

## BIOSECURITY PLAN

**Title:** Biosecurity Plan for Far and Away Islands, Republic of Pacifica

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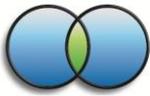
### Version History:

VERSION	DATE	AUTHOR	REASON FOR CHANGE
Final Version 1.0	1st November 2010	David Sagolo and Viliamu Reed	First version complete for review
Version 2.0	21st November 2010	David Sagolo and Viliamu Reed	Inclusion of crazy ant as a potential invasive species

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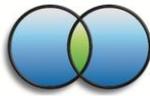
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## Contents

1	INTRODUCTION .....	3
2	THE SITE .....	4
3	RISK SPECIES.....	7
4	PATHWAYS .....	9
5	PREVENTION .....	10
6	SURVEILLANCE .....	14
7	INCURSION RESPONSE .....	17
7.1	Response decision making.....	17
7.2	Response readiness.....	19
7.3	Incursion Response .....	20
7.3.1	General response activities.....	20
7.3.2	Equipment.....	23
8	REFERENCES.....	26
	Appendix 1. CHECKLIST FOR TEAM LEADERS FOR VISITS TO FAR AND AWAY ISLANDS.....	27



## 1 INTRODUCTION

*Explanation: Set the scene and background to the need for a Biosecurity Plan.*

*Prompts*

- *Include the purpose of the Biosecurity Plan*
- *Include who the target audience is for the Biosecurity Plan*
- *Give a brief overview of the project to date.*
- *Include who is responsible for implementing the Biosecurity Plan.*
- *Remove this Help Box when the Biosecurity Plan is complete.*
- 

*Useful tools:*

- *Guidelines on Biosecurity*

The purpose of this document is to guide the Department of National Parks and Conservation (NPC) of the Republic of Pacifica and the Windward Marine Protected Area (WMPA) in implementing a strong and sustainable biosecurity defence of Far and Away Islands. These islands are currently being restored via eradication of Pacific rats, and once that has been achieved the islands will be free of mammalian invasive species and of most other troublesome invasive species. The significant conservation gains made by restoration of the islands can only be maintained if the islands are kept free of such species.

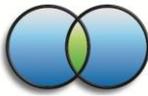
The current project began with a feasibility study assessing the likely success of the eradication of rats from Far and Away Island, Republic of Pacifica (Toa and Reed, 2009). The feasibility study concluded that the project was feasible. A project plan (Reed and Toa, 2010) was written to define the management structure of the project. The details of the project activities and the eradication operation are defined in the project Operational Plan (Toa and Reed, 2010) and the monitoring is detailed in the associated Monitoring and Evaluation Plan (Reed, 2010). The above work has been funded by Biodiversity International with NPC contributing the time of several staff members.

This plan focuses on a series of practical and sustainable tasks that are urgently needed and should be implemented as soon as possible.

It is vital to prevent other invasive species from invading the islands, which would greatly undermine current restoration efforts. This document provides activities to:

- 1) strengthen quarantine measures for the islands
- 2) undertake surveillance for any invasive species that might arrive in a breach of the biosecurity, and
- 3) implement emergency incursion response procedures.

In order to strengthen biosecurity of the islands, the Biosecurity Plan identifies the likely sources and pathways for invasive species to get to the islands and outlines the most urgent biosecurity



measures that need to be undertaken at the source points and on the vessels, and on the islands themselves. They include protocols for parties planning to land on the islands.

Practical and inexpensive approaches are favoured throughout to ensure the approach is financially sustainable.

Emergency incursion response measures for when invasive species are detected on the islands are outlined.

This plan should be updated as new findings are made and/or revised approaches are recommended.

This plan should be reviewed and updated if necessary after any confirmed incursions.

## 2 THE SITE

*Explanation: Provide a brief overview of the site that is relevant to the Biosecurity work.*

*Prompts*

- *Include a brief overview of the island – a detailed account is not necessary as you can refer the reader to the Feasibility Study Report, the project Plan or the Operational Plan.*
- *Where useful copy and paste some of the material from the Feasibility Study Report, the project Plan and the Operational Plan.*
- *Remove this Help Box when the Biosecurity Plan is complete*

*Useful tools:*

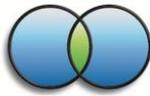
- *Guidelines on Biosecurity*

The Windward Island group lies off the east coast of Manu Island, in the Republic of Pacifica. The group is made up of four islands, namely Far, Away, Near and Furthest (see Table 1 and Map 1).

Island ownership rests with the head of individual families in the main village of the Windward coast, Magaia, but the island group forms an integral part of the Windward Marine Protected Area (WMPA), established in 1999. All claimants have endorsed the islands as being part of the WMPA and they are included in the management plan for it. The WMPA is managed by a committee which includes leaders from the local village as well as government representatives from the National Parks and Conservation Department (NPC) and Ministry of Agriculture and Fisheries (MAF).

All of the islands are uninhabited, but are sometimes used by villagers from the Windward coast villages for harvesting of coconuts and other wild-growing crops. Far Island is visited very infrequently by one of the families and Away Island even less so (P. Matipo *pers. comm.*). This region is not developed for tourism as yet, so the islands receive very few visitors apart from infrequent visits from scientists and conservation managers.

None of the islands have any wharfs or permanent structures on them.



Weather patterns are typical for the region, with a wet season from October to April, and a dry season with often strong trade winds in the months June to September. The outer two islands have limited safe access spots and are often difficult to access during the trade wind season.

**Table 1. Islands in the Windward Group, Republic of Pacifica.**

ISLAND	SIZE	DISTANCE TO MAINLAND and/or NEAREST ISLAND	PEST STATUS
Far	108 ha	1.3km to mainland, 500m to Away	Pacific rat to be eradicated 2011
Away	25 ha	500m to Far	Red-vented bulbul and some plant pests present
Near	21 ha	700m to mainland, but within fringing reef	Rats present (unknown species)
Furthest	7 ha	>4km to mainland	Status of other invasives not clear

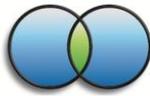
While Near and Furthest Islands currently have rats present, it may be feasible in the future to eradicate or control the rat populations. While this plan is generally focussed on the conservation and biosecurity needs of Far and Away Islands, the same basic concepts should apply to Near and Furthest as well, to minimise the risk that they also could be invaded by different invasive species.

