given in detail in Jakob-Hoff (2000). These include: Health screening; Quarantine duration; Quarantine details (location, facilities, equipment, budget, people, responsibilities, training, records); Reviewing the outcomes of the quarantine period; and Risk decision and movement recommendations.

2.5.1 *Egg transfers*

Eggs can be wiped with a mild disinfectant to remove excess dirt, but the egg must be thoroughly dried and care must be taken not to abrade the outer membrane.

They should be transported in clean (preferably sterile) containers and placed in sterile incubators. All transport containers should be cleaned after each use.

If eggs are to be put into nests, contaminated nest litter should be removed, as long as this does not disturb incubating adults.

Once hatched, chicks should be inspected for sign of any diseases that can be transmitted from hen to embryo (e.g., *Salmonella* spp., *Escherichia coli*, and avian encephalomyelitis virus).

2.5.2 *Chicks*

Chicks should have their feet and bills washed with mild disinfectant before transfer.

2.5.3 *Transfer boxes and other equipment*

All transfer containers should be cleaned before and after use.

All equipment (e.g., transfer boxes, weighing bags, etc.) should be disinfected prior to entering the area, or site-specific equipment should be used.

2.6 Dog vaccination

2.6.1 *Example of a vaccination schedule (annually)*

Diseases:

- Canine parvovirus type 2 virus;
- Canine distemper virus;
- Caninene adenovirus type 2;
- Canine parainfluenza;
- *Leptospira interrogans* vars. *ictgerohaemorrhagiae*; *copenhageni*; *pomona* and *hardjo*

- *Bordetella bronchiseptica*

Treatment:

- Canvac 4 in 1 +, Lepto 3 way +, Canvac lepto +, Protech Tracguard

Worms

- Cestode
- Nematode

Treatment:

- Wormed six monthly with anti-cestodal and anti-nematode drugs e.g., Drontal Plus (praziquantel, pyrantel pamoate, febantel).
- Also within 10 days prior to moving to the island.

External parasites

- Fleas, ticks and ear mites.

Treatment

- Within 14 days prior to moving to the island with *Frontline top spot* or *Advantage flea adulticide*.

Isolation

- When treated dogs should be isolated from other dogs, which have not been treated.

All records of examinations, vaccinations and treatments should be updated on a medical record card.

This card should be signed by a veterinarian each time and be available for inspection.

3

Contingency

3.1 Rodent control methods adapted for island situations

3.1.1
Trap type Victor professional rat or mouse trap with plastic pedal; or Mk IV Fenn trap.

3.1.2
Trap cover Solid, lightweight pegged down cover that keeps out weather and non-target species.
Ensure that non-target species cannot reach the trap from outside the cover.

Ensure that tunnels are firmly bedded and that the entrances are clear.

3.1.3
Bait stations Must be stable and secure.
Options include:

- IPM low profile, (heavy-weight plastic);
- “Yellow Submarine” bait stations;
- Purpose-built wooden stations with plenty of dry space inside. Lindsay Chatterton used these on Ulva Island to great effect during a prolonged eradication programme. He considered that wooden bait stations that had been on-site for an extended period were far superior in bait take to new stations that had been placed out only for a few months;
- Novacoil™ tubing;
- Rentokil™ stations,
- Modified Philproof™ stations.

3.1.4
Trap and bait station grid Rats: 50m x 50m
Mice: 25m x 25m
If using compass lines and hip chains, recover all hip chain cotton.

3.1.5
Trap and bait station sites Installation of the trapping or tracking tunnels should occur at least one week before they are set up; this is to avoid neophobia form the rodents. (They are generally suspicious of anything new.)

Select lines that represent all major habitat types, but focus on preferred sites and known invasion sites.

Place traps where there is plenty of natural cover and where rodents are likely to be active (e.g., alongside large rocks, around the bases of trees, under logs, overhanging vegetation, and under buildings).

If rodent droppings, food remains or runways are visible set traps nearby.