Comprehensive details of the vegetation and fauna of Far Island are available in Jameson *et al* 1992. Away Island has also had some survey work conducted (e.g. Johnson 2003) but literature on Near and Furthest is relatively lacking.

A wildlife survey report (McCormack *et al* 2000) found that Far Island is home to a number of endemic and internationally threatened species. These include:

- Crimson pigeon (endemic; Endangered)
- Ground dove (*Gallicolumba stairi*) (regional endemic, Vulnerable)
- Pacifica broadbill (*Myiagra pacifica*) (Endemic, Vulnerable)
- coconut crab (*Birgus latro*) (Vulnerable).
- Pacifican ‘flying fox’ fruit bat (*Pteropus pacificus*) (Endemic, Endangered)

Far Island also provides habitat for a number of other locally and regionally endemic birds (Turner 2000). This island is a breeding ground for the red footed and brown boobies (*Sula sula* and *Sula leucogaster*), black terns (*Sterna sumatrana*) and white terns (*Gygis alba*), great frigate bird (*Fregata minor*), and other seabirds, and is the last nesting seabird colony in Republic of Pacifica (WMPA, 2002).



Four skinks, two geckos and one snake species (the Pacifican boa *Candoia pacifica*) are present on the Windward Islands. None of these reptile species are threatened (McCormack *et al.* 2003b). Hawksbill turtles (Critically Endangered) nest on the beaches of Far and Away, and they and green turtles (*Chelonia mydas*) are often observed in the seas around the islands (P. Matipo *pers comm.*).

Collectively this group of islands make up approximately a third of the total number of small forested islands off the coast of the main islands of the Republic of Pacifica. Far and Away are the only two of these in relatively unmodified state and far enough offshore to provide a degree of surety against natural rat re-invasion. They therefore offer a limited and valuable potential resource for conservation of any of the Republic of Pacifica's biodiversity that is affected by the presence of rats.

### **Far Island**

Far Island lies 1.3 kilometres from the Windward coast, and is only 500m from Away Island. Far (108ha) is the highly eroded remains of a tuff cone (high point is 100 metres) that was originally circular in shape, but due to erosion, various portions of the rim are now gone (Singer 1983). Hence, Far has moderate slopes with some small areas of steep to vertical terrain, which is broken by a series of small bluffs (Turner 2000). On the north and west sides of the island are low marine cliffs up to 30m high (Singer 1983). The vegetation covering the whole island is native or only partially disturbed, with a relatively open understorey, only a few vine tangles and limited ground cover (Turner 2000). However there is a small plantation area on the island (at Black Beach) supporting vegetable species and coconuts.

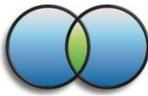
The vegetation of Far Island was considered by Jameson *et al.* (1992) to be of conservation significance because:

- coastal and lowland forests are rare and uncommon (respectively) in the Republic of Pacifica
- Species diversity is high, with over 160 species of plants recorded
- Several species are rare, the most significant being *Chionanthus vitiensis*, polo (*Solanum viride*) and pani (*Manilkara dissecta*)
- The vegetation is very important for the seabirds present.

### **Away Island**

Away Island (25ha) is in effect a smaller version of Far. It is similar to Far in its geology, with a tuff cone (maximum height 70m) breached on the eastern side by the sea, though its cliffs are not so high. Its vegetation is also similar, though few formal surveys have been made. It is more difficult to land upon and is further offshore than Far Island so visits have been relatively rare.

Away Island contains the most intact lowland coastal forest assemblage in Republic of Pacifica and is of high conservation significance. The vegetation is very similar to that of Far (Jameson *et al.* 1992), but is practically unmodified and there are few coconut palms. One plant species is present that is found nowhere else in the country (*Suriana maritima*) (Jameson *et al.* 1992)) and another, *Boerhavia alba* is rare in Polynesia and has only been recorded from Away Island and Fanuatapu in Samoa.



### 3 RISK SPECIES

*Explanation: Describe which invasive species are likely to invade or re-invade the island.*

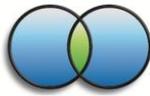
Prompts

- Review the section 5.2: Sustainable in the Feasibility Study Report for what was recorded during the Feasibility Study Stage.
- Include invasive species targeted in the eradication operation and other potential new invasive species.
- Include a description of the impacts if the species were to invade the island.
- The impact severity is used to identify the biggest threats and where to focus prevention/surveillance/response effort
- You may need to consult with ecology experts to allocate an impact severity to each invasive species
- Remove this Help Box when the Biosecurity Plan is complete

Useful tools:

- Guidelines on Biosecurity

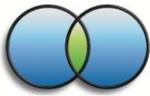
Invasive species	Impact Severity	Impact description
<i>Common or local and scientific name for invasive species</i>	<i>Critical/High/Medium/Low</i>	<i>Describe the impacts of an invasion</i>
Norway rat	Probably high, maybe critical	Predation of many ground-dwelling or ground-nesting species. Ground doves, seabirds and lizards would particularly suffer. Possible loss of some species from islands.
Ship rat & Asian rat	Medium	Predation of many smaller species, including tree-dwelling and tree-nesting species. Possible loss of some species from islands.
Pacific rat	Medium	Situation would return to pre-eradication state, decline in many native species populations.
Mice	Medium	Hard to assess – ecosystem level changes would occur through competition with native species for food. Some predation of smaller native species is also likely.
Yellow crazy ants	Difficult to assess,	Significant alteration of



	probably high	ecosystems – predation on native invertebrates, reduction in crab numbers, possible abandonment of nests and chick loss in ground-nesting birds.
Myna	Medium	
Plant Pests (various species)	Medium	Competition with native vegetation and alteration of habitats

Impact Severity explained

Impact category	Explanation of severity of impact		
	Biodiversity	Economic	Cultural
Critical	Loss of a threatened species from the island	Inability to re-grow crops, no income from tourism, and/ or high costs in management.	Extinction or permanent destruction of cultural value.
High	Loss of at least one native species from island.	Loss of major crops, income from tourists, or high control costs.	Major degradation of cultural significance.
Medium	Decline in populations of many native species.	Decrease in food and income from crops, and/ or tourism.	Degradation in an area or decline in species of significance.
Low	Decline in population of at least one non-endemic species	Small decrease in crop yields	Small changes in abundance of culturally significant native species or quality of an area on the island.



## 4 PATHWAYS

*Explanation: Describe the major pathways that invasive species may use to invade the island.*

*Prompts*

- Review the section 5.2: Sustainable in the Feasibility Study Report for what was recorded during the Feasibility Study Stage.
- Include the invasive species that might use each pathway
- This information is used to identify where prevention work is needed.
- Remove this Help Box when the Biosecurity Plan is complete.

*Useful tools:*

- Guidelines on Biosecurity

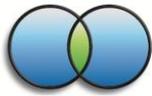
Pathway	Invasive Species
Boats – NPC or WMPA visits to islands	Rats, mice, ants, other invertebrates
Boats – local villagers and fishermen	Rats, mice, ants, other invertebrates
Tourist vessels, private yachts	Rats, mice, ants, other invertebrates
Camping equipment and food for workers	Rats, mice, ants, other invertebrates
Shipwrecks, sinkings	Rats, mice, cats, dogs
Deliberate introduction by humans	Pigs, chickens, cats, dogs
Local villagers visiting islands for agriculture	Plant pests and seeds
Natural spread from mainland if they establish there	Mynas

Given that rats and various other invasive species occur elsewhere in Pacifica and on many vessels that visit the Windward Coast area, there is a need for a coordinated effort to prevent these reaching or re-establishing on the islands.

*The key species are:*

Rats – several species, including black rat, Norway rat and Pacific rat that occur in the Republic of Pacifica, or Asian rats which may be present on ocean-going vessels.

House Mouse – present at Port Pacifica and perhaps elsewhere on the main island, and on vessels.



Invasive ants – yellow crazy ants are present along the Windward Coast including the area around Magaia. Many other species could easily be transported to the area or the islands in materials, on boats or by natural spread once they establish.

*Other species that could cause problems include:*

Cats – present at Magaia and elsewhere in the Republic of Pacifica and potentially on vessels

Dogs – present at Magaia and elsewhere in the Republic of Pacifica and on some vessels – potentially getting ashore with illegal landings and wrecks

Other invertebrates – spiders, beetles, mosquitoes, etc

Mynas – two species in most neighbouring countries

Snakes, mongoose, cane toads, frogs – tree snakes and amphibians have been found in many containers transported around the Pacific, while mongooses have been detected on some additional islands recently including at Samoa and New Caledonia (Pierce 2010).

Pest plants – many species present on the main islands of the Republic of Pacifica.

## 5 PREVENTION

*Explanation: Describe what you will do to prevent invasive species getting to the island.*

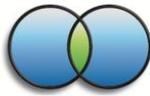
*Prompts*

- *Review the section 5.2: Sustainable in the Feasibility Study Report to see what prevention strategies were suggested during the Feasibility Study Stage.*
- *Review Appendices of the Feasibility Study Report to remind yourself what biosecurity measures were implemented during the feasibility study site visits.*
- *Each pathway identified in the Pathways Section may require a different approach.*
- *The work will comprise of: 1) what prevention measures the project team will implement; 2) what prevention measures other visitors to the island will implement and 3) the work the project team need to do to help (2)*
- *Remove this Help Box when the Biosecurity Plan is complete*

*Useful tools:*

- *Guidelines on Biosecurity*

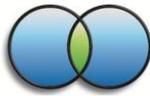
The goal of the eradication project is to have Far and Away Islands free of invasive mammalian invasive species in the near future (e.g. Reed and Toa, 2010). This will involve not only the eradication of Pacific rat from both islands, but enhancing the biosecurity measures to ensure they or other pest species do not return.



## Managing Agencies

It is acknowledged that trips by conservation agencies may make up a significant proportion of visits to the islands in future, and the number of trips raises the risk that any one of them may accidentally introduce invasive species to the islands. Some of the key preventative measures will include:

- Further training of several key members of NPC in biosecurity, particularly surveillance and response measures.
- Maintaining good checking, packing and storage at the packing and storage site; checking gear as it is loaded; safe storage, checking for pests on the boat; and checking gear on arrival at the island.
- NPC and WMPA setting a good example for other island users – whenever they travel to islands they should demonstrate good prevention measures.
- Reducing the number of vessels travelling to the islands and the number of overall visits will minimize the risk of invasive species arriving. Trips to the islands for different reasons (e.g. bird monitoring, rat monitoring or biosecurity checks) should be combined into a single trip wherever possible.
- Wherever possible, packaging food and other supplies into containers which rodents or ants cannot get into (e.g. plastic pails or drums with tightly sealable lids). Purchase and use of re-usable rodent-proof containers is a very important biosecurity measure. NPC and WMPA will have a designated set of such containers. These will be of one particular colour, and branded with the agency name to ensure the containers are not 'lost' or used for any other purpose. For other regular users of the island, NPC should consider providing such containers to encourage them to use safe containers and to think about biosecurity.
- Each official field trip to the island will have a designated team leader. It will be that person's responsibility to ensure biosecurity prevention measures have been undertaken by all members of the party. Any non-NPC official trips to the islands (e.g. by scientists, media, other government departments, planned tour parties, etc) will have a biosecurity briefing. Wherever possible, an NPC or WMPA officer will accompany the trips, but if not, the team leader will receive a basic biosecurity checklist (see Appendix 1).
- Food and equipment for the islands will be packed and stored in a designated area within the NPC equipment field store at Port Pacifica, or for the case of the local WMPA officer in Magaia, in a clean tidy area within the office annex (that has doors and windows that tightly close). Items will be stored for a short a time as possible, and the areas will be protected by placing rodent traps and poison bait stations in and around it as well as residual permethrin-based invertebrate sprays.
- Funding for a self-contained rodent-proof and insect-resistant area for island prevention measures within the current NPC storeroom will be sought. Until then, improvements will be



made to the existing facilities by creating a designated space for this purpose. The concrete floor will be painted for easy cleaning. Rodent bait stations and insect 'sticky traps' will be permanently maintained in and around this area. No foodstuffs, soiled items or rubbish will be stored in the area.

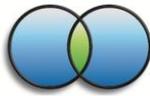
### **Local Communities**

The local community's visits to the islands also pose a significant biosecurity risk. The boats used to get to the islands are small and generally 'open', meaning there are very few places for rodents to hide in and this is a big advantage. However, the closeness of the islands means that trips are quite short and rodents or other invasive species on the boat may not be detected until arrival at the islands.

The presence of yellow crazy ants in the Magaia area creates a significant risk that this very small invasive species could remain undetected and therefore be easily transported to the islands amongst food or equipment.