Bait stations should be set up to face away from the prevailing weather to prevent wind driven rain from gaining access to the bait. They should also be set against the angle of the terrain to avoid debris/water flowing into the station.

3.1.6
Trap bait(s)

Peanut butter/rolled oats mix, add bacon if after Norway rats.

Hens' eggs may also be used if disease risks are not a significant risk.

3.1.7
Toxic baits

Pestoff™ baits are best for rodents but be prepared to ask experienced colleagues for other options.

For mice, avoid using baits with the repellent Bitrex™ (this includes all Talon™ baits, e.g., Cropcare™, and Storm™ (although the repellent in this is another agent).

3.1.8
Bait wrap

Tin foil or plastic wraps may reduce insect take.

3.1.9
Bait and trap service period

Must ensure that bait remains attractive and the trap is workable for the whole service period.

If you can't guarantee replacement or checking within the period then consider other [quarantine](#) options.

3.2 Pest invasion kits

Pest invasion kits are for use in the case of an invasion event. Three examples are provided: a generic Pest Invasion Kit, and examples from the Chatham Islands and from Northland. The two examples from different conservancies show considerable variation in requirements. Both are similar in that they provide a checklist for equipment that must be available at all times.

3.2.1
Example generic pest invasion kit

Reference information		
<input type="checkbox"/> Copy of local contingency plan	<input type="checkbox"/> Pest report information from this event	<input type="checkbox"/> Background data on the island
<input type="checkbox"/> Map of island(s)	<input type="checkbox"/> Reference books/papers	<input type="checkbox"/> Trip log book
Record keeping		
<input type="checkbox"/> Waterproof notes books	<input type="checkbox"/> Pens/pencils	<input type="checkbox"/> Datasheets for traps/tunnels, etc
<input type="checkbox"/> Maps for records	<input type="checkbox"/> Flagging tape (colour coded)	<input type="checkbox"/> Vivid marker pens
<input type="checkbox"/> Compass	<input type="checkbox"/> GPS	<input type="checkbox"/> Specimen containers (jars, zip lock bags)
<input type="checkbox"/> Labels for jars or bag	<input type="checkbox"/> Phone numbers for experts, local contacts, etc	<input type="checkbox"/> 1 litre 70% ethanol
<input type="checkbox"/> Camera, macro lens, film	<input type="checkbox"/> Plant press	<input type="checkbox"/> Hand lens
<input type="checkbox"/> Rain gauge	<input type="checkbox"/> Hip chain	<input type="checkbox"/> Marker poles, flags
Pest detection equipment		
<input type="checkbox"/> Tracking tunnels	<input type="checkbox"/> Dye & paper for tracking tunnels	<input type="checkbox"/> Sticky hair tunnels
<input type="checkbox"/> Tracking pits	<input type="checkbox"/> Gnaw sticks and or other indicator baits, (candles, soap, apples, eggs, freeze	<input type="checkbox"/> Trained dog