Some key actions will be:

- On-going education and communication with the Magaia community will be conducted by NPC and the local WMPA officer. Users of the island will be met with regularly and any issues discussed. Education will be provided (either formally in schools, meetings, etc, or informally by talking to key individuals).
- When raising public and community awareness, the possible benefits to them in adopting biosecurity measures will be promoted (for example, no rats on an island means less health concerns, less food and crop damage, possibly more eco-tourism through increased native biodiversity, etc). People who can see the direct benefit to them are more motivated to conduct the necessary measures.
- Provision of rat-proof sealed buckets (surplus from the rat eradication project) for use by the few families that regularly use the islands, particularly the Matipo family who operate the boats that most frequently land on the islands.
- The local community will be encouraged to keep the beaches at Magaia as clean and rodent-free as possible. Food waste or rubbish that contains food should not be dumped or stored near the beaches.
- It is not economically practical to have a rodent control programme over the entire extent of the village and adjacent beach area, and the concern of villagers about poisons from baits entering their food chains means that long-term rodent bait stations anywhere outside are not desirable. A small number of wooden tunnels will be set up around the boat storage area and from time to time, especially just prior to boating expeditions to the islands, baited snap-traps can be added to them. Paga Matipo has been assigned responsibility for maintaining these traps, as part of the agreement to use his boat as the main source of transportation to the islands. He will be provided with bait as and when required (he can also use locally sourced coconut as bait).



- All boat operators intending to travel to the islands will be encouraged to check their boats (and any gear being taken) before launching.
- All boat operators intending to travel to the islands will be encouraged to remove sources of food and water on the boat while it is pulled up on land. This will help prevent rodents being attracted onto the boat.

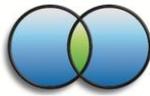
### **Communications**

- Signs outlining the need for biosecurity and some key actions to take will be installed on the islands at the regular landing points, and at the launching beach at Magaia.
- A poster and an information pamphlet on biosecurity and preventative actions will be prepared for distribution, based on examples from other islands, and will be given out as appropriate to groups visiting the islands.
- Presentations to Magaia community groups (especially the school) will occur.
- NPC will promote the value of the islands in press releases to the general media, and will reinforce the message that biosecurity is vital to maintain that value.

### **Boats/ Transport to the Island**

- All risky cargo (e.g. timber, food supplies) should be searched prior to it being loaded aboard. It should be unpacked and repacked just before loading if necessary, just to be sure. Consideration will be given to any space a rodent could hide in or any item it might be attracted to – this will be checked prior to departure.
- Passenger education needs to occur – ensure they all know the risks of biosecurity, the most likely pathways and what to look for. All high risk invasive species should be known and must not be permitted on board.
- Loading of supplies at night (when rodents are most active) should be avoided.
- Any necessary stops at Far and Away Islands (free of most invasive species) should if possible be done first, before visiting Near or Furthest Islands (with rats still present), to prevent accidental picking up of rats and transporting them to the other islands.
- The regular boat operators (P. and T. Matipo) will be paid to assist in some rodent monitoring on the islands. As a result they will gain skills and experience in identifying rodent sign and how to set detection and control devices, which can then also be applied for biosecurity uses on the islands and around the Magaia village.

### **At the Islands**



- Visitors will be asked to plan how to stop invasive species escaping from the boat or from any gear brought ashore. They will be asked to unpack equipment in an open area in daylight so that any pest animals can be detected easily.
- At the landing beaches and campsites, long-term rodent bait stations will be installed.

## 6 SURVEILLANCE

*Explanation: For each invasive species, describe the surveillance methods you will use on the island to detect whether it has evaded the prevention measures.*

*Prompts*

- *Review section 3: Risk Species to identify which invasive species that will require surveillance effort.*
- *If resources are limited or there are many potential invasive species, focus the surveillance effort on invasive species that have greatest impact severity.*
- *Remove this Help Box when the Biosecurity Plan is complete.*

*Useful tools:*

- *Guidelines on Biosecurity*

### Rodents

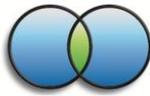
Methods of detecting rats and mice can be difficult because just one or two individuals arriving on the islands could easily escape detection until they are well-established in numbers and spread across the entire island. For example an invasion at Far Island by Norway or ship rats could result in them being spread throughout the island and causing severe population impacts on birds within a few months.

For this reason the emphasis must primarily be on preventing invasion at the source and on vessels. However, the prospects for early detection on the islands can be improved by certain measures.

Key methods for detecting rats will be:

#### Permanent Bait Stations

- A number of wooden tunnel-type boxes will be set out permanently over the range of likely habitats (at least a few in each major habitat type where rodents might occur). There will be a relative concentration of these around the major landing site and campsite on both islands, but they should be approximately 100m apart to maximise the potential coverage. The location of all such devices will be recorded on GPS and will need to be in relatively easy places to service regularly. Because of the problem of crabs stealing bait from stations, the design of the stations will mean entrance holes will be elevated above the ground to reduce crab access (advice on



best designs is currently being sought from PII and other agencies). The stations will not permanently have bait placed in them because of regular invertebrate damage but will be periodically baited (on a 3-month schedule) and will be checked at least on that frequency but more often if possible, as trips to the islands allow.

- In addition to the permanent bait stations a range of other detection devices will be used on a regular basis. Snap-traps, tracking tunnels and wax tags will be deployed as part of an on-going monitoring programme. Ideally this should occur on a regular 3-monthly basis but for economic reasons schedules may be tied in with other trips to the islands.

#### Seabird egg predation

- Searches will be made at the known colonies of small seabirds (e.g. terns, noddies) for abandoned or failed eggs – rat-eaten eggs have many jagged edges. On islands lacking rats and other predators, the failed/abandoned eggs are generally intact or broken open without characteristic rat-gnawed edges. [The large eggs of frigatebirds and boobies will not be checked as these birds can defend their eggs against rats].

#### Seeing rats and mice

- Rats and mice become quite active in the evening when it is still daylight, and when on the islands it is quite possible that they may be detected this way. All visitors will be requested to advise NPC or WMPA of any sightings.
- If no sign is found during the day, searching at night using a strong headlamp or spotlight can also yield results.

#### Footprints

- Footprints in damp sand or mud will be checked for. The inland edge of sandy beaches or the edges of any muddy patches (e.g. along the walking tracks) should be targeted where footprints of rats if present, are often conspicuous.

#### Coconuts

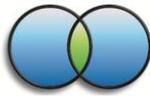
- Look for rat gnaw-marks on coconuts and other fruits, but be aware that crab feeding sign may be confused with this.

#### Other

- Check bones of dead seabirds and fish for gnaw marks.

#### **Ants**

Protocols for ant surveillance will be followed, which in summary comprises:



- Lures – sugar and protein-based lures set out in a series of 10 pairs of containers in likely invasion site, e.g. camp site, immediately above landing site (and GPS these areas). Operate traps in the daytime for c.30 minutes or until lures are starting to dry out and collect and preserve any ants lured into the jars in formalin or alcohol. Label specimen jars with location, date, observer, sample type and number for later inspection.
- Maintain good observations at campsite and landing areas – if invasive ants are present they should quickly become relatively obvious, especially if food or lures are present.

#### **Other animals**

- Mynas or other perching birds will usually be conspicuous either by sight or calls.
- Visitors to the islands will be encouraged to immediately report any unusual sightings, e.g. of toads/frogs, all mammals, colourful reptiles, unusual invertebrates, etc, and collect as much information on identity (photograph, specimen ideal) and location as possible.
- NPC staff will undergo further training on identification and knowledge of likely pathways for invasive species currently not known in the country but which could establish (e.g. cane toads, iguanas, mongoose, ant species).

#### **Pest plants**

Several pest plants are already present at the islands. Key needs are to:

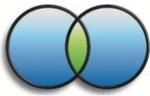
- Provide pest plant identification manuals for visitors to islands highlighting key likely invasive plants that could invade.
- Provide some further training to NPC officers in identification of key invasive plants and best practice control measures.
- All visitors to islands are to report (and if possible GPS) any sites of invasive plants (or suspected invasives) that they find.

#### **Surveillance kits**

Surveillance kits should be based at each of the following offices:

- NPC equipment storeroom in Port Pacifica (and available for all staff and research trips to the island),
- WMPA Windward Coast local officer (David Sagolo).

A generic surveillance kit for all visitors to the islands is identified in Section 7.2. This kit should be checked at the end of each visit, and gear cleaned and/or oiled as necessary. It should be checked again in advance of any trip to enable replacements to be purchased as necessary, while some items (e.g. ant lures) need replacing close to departure date.



## 7 INCURSION RESPONSE

*Explanation: The plan of how to respond when surveillance indicates a possible incursion.*

*Prompts:*

- *You will need to respond to a possible incursion for each invasive species that is under surveillance in section 6: Surveillance.*
- *In case of a possible incursion you will need:*
  1. *To have a management plan for gathering information and deciding on next steps (Section 7.1).*
  2. *To have some equipment ready and waiting and people available (Section 7.2).*
- *Detailed operational response plans do not need to be prepared for every species as every incursion is different and you will not be able to plan for every scenario, but preparation of a generic decision-making plan (Section 7.1) is strongly advised.*
- *Remove this Help Box when the Biosecurity Plan is complete.*

*Useful tools:*

- *Guidelines on Biosecurity*

### 7.1 Response decision making

*Explanation: Detail the process that will be followed to: 1) confirm that a real incursion has occurred and (if confirmed) 2) to decide the plan of action to respond.*

*Prompts*

- *Detail what and how information will be collected to confirm the incursion*
- *For sightings of target species: detail how you can use DNA to establish if the individuals are from the original island population (ie not all were eradicated) or whether they are from an introduction from off the island.*
- *Clearly detail who is responsible for making which decision in the process*
- *Detail the communication plan for the decision making process, e.g. who needs to be informed of:*
  - *a possible incursion*
  - *the outcome of the confirmation*
  - *the agreed response plan*
  - *outcomes of implementing any response plan.*
- *Remove this Help Box when the Biosecurity Plan is complete.*

*Useful tools:*

- *Guidelines on Biosecurity*

The planning of any response to an incursion of any invasive species on Far and/or Away Island will be led by Viliamu Reed of NPC, with David Sagolo of WMPA acting as his deputy, or in his absence, his replacement.

All reports of possible incursions need to be reported as soon as possible to one of these two positions.

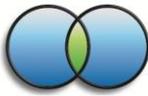
The operational response will depend on the exact details of a particular incursion. As there are many different factors that affect a scenario it has been decided that a detailed operational response plan cannot be pre-planned for every likely scenario.

### Management Plan

	Action	Responsible
1	Confirm incursion by gathering surveillance information.	V. Reed(or D. Sagolo)
2	If incursion is by the target species: If available use dna samples to establish if individuals are from original population on island (ie not all were eradicated) or from another population (new introduction)	V. Reed(or D. Sagolo)
3	Assess the severity of the risk that the incursion has to the island (i.e. what species it might be and what damage this species can do to native species or ecosystems on the islands).	V. Reed(or D. Sagolo)
4	Decide on the basis of (2) above, what actions should be taken and when (consultation with experts may be required here to formulate the best possible action plan).	V. Reed(or D. Sagolo)
5	Carry out response actions.	As delegated by V. Reed(or D. Sagolo)
6	Review outcomes of response actions.	V. Reed(or D. Sagolo)
7	Report to key stakeholders on the incursion, response action and outcome of the actions. Any other reporting defined in the <i>Project Reporting Section of Project Plan</i> (Reed, L. & Toa, M. 2010)	V. Reed(or D. Sagolo)

If an incursion is confirmed, advice will be sought from external experts to help prepare an adequate response plan. They will be provided with as much detail as possible to help them in providing the best possible advice – the more they know, the better the advice is likely to be.

A response uses many similar techniques to surveillance but the clear aim here is not only to find if any pest animals are present, but to kill or remove them before they breed or do significant harm to native wildlife.



## Confirming the incursion

- Any sightings/evidence of incursions will be confirmed before planning any operational response actions. That is, if the evidence is not clear cut, a team will be sent to the island with a range of surveillance tools to attempt to gather further information.
- The precise nature of what has been seen (live animal, dead animal, footprints, droppings, etc) will be recorded, where this occurred, who saw it and who reported it.
- If the sighting of the pest was made by another person, that person will be interviewed as soon as possible and details will be recorded, including when the sighting took place and when the interview took place. Focus will be on the most important factors - how well they saw it, i.e. how close, how long, what visibility. The exact location of the sighting should be recorded, if necessary by taking them back to the location.
- The reliability of the information is extremely important – if the information is very trustworthy, you can proceed immediately with a response. If the information is lacking in some detail or the possible presence of a species cannot yet be confirmed, continue with standard Surveillance techniques, and increase these if desired. In all initial ‘confirmation’ visits, a range of control options will be taken ‘just in case’. The confirmation team should go prepared to stay on the island for some time, or allow for replacement personnel after a set period.
- Based on the information gathered during the confirmation, the severity of the risk will be assessed.