3.2.2
Example rodent contingency kit checklist from Chatham Island

	dried rats/mice, chocolate, meat)	
<input type="checkbox"/> Peanut butter, rolled oats, salami or bacon.	<input type="checkbox"/> Light traps, sticky pads, pheromone traps	<input type="checkbox"/> Taped calls
Pest control equipment		
<input type="checkbox"/> Snap traps	<input type="checkbox"/> Leg hold traps	<input type="checkbox"/> Cage/Live traps
<input type="checkbox"/> Fresh baits/lures	<input type="checkbox"/> Toxin or toxic bait	<input type="checkbox"/> Herbicide
<input type="checkbox"/> Gas for burrows	<input type="checkbox"/> Insecticide	<input type="checkbox"/> Firearms (shotgun &/or rifle)
<input type="checkbox"/> Bait stations		
Safety and other equipment		
<input type="checkbox"/> Gloves	<input type="checkbox"/> Ropes	<input type="checkbox"/> Emergency locator beacons
<input type="checkbox"/> 1 st Aid kit	<input type="checkbox"/> Radio	<input type="checkbox"/> Frame packs
<input type="checkbox"/> Boat & safety gear	<input type="checkbox"/> Fishing lines, etc	<input type="checkbox"/> Tools, hammers, etc.
<input type="checkbox"/> Nails, staples	<input type="checkbox"/> Personal protective equipment	
Date: dd/Mmm/YYYY	Island	Observer
<input type="checkbox"/> Copy of Chatham Island Rodent Contingency Plan		
<input type="checkbox"/> 100 mouse traps	<input type="checkbox"/> 100 gnaw sticks	<input type="checkbox"/> 1x10 kg Talon WB 50 (need expiry date)
<input type="checkbox"/> 100 rat traps	<input type="checkbox"/> 30 tracking tunnels, trays and appropriate sponges	<input type="checkbox"/> 100 Novacoil™ bait stations
<input type="checkbox"/> 50 Philproof™ trap covers	<input type="checkbox"/> 10 litres of food dye	<input type="checkbox"/> Bait recording sheets & pens
<input type="checkbox"/> peanut butter/rolled oats	<input type="checkbox"/> watercolour paper	<input type="checkbox"/> 2 rolls of orange flagging tape
<input type="checkbox"/> 1 litre of preservative solution	<input type="checkbox"/> 2 frame packs	<input type="checkbox"/> 2x25 metre lengths of rope
<input type="checkbox"/> 2 compasses	<input type="checkbox"/> 2 pair of rubber gloves	
Note: Use of Talon™ is not recommended as it contains Bitrex™.		

3.2.3
Example rodent, cat, possum and mustelid emergency kit from Northland Conservancy

- One kit at each Area Office.
- Area Managers and Field Centre Supervisors are accountable for assembling and maintaining these kits.

Rodent emergency kit:

<input type="checkbox"/> Copy of Contingency Plan	<input type="checkbox"/> Cunningham and Moors 1996	<input type="checkbox"/> Bait station data sheets, spare paper
<input type="checkbox"/> 20 betterset mouse traps with strings	<input type="checkbox"/> Gnaw sticks, soap, candles	<input type="checkbox"/> 2 large jars of peanut butter
<input type="checkbox"/> 6x12.5 kg pails Talon 50 WB (replace every 3 years),	<input type="checkbox"/> 20 kg poisoned kibbled wheat (Rentokil) (replace every 3 years),	<input type="checkbox"/> 200 bait stations (400 mm lengths of 100 mm diameter, yellow, plastic Novacoil™ pipe)
<input type="checkbox"/> 5x1 litre plastic specimen containers	<input type="checkbox"/> 5 waterproof notepads & pencils	<input type="checkbox"/> 1 box zip-lock plastic bags
<input type="checkbox"/> 1 litre 70% ethanol	<input type="checkbox"/> 10 rolls tin foil	<input type="checkbox"/> 1 carton pink fluorescent flagging tape
<input type="checkbox"/> 2 field compasses	<input type="checkbox"/> Purchase as required: white chocolate and apples for lures	<input type="checkbox"/> 3 black Vivid™ marker pens

Note: Use of Talon is not recommended as it contains Bitrex.

Emergency kit for cats

(To be prepared if necessary from conservancy stocks.)

<input type="checkbox"/> 50 Victor 1½ soft-jaw leg hold traps	<input type="checkbox"/> 5 kg batten staples, hammer	<input type="checkbox"/> 10 collapsible wire cage traps
<input type="checkbox"/> Spotlight and .22 rifle/shotgun	<input type="checkbox"/> Fresh rabbit, fresh fish bait to be secured prior to leaving	<input type="checkbox"/> Animal Control Products Wanganui for 1080 cat bait
<input type="checkbox"/> 1 litre of 70% ethanol	<input type="checkbox"/> 1 box of extra large freezer storage bags	<input type="checkbox"/> 2 waterproof notebook & pencils
<input type="checkbox"/> 2 compasses	<input type="checkbox"/> 12 rolls of pink flagging tape	

Emergency kit for possums
(To be prepared if necessary from Conservancy stocks.)