## 7.2 Response readiness

*Explanation: Detail what preparation will be completed to be ready to respond to a possible incursion and to implement any agreed response plan.*

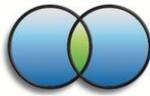
### *Prompts*

- *Include the people and their roles that will make up the incursion response team.*
- *List the equipment that will be available to the incursion response team to assist in:*
  - *Any confirmation work*
  - *Any agreed response actions*
- *Detail how the team will source any extra equipment identified during the Response Decision Making Process*
- *Remove this Help Box when the Biosecurity Plan is complete.*

### *Useful tools:*

- *Guidelines on Biosecurity*

For animal incursions, time is of the essence in responding to incursions - the response should occur as soon as possible, ideally before the invasive species has had a chance to breed and establish a population (the animal may be pregnant or there may be more than one animal present).



An incursion response kit will be put together, and will be held in the NPC and WMPA stores. The response kit will include all the equipment that will be required immediately a possible incursion is notified to complete the confirmation and any immediate eradication. The exact contents of the response kit will depend on the details of the actual project (e.g. whether it is a rat incursion, or ants have been found, or a cat, etc).

## **Staff**

The leading of any response to an incursion of any invasive species on Far and/or Away Island will be by Viliamu Reed of NPC, with David Sagolo of WMPA acting as his deputy, or in his absence, his replacement. Other team members will be drawn from any NPC staff available. P. or T. Matipo from Magaia village will provide boat transport and can also assist on-site, as part of the goal of training some people from the local community.

Outside advisors may be required to provide advice for certain aspects of incursion responses. The primary contacts will be:

Rodents – D. Toa (private consultant), and the Island Eradication Advisory Group (NZ Department of Conservation).

Ants – B. Simanu (Biosecurity Officer), Ministry of Agriculture, Republic of Pacifica

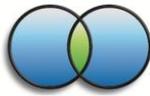
Plants – C. Leary (private consultant)

## **7.3 Incursion Response**

### **7.3.1 General response activities**

#### **Rodent Incursions**

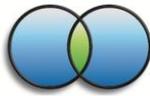
- The best response to a rodent incursion is to use a certified rodent detection dog to indicate where they are. However it is unlikely that such a dog would be available in most instances.
- The next best response in this situation is to use a trap/bait station network already in place on the islands. Having such a network in place reduces the risk of neophobic rats (i.e. shy of new objects) avoiding newly established stations.
- Any grid system of traps or detection devices should cover all major habitat types, but focus on preferred sites and known invasion sites.
- All traps and bait stations should be numbered and mapped, and their location clearly marked with coloured tape or similar attached to nearby vegetation (do not attach tape to stations as it may deter the pest animals from going near it). Any member of the team should be able to find every trap or bait station site using the number system and the map.
- Traps used should preferably be of a 'kill' type e.g. snap-traps and baited with a known attractant. Traps should be checked daily. Bait stations should be checked and replenished if



necessary daily but this can be done every second day if necessary. Keep accurate records of all bait takes and trapping activity. If in any doubt about the species of pest e.g. which species of rodent it is, take photos and keep samples of any evidence found for future reference (e.g. animals caught in traps, droppings, damaged bird eggs, etc). Keep any part-eaten baits, fur caught in traps etc for future reference if needed, to confirm what species may have caused it.

- Place traps where there is plenty of natural cover and where rodents are likely to be active (e.g., alongside large rocks, around the base of trees, under logs, overhanging vegetation, and under buildings). If rodent droppings, food remains or runways are visible set traps nearby.
- The best trap type will depend on the target species. The DOC 150 trap is good for all rats but not for mice, and with its wooden cover is bulky and difficult to transport in large numbers. The Victor Professional rat trap is good for ship rats and Pacific rats but can allow Norway rats to escape and may have non-target impacts on lizards. The Victor professional mouse trap with plastic pedal is recommended for mice.
- All trapping for rodents will require trap covers to direct the target species into the trap, to help reduce non-target captures, and to keep the weather off any bait or lure used.
- Covers should be used for traps. Covers should have a single entry (so rats have access to right end of trap), with an entry hole of 45mm x 45mm (A larger entry hole will not exclude non-targets like birds), with easy removal of covers to check traps. There should be an ability to fix the cover to the ground with a wire hoop (This prevents traps being disturbed by other animals (e.g. seabirds).) Ideally the trap should be on a wooden floor or similar (this keeps the trap dryer and extends the life of trap.) and fixed to the cover or pegged down (so the trap cannot be dragged out of the cover). When set, the trap should be stable and should not be able to be rocked or tilted easily (so the trap doesn't move until triggered).
- Specification for tunnel/cover designs that meet these requirements are in the PII Trapping Guidelines. Bait the traps with something that the rodents are already familiar with. In the absence of a clear choice peanut butter/rolled oats mix is usually acceptable. A protein-based bait is more likely to attract Norway rats.
- Beyond the grid of bait stations or traps (if it does not cover the entire island), or in addition to it, check for sign in likely areas where the rodents or cats may be attracted to or even have originated from, e.g. landing sites, wharves, sheltered buildings, or anywhere with abundant food supplies for the animals (inhabited houses, coconut groves, rubbish dumps, etc).
- Trapping and/or bait stations should continue for at least 2 weeks after the last sign has been detected, and longer if at all possible. Bait stations can be restocked with a more weather-proof type of bait (e.g. waxed blocks rather than pellets) and left for weeks between checks if staff cannot stay on the island. Once there has been a prolonged period with no bait take or captures, the response can be downgraded, and standard surveillance methods should resume.

### **Invasive Ants Incursions**



- If invasive ants are detected on the islands, it is unlikely that anything can be done. However, the first step is to determine the extent of the invasion. If it is a very recent invasion, e.g. the ants are very localized, it may be possible to do something, and an attempt at eradication could be made, but the current technology has no proven options for ant eradications off islands once they are well-established.