<input type="checkbox"/> 10 Philproof™ bait stations	<input type="checkbox"/> 1 packet 75 mm galvanised flathead nails	<input type="checkbox"/> Feratox™ and peanut paste
<input type="checkbox"/> Amyl nitrate capsules in 1 st Aid Kit	<input type="checkbox"/> 10 collapsible wire cage traps	<input type="checkbox"/> 50 Victor 1½ leg hold traps
<input type="checkbox"/> 5 kg baton staples, hammer	<input type="checkbox"/> 12 rolls of pink flagging tape	<input type="checkbox"/> 1 litre of peach or cinnamon essence
<input type="checkbox"/> 20 kg flour, 3 bags icing sugar	<input type="checkbox"/> Container for mixing	<input type="checkbox"/> 2 waterproof notebook & pencils
<input type="checkbox"/> Box of extra large freezer storage bags	<input type="checkbox"/> 1 litre of 70% ethanol	<input type="checkbox"/> Spotlight and .22 rifle/shotgun

Emergency kit for mustelids
(To be prepared if necessary from Conservancy stocks.)

<input type="checkbox"/> Gas capsule (Megtoxin CO ₂)	<input type="checkbox"/> Cage traps (for live capture)	<input type="checkbox"/> No.6 Fenn traps with covers and mesh for ends
<input type="checkbox"/> Bait: rabbit, fish or poisoned eggs		

4

Surveillance

Surveillance is about searching for a target pest but may not necessarily involve killing the pest.

4.1 Programmed surveillance

4.1.1 *Set out using rodent trapping as an example*

A minimum of 45 trap/tunnel nights over three nights per 100 ha of island area. (Chatham's Area recommended 120 tunnel nights per 100 ha area).

Use areas that are attractive to pest or where likely to invade to provide the best chance of detection.

However there may also be pests present elsewhere on the island because their invasion site was well away from expected entry points, so a mix of inland and coastal sampling is recommended.

4.2.1 *Frequency of pest surveillance*

The frequency required for surveillance depends on both the values of the island at risk and the breeding biology of the likely pest species.

Frequency also depends on how long the baits and traps remain effective for.

Other practical considerations are how often staff are present on the island undertaking other tasks.

Quarantine traps and bait stations can often be used as surveillance tools.

4.2.3 *Frequency indicator*

Managers need to determine when would an invading pest population build up to such a level that extinction of the most critical species on the island is imminent?

4.2.4 *Determining surveillance intervals*

Tusked weta scenario:

A pregnant female Norway rat invaded an island with tusked weta habitat (Mercury Islands).

- How soon do managers need to know so that tusked weta can be saved?
- Determine the approximate rate of increase of rat population to put most tusked weta at risk of predation.
- Then bring that forward to have a surveillance period that gives a safety margin.

Two actions then become priorities:

1. Set surveillance checks to 6 monthly.
 2. Increase the number of tusked weta populations.
-

4.2 Weed surveillance

The [Weed Surveillance SOP](#) (QD-NH 1228) (DOC 1999a) is designed to assist staff in

the detection and identification of populations of invasive weeds new to an area, and should be referred to for any weed surveillance planning on islands. The SOP also emphasises the importance of recording the occurrence of new weed incursions. For island infestations, new incursions will need to be entered both in the Weeds Database (Bioweb, DOC Intranet) and in the Islands Invasion Database. Note that even if a weed is successfully removed, then the infestation incident must still be recorded.

4.2.1
Staff trained

Weed observation by staff or other visitors with botanical knowledge.

4.2.2
Systematic searches

A priority on disturbed or modified areas, hut sites, camp sites, landing points, tracks etc.

Searching should be in a circular pattern outward from the known infestation site.

Take note of the prevailing and predominant wind directions for possible spread.

4.2.3
Weed surveillance programmes

Weed surveillance planning will be incorporated into the Conservancy's weed control and management plans and should be implemented on islands.

4.2.4
Weed information kits

Typically contain information on weeds to look out for on the island, (including what weeds are already known to be where on the island):

- Weed identification sheets with photos or drawings and a written description,
 - Likely places to look,
 - Plastic bags for holding specimen samples (or a plant-press if the trip is over a longer period of time),
 - Cruise tape for marking the infestation for future control, GPS for accurate location,
 - What to do if infestation is found, and
 - Basic weed control equipment, e.g., a hand-saw and some generic herbicide (e.g., Vigilant™ in a bottle-brush container).
-

4.2.5
Weed control

Weed control while on surveillance trip should only be attempted if the weed can be confidently identified, and if the infestation is small.

For large infestations, or infestations in fragile ecosystems, then expert advice must be sought before any control is carried out.

4.2.6
Frequency of weed surveillance

Depends on the potential rate of infestation and spread, habitat type affected, and ability to find the weed.

Surveillance intervals for different habitats types (e.g., forest, turf, shrub, wetland and bare), and types of weeds are given in Harris & Brown (2000).

<http://docintranet/content/sru/pubs/pdfs/SFC175.pdf>

5

People and islands

5.1

Advocacy

5.1.1 *Pamphlets and brochures*

Island Care Codes can be either visitor information sheets or pamphlets. Either, or both, of these can be given to visitors and volunteers, handed out with the entry permits.

The DOC staff at Kapiti Area Office prepared a generic pamphlet on protection of islands from pest animals, plants and insects. This can be used around the country and can be obtained from the Programme Manager –Threats, Kapiti Area Office.

- Information sheets are provided for Stephens/Takapourewa and Maud Islands:
<http://docintranet/content/sop/IslandFactSheets/StephensIsland.pdf>
- <http://docintranet/content/sop/IslandFactSheets/MaudVisitorGuidelines.pdf>

Pamphlets are provided for visitors to the Subantarctic islands. The ‘Subantarctic Islands Minimum Impact Code’ and the ‘Subantarctic and Southern Islands Pest and Disease Quarantine’ are given to tourists, researchers and island managers:

- <http://docintranet/content/sop/IslandFactSheets/SubantarticMinimumImpactCode.pdf>
- <http://docintranet/content/sop/IslandFactSheets/SubantarticPestPrevention.pdf>

Recently, Nelson/Marlborough Conservancy produced a poster that briefly describes values of some of the island sanctuaries of Cook Strait and provides some minimum standards centred on the risks and threats of boaters visiting islands:

- <http://docintranet/content/sop/IslandFactSheets/Poster.pdf>
-

5.1.2 *Signs on islands*

Standards for the design of signs is covered in [Guidelines for the design of Outdoor Visitor Structures](#).

Signs on islands which are open to the public should include interpretative material on the island’s historical and natural values, and inform the visitor of any hazards.

Signs on closed islands should clearly inform any visitor that a permit is required for entry.

5.1.3 *Public awareness programmes*

The following document provides guidance on developing a public awareness programme: [Guidelines for Community Relations in Conservation Projects](#).

5.2

Staff training

5.2.1 *Ecological Management Skills training courses*

Several of the Ecological Management Skills training courses are relevant to island best practice. For details contact [Dale Williams](#) or [Iain Rayner](#).

5.3 Entry permits

5.3.1

What islands require permits?

All islands which are designated: Nature Reserve, Special Area of a National Park or Wildlife Sanctuary, require a permit for entry. Also, some Scenic Reserve islands may require permits. There may be other islands that require an entry permit; check the Conservation Management Strategy.

5.3.2

Who requires a permit?

All visitors.

Some conservancies (or areas) may choose to issue permits to staff as a tool to ensure quarantine standards are being maintained, and to keep track of activities on the island(s), however in general, DOC staff undertaking approved, departmental work do not require entry permits.

Permits must comply with:

- The Act that the permit was issued under;
- CMS or island management plans;
- Island Biosecurity plans.

Permits may be accompanied by:

- Minimum Impact Codes.
- Quarantine pamphlets and checklists.
- Hazard Identification Information.
- Current work being carried out on the island.
- Information sheet about the features and conservation values of the island(s).