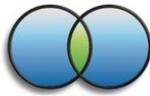
### **Other Animal Incursions**

Other animals are also very difficult to eradicate and effective quarantine is the best approach.

- *Mynas*: A single myna might not be a problem by itself, but the risk is that if another arrives during its lifetime then there is a chance of a fertile pair forming and a population starting. Therefore, if a single myna arrives it should be studied and if possible fed with food scraps to encourage tameness. Meanwhile, NPC would be informed to discuss and agree on the best eradication method. If multiple mynas arrive, then they should also be studied and further advice sought from advisors on how to proceed with eradications.
- *Cane toads, other mammals, amphibians, non-native reptiles*: These should all be killed immediately when they are found if possible and specimens preserved in preservative for formal identification by NPC staff. If no preservative is available, photograph, and get to Magaia(WMPA field station) or NPC offices at Port Pacifica. If the animal(s) cannot be caught record as much detail as possible (e.g. date, time, observer, what was seen and where, what it was doing, etc) and report this immediately to NPC or the local WMPA officer.

### **Pest Plants Incursions**

- Remove invasive plant from islands that it is found on. Dig them out taking care to remove all the roots from the ground, and leave with roots exposed to the air (anchoring in place, e.g. wedge in 'V' of tree branch).
- If plants are seeding, it may be necessary to collect the whole plant in plastic bags for later incineration. If only a few seeds are on the plant it may be possible to break off the seeding parts and carefully bag these (in sealable plastic bag) for incineration, leaving the dead plants as above. Always take care that there are no seeds left at the site.
- GPS and photograph sites from which invasive species are found, and to assist people in re-locating the incursion spot, mark it with flagging tape and another physical marker, e.g. large stone, piece of timber or coral mound.
- Record and report on all details. The report should alert the need for subsequent parties to return to this incursion site as frequently as possible in order to remove any further seedlings. If in doubt of seedling identity, remove it.



### 7.3.2 Equipment

The tables below provide a guide to what will be held in the NPC equipment storeroom in Port Pacifica and the WMPA workshop at Magaia, ready for use in case of an incursion or suspected incursion on Far and Away Islands.

Note that not all equipment need be taken for each incursion – the nature of the work (whether it is confirmation or a response) and what species is being targeted will enable the team leader to dictate what needs to be taken.

Some kit items (e.g. GPS, binoculars, camera) are also used for other purposes, so use the table as a checklist – some items may be held elsewhere.

All details already known from the incursion should be written down and a copy of this taken with the response team, so they have this vital information on-site.

#### Additional Supplies

It is considered that due to the small size of the islands enough stocks of most items are held by NPC to cater for most incursion response needs. Many other items can be sourced through local grocery, hardware or chemist outlets (gloves, ethanol, plastic bags, timber for tunnels, residual insect sprays, etc). However if further items are required the likely source will be:

*Rodent traps* - NPC has further stocks of rodent snap-traps that are used for monitoring purposes.

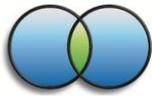
*Bait* - Extra bait (pellets or wax-blocks) can be ordered directly from ACP at [www.pestoff.co.nz](http://www.pestoff.co.nz)

*Traps* - more snap-traps, cage traps, leg-hold traps etc can be obtained from [www.nopests.co.nz](http://www.nopests.co.nz) or from [www.traps.co.nz](http://www.traps.co.nz)

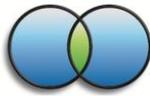
*Tracking tunnels and papers* – [www.gotchatraps.co.nz](http://www.gotchatraps.co.nz)

In most cases these items would need to be air-freighted to get to Pacifica in time to be of value.

Item	Number/amount	Tick when included in kit
Maps of each of the islands ( laminated)	1	
Photocopies of maps for writing on	5	
Far and Away Islands Biosecurity Plan	1	
Copies of relevant PII Guidelines (Biosecurity; Rodent Survey, Monitoring and Identification; Trapping; Rodent Bait & Baiting; Cat Eradication and Monitoring Techniques) – all laminated if possible.	1 of each	
Laminated list of GPS locations and/or physical description of location of any permanent monitoring	1	

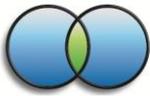


devices already established on island		
Relevant background information on island, contact details for experts, species & pest identification material	1 of each	
Binoculars(held in NPC office)	1	
Digital camera(held in NPC office)	1	
Tape measure 25-50 m	1	
Compass	1	
Day bag	1	
Dry bag	1	
Ruler	1	
Ziplock bags	50	
Water proof notebooks	2	
Pens/pencils	4	
GPS and set of spare batteries (held in NPC office)	2	
Data sheets for traps/tunnels		
Flagging tape (colour coded)	3 rolls	
Vivid marker pens	2	
Specimen containers (jars, zip lock bags) & labels	10	
70% ethanol	1 litre	
Sharp knife or dissecting tools (e.g. scalpel and tweezers)	1	
Disposable Gloves (for handling baits, traps or dead animals)	20 pairs	
<b>For rodents only</b>		
Tracking tunnels	20	
Dye and paper for tracking tunnels	40	
Bait for tracking tunnels (peanut butter/oats, pieces of coconut, etc)	Enough for 100 baits	
Long-lasting indicator baits (wax tags, wax candle pieces)	20	
Bait for snap-traps – peanut butter & rolled oats in unopened packets, or coconut pieces (obtain fresh)	Enough for 100 individual baits	
Snap traps (mouse and rat-sized), with length of cord for each trap to attach to anchor-point (plus trap covers and pegs if required)	20 rat traps 20 mouse traps	
Bait stations	(Not required, already on island)	
Toxic rat bait Pestoff 20R and/or Pestoff wax blocks	25 kg bag	
<b>For cats only</b>		
Spotlight and batteries, and spares or means to	1 per searcher	



recharge batteries		
Cage/Live traps	5	
Fresh baits/lures (red meat, chicken, or fresh fish - and/or means to obtain this e.g. fishing line or net)	Obtain fresh, 1kg	
LED headlamps or personal torches, plus set of spare batteries	1 or more per person	
Leg hold traps	10	
Back-up (non-perishable) types of baits/lures (e.g. tinned cat food, tinned fish, vacuum-packed or freeze-dried fish, freeze-dried rodents)	500g each of two types	
Firearms (shotgun &/or rifle) and ammunition, cleaning equipment	1 per experienced hunter	
Spare plastic bags (zip-lock preferred) for bait, etc.	20	
Fishing lines, hooks, etc (to catch fresh fish for bait)	1	
<b>For ants only</b>		
Ant bait stations (small jars, plastic or glass)	20	
Plastic vials for storing insect samples	20	
Preservative (ethanol or formalin)	1 litre	
Ant lures (protein and sugar-based)	Enough for 2-3 rebaitings	