Permits may have the following conditions:

- File reference
 - Date of issue
 - Name and address of permit holder and/or trip leader
 - Period of entry
 - Purpose of entry
 - Only authorises entry to the named islands for the purposes outlined.
 - The holder shall comply with all laws and regulations.
 - The permit is not transferable, and may be revoked or its conditions varied at any time.
 - Schedules of: approved activities; party members; and special conditions.
-

5.3.3 *Permitting conditions*

Prior to entry:

- The Department accepts no responsibility whatsoever in connection with transport, accommodation and safety of the permit holder.
- A comprehensive safety plan is required. The Department may require the plan to be reviewed.
- The permit holder must arrange transport to the island.
- The holder will indemnify the Department against all claims, which may be made against the Department in respect of any loss, damage or injury arising out of the exercise of this permit.
- The permit holder is responsible for making their own arrangements if they require urgent evacuation from the island through illness, accident or other eventuality whatsoever. Should assistance be sought in this connection, any assistance that may be afforded must be paid in full by the permit holder.
- The holder must comply with the Departments quarantine, packing, checking; clearance; daylight loading, departure, and landing requirements.
- Offshore anchorage (no mooring ropes except in emergency).
- Crew left on vessel at all times.
- Ensure that the Departments other research or management priorities beyond the party's principal objectives can be co-ordinated with the permit holders objectives.
- Radio schedule details or other communication requirements.
- An agreed process for seeking departures from the approved research or management programme.

During visit:

- Only permitted (approved) activities and equipment on the island.
- The party shall abide by the directions of any Departmental representative or any written guidelines.
- No fires.
- No animals are to be introduced.
- No plant life to be introduced.
- No soil or rocks dug or removed.
- No rubbish left on the island
- No buildings erected or modified.
- No cutting of tracks or damage or taking of any thing (alive or dead) on the island.
- Camp only at authorised places.
- Inter-island quarantine to be maintained.

After visit:

- Report any evidence of major ecological changes that have or are occurring.
- Make all photographs or video available to the Department for inspection or copying on request.
- Provide a report to the Department within 3 months of the visit. Including an outline of research done, preliminary results, proposed publication, and any matters relating to the management of the island.
- A copy of any subsequent papers or reports should also be forwarded to the Department.

Sign-off:

- By staff member with the correct delegation and by permit holder.

- Check for any other permits needed.

5.3.4 Example permits

Kapiti Island “Conditions of Permit” accompanied by booklet about Kapiti Island Nature Reserve:

- <http://docintranet/content/sop/IslandFactSheets/Conditions1.pdf>
- <http://docintranet/content/sop/IslandFactSheets/Conditions2.pdf>

Relevant contacts

Internal biosecurity response

Any new incursion should be reported immediately to:

Chief Technical Officer (CTO) – Conservation:

Geoff Hicks

ph 04 471 0726 or VPN 8286, or 025 478 662.

If unavailable try Biosecurity Technical Officer:

Rachel Garthwaite

ph 04 47 3212 or VPN 8213 or 021 442 909.

Also see: Internal Biosecurity Response Procedure ([QD-NH 1323](#))

New Zealand Defence Forces liaison

If support from New Zealand Defence Forces may be required, then insert contact details. (This may be applicable for Kermadec’s, Chathams, and Subantarctic islands.) It is a role for Conservator or Area Manager.

Position	Location	Phone
Director Joint Operations and Plans	Defence Operations Room, Wellington	04 496 0999

Biodiversity Recovery Unit, Wellington*

Position	Person	VPN
Manager	Janet Owen	8084
SPO (Predators)	Ian McFadden	8348
SPO (Sea Birds)	Graeme Taylor	8294
SPO (Reptiles)	Rod Hitchmough	8249
SPO (Plants)	Andrew Townsend	8079
SPO	Nigel Cotsell	8212
Manager-NKT	Paul Jansen	8236
Scientist-NKT (Nelson)	Graeme Elliott	5092
Vet., NKT (Wildlife health)	Kate McInnes	5094

Science and Research, Wellington*

Position	Person	VPN
Manager	Geoff Hicks	8063
Mainland Islands (Hamilton)	Alan Saunders	6120
Predators (Hamilton)	Craig Gillies	6127
Island Ecol. (Auckland)	David Towns	7033
Pred. Ecol. (Christchurch)	Elaine Murphy	5413
Birds/Bats (Christchurch)	Colin O’Donnell	5430

* Unless otherwise stated.

	Birds (Christchurch)	Peter Dilks	5432
Regional Offices	Position	Person	VPN
	Northern Region	Keith Broome	6187
	Central Region	Pam Cromarty	8693
	Southern Region	Wayne Hutchinson	8854
Dog handlers	Trounson Kauri Park, Northland	Scott Theobald	7381

Glossary and definitions

Biosecurity	Protecting an island (or secure area) from a target pest. (It encompasses both quarantine and contingency operations.)
CMS	Conservation Management Strategy.
Contingency operation	Containing the target pest once it has arrived on the island (or secure area).
Control	Reduce the numbers of a pest on an island (or within an operational area) to a level where their impact is minimised or mitigated, when measured against an indicator species.
EPIRB	Emergency Position Indicating Radio Beacon
Eradication	Completely remove all living examples of the pest from an island (or operational area).
IEAG	<p>Island Eradication Advisory Group provide expert advice to DOC staff on island and eradication best practice. The IEAG members are:</p> <ul style="list-style-type: none">• Keith Broome (Chair)• Pam Cromarty• Wayne Hutchinson• Andy Cox• Ian McFadden• Raewyn Empson
Invasion event type	<p>Interception: Where a pest is detected in a secured area either on the mainland or on the island, e.g., quarantine store, wharf, helicopter pad, boat, aircraft, or on the island while unpacking, etc. Implies: picked up outside a barrier.</p> <p>Incursion: Where a pest is found in the wild on an island or steppingstone island. Implies: a breach; having got past a barrier.</p> <p>Establishment: Enough individuals found for a breeding population to establish or evidence of breeding or young found.</p> <p>Spread: Pest has already spread over the island at the time of detection.</p> <p>Suspicion of invasion: Level of certainty for a possible pest sighting. Used where:</p> <ul style="list-style-type: none">• a bird-wreck has been recovered with possible bites or mauls on it;• a bird-wreck which doesn't necessarily have any bites or mauls on it but where a pest has been reported in the vicinity; or• a second-hand report of a pest has been made.
Island cluster analysis	The process by which islands are grouped into manageable units. Generally, islands are grouped by where they are serviced from.
Lead RGM	General Manager accountable

Minimum Impact
Islands

The highest category of island assessment used in Atkinson & Towns (1990). The scale ranges from: to minimum impact to multiple use:

“**Minimum impact islands** include those with plant or animal species endemic to them, with very fragile biotic systems, or with relatively unmodified systems. The primary aim of management is to minimise human interference.

Refuge islands include a majority of our island nature reserves which protect not only common lowland and coastal plants and animals but also provide refuge for many relict species of the mainland. It may sometimes be necessary to use some refuge islands to ensure survival of mainland species not originally present on the mainland.

Restoration islands are a minority group of islands because restoration is a labour-intensive activity and is only appropriate where natural processes cannot be expected to secure the future for certain threatened species and communities. The level of public involvement with restoration on such islands would vary widely according to ease of access and vulnerability of the restored communities to human use. The educational benefit of involving the public in restoration programmes, whenever possible, should never be underestimated. With skilful interpretation it will lead to a broader appreciation of the value of nature conservation.

Open sanctuary islands are also a minority group because they combine extensive programmes of public interpretation of the New Zealand biota with labour-intensive species-specific management of plants and animals, including those threatened by extinction or destruction.

Multiple-use islands are those with some conservation function but it is secondary to other uses such as farming, forestry or recreation. Farm parks and many privately owned islands could be included here.” (From Atkinson & Towns 1990).

Neophobia

Fear of new things; reference to rats, cats or other pests experiencing new baits, bait stations or traps within their territory.

Pest

An organism which is not wanted on the island or other biologically significant area. Includes both animals and plants.

Quarantine

Kill the target pest before it reaches the island (or other secure area).

Risk assessment

Risk is assessed by considering the consequences and probability of a pest invasion event occurring.

Strait

Body of water between islands or an island and the mainland.

Surveillance

Active searching for a target pest; it may not involve killing the pest.

Virkon™ footbath

Virkon™ footbaths consist of an absorbent mat inside a sealed plastic box. The mat is soaked in a solution of “Virkon S” so that island visitors can tread through the box which is then re-sealed. Each kit contains a stock of the concentrate, a container for mixing and full instructions. A pen and slate is provided to record the date of each fresh mixing of the solution. Kits are available on the vessel Te Hoiere, on the jetty at Maud, the landing at Stephens and with Danny Boulton at French Pass. An additional kit is stored in the hut on Motuara. All footbaths are maintained by Area staff.

Additional supplies of Virkon™ are available from stock and station agents. While relatively safe for human contact, it should not be used on bare skin and splashes should be washed off immediately.

Pest Invasion and response planning form

To be completed by the DOC person receiving call, or the first Conservation Officer at the scene. Once completed, a copy should be immediately given to the Area Manager.

Electronic Pest Invasion Form

[WGNCR-46235](#)

Use the [Tab] key or arrows to navigate around the form and fill in the boxes.

- Forwards: [→] [↓] [Tab →]
- Backwards: [←] [↑] [↑Shift] & [Tab←]

Assistance with filling in the form is provided in the status bar (at the bottom of the screen), and also whenever [F1] is pressed.

Paper-copy Pest Invasion Form

[WGNCR-45511](#)

References

- Cunningham, D.M. & Moors, P.J. 1996. *Guide to the identification and collection of New Zealand rodents*. 3rd ed. Department of Conservation, Wellington.
- Department of Conservation. 2000. [Internal Biosecurity Response Procedure](#). QD NH 1323. Department of Conservation, Wellington.
- Gillies, Craig. & Williams, Dale. 2001. [Using tracking tunnels to monitor rodents and other small mammals](#). Department of Conservation, Auckland.
- King, C.M. ed. 1990. *The Handbook of New Zealand Mammals*. 2nd Edition. Oxford University Press, Auckland.
- Towns, D.R., Daugherty, C.H., & Atkinson, I.A.E. (Eds). 1990. *Ecological restoration of New Zealand islands*. Conservation Sciences Publication No. 2: 73-90. Department of Conservation, Wellington
- Booth, Andrea. comp. 2001. *Argentine Ant Quarantine Plan*, Northland Conservancy. Technical Support Unit, Department of Conservation, Northland Conservancy.
- Jakob-Hoff, Richard. 2000. *Workbook for developing quarantine and health screening protocols for native animal movements within New Zealand*. Auckland Zoological Park, prepared for Department of Conservation.
- Reed, Christine & Stockdale, Peter. 1994. Disease Considerations in Captive Breeding and Translocations of New Zealand Birds. *Ecological Management*. 2:46-54.
- Reed, Christine. 1998. *Report on wildlife health issues identified during the visit of Dr Wayne Boardman to Departmental threatened species programmes*. Biodiversity Recovery Unit. Science, Technology and Information Services. Department of Conservation. Wellington.
- Reed, Christine. [Department of Conservation Guidelines for: Health Management of species protected under The Wildlife Act](#). QD NH 1176. Department of Conservation, Wellington.
- Townsend, Andrew. 2001. [Standard Operating Procedure for the Translocation of New Zealand's Indigenous Flora and Fauna](#). QD NH 1174 Biodiversity Recovery Unit, Department of Conservation, Wellington.
- Braithwaite, Helen. 2000. *Weed Surveillance Plan for the Department of Conservation*. Department of Conservation, Wellington.
- Department of Conservation. 1999a. [Weed Surveillance Standard Operating Procedure](#). QD NH 1228. Department of Conservation, Southern Regional Office.