<b>SAFETY AND OTHER GENERAL EQUIPMENT</b>		
<b>(does not need to be in kit, but use this as a checklist to ensure key items are not forgotten)</b>		
All relevant information from initial report of incursion	1 copy	
Rodent-proof and waterproof containers for all equipment to be packed in.		
Insect spray (either long-lasting broad-spectrum aerosol type or preferably mixable type e.g. Ripcord) and means to apply this. [for use in containers and equipment etc if invertebrate infestation is discovered or suspected]	1 can	
Tools (hammers, spades, pliers, thin wire for tying traps to trees, thicker wire for trap-cover hoops/pegs, nails, staples, etc)		
1st Aid kit	1	
Boat, with outboard, fuel, lifejackets, spares & safety gear		
Two means of long-distance communications: Two-way Radio and/or Satellite phone and/or Emergency locator beacons, and spare batteries or means to charge these.	1 of each	
Personal protective equipment e.g. protective and/or		



sunglasses, sunscreen, disposable or washable protective clothing (if handling toxins), leather or rubber boots.		
Packs or sealable buckets (other than personal daypacks) for carrying bait, traps, trapped animals.	1 per trap operator	
Tents and sleeping equipment		
Food, water and cooking implements		
Generator (and fuel), or solar panel and inverter, or other means to recharge batteries, radios, phones, laptops	1	

## 8 REFERENCES

*Explanation: Use this section to record other documents that have been used and referred to in preparing the Biosecurity Plan*

*Prompts*

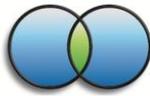
- *List the references alphabetically.*
- *Remove this Help Box when the Biosecurity Plan is complete.*

Pierce, R. 2010. Biosecurity Guidelines For The Phoenix Islands, Kiribati. Eco Oceania Pty Ltd Report for Government of Kiribati and Critical Ecosystem Partnership

Toa, M. and Reed, V. 2009. Feasibility Study for the Eradication of Rats from Far and Away Islands, Republic of Pacifica. Unpublished report to National Parks and Conservation Department, Republic of Pacifica.

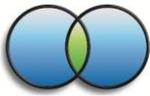
Toa, M. and Reed, V. 2010. Operational Plan for the Eradication of Rats from Far and Away Islands, Republic of Pacifica. Unpublished report for Department of National Parks and Conservation, Republic of Pacifica.

Reed, V. & Toa, M. 2010. Project Plan for the Eradication of Rats from Far and Away Islands, Republic of Pacifica. Unpublished report prepared for National Parks and Conservation Department, Republic of Pacifica.

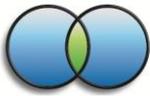


## Appendix 1. CHECKLIST FOR TEAM LEADERS FOR VISITS TO FAR AND AWAY ISLANDS.

Task	Completed?
Have I given clear verbal biosecurity instructions to <u>all</u> trip members?	Yes/No
Have I checked they have understood these instructions?	Yes/No
Have all stores and supplies been packed in approved rodent- and ant-proof containers?	Yes/No
<p>Itemise gear too bulky/awkward to fit into rodent-proof containers here:</p> <p>Check these immediately prior to departure -</p>	Yes/No
Has everything been stored in equipment room in sealed containers or re-checked immediately prior to departure?? (Remember the 'extras' like boats, radios, day-bags, last-minute items etc).	Yes/No
<p>Check with every member of trip:</p> <ul style="list-style-type: none"> <li>- packs kept in rodent-free areas or checked and re-packed since?</li> <li>- no food held in any unsealed bags?</li> <li>- all fresh food items checked for presence of ants and other invertebrates?</li> <li>- boots and other footwear clean and free of soil/seeds?</li> <li>- packs, pockets, Velcro fasteners, socks, etc clean of weed or grass seed?</li> <li>- no-one in party has worked in area of known invasive plant infestation recently?</li> </ul>	Yes/No
<b>IF THE ANSWER TO ANY OF THE ABOVE IS 'NO', THEN FURTHER ACTION IS REQUIRED!</b>	
<u>What are the added risks on this trip?</u>	Yes/No



<ul style="list-style-type: none"> <li>- are we leaving/ travelling at night?</li> <li>- are there planned stops en route where pests could enter or exit?</li> <li>- what bulky or non-rodent proof packages do we have?</li> <li>- are we travelling on a boat with no poison rat baits or effective rodent control measures?</li> <li>- are any items being stored on deck or in non-rodent proof holds?</li> <li>- are we taking fresh vegetables which may contain ants, insects, soil etc</li> </ul>	
<p><b>IF THE ANSWER IS YES TO ANY OF THESE QUESTIONS YOUR TRIP HAS EXTRA RISKS. BE AWARE!</b></p>	
<p>Have I addressed these concerns by identifying 'tailor-made' solutions? (How do I deal with the added risk to minimise potential risk to the islands?).</p>	<p>Yes/No</p>
<p>If your answer to this is no, then your trip should not proceed until you have addressed these issues.</p>	
<p><u>In Transit to Islands:</u></p> <p>If any sign of rodent or ant presence is detected on the boat whilst en route to your destination, stop! Do not land at the destination island or any other island until the problem has been identified and remedial actions implemented in consultation with NPC.</p>	
<p><u>On Arrival at Destination Island:</u></p> <ul style="list-style-type: none"> <li>- Have I inspected all containers for rodent or ant entry or damage which could allow such?</li> <li>- Has everything been unpacked or opened up and carefully inspected in an open area?</li> <li>- Have I instructed everyone on rules for disposal of organic rubbish?</li> <li>- If planning to go to the other island from here, have I considered and established how to apply quarantine procedures before we leave?</li> <li>- If on a daytrip only, have I ensured only day-bags are being taken, and that they have been checked as clean and been packed only on the day of departure?</li> </ul>	<p>Yes/No</p>



**IF YOU HAVEN'T DONE THESE TASKS, WHY NOT?! PLEASE DO IT!**

We cannot totally eliminate the risk of accidental introduction of invasive species - short of prohibiting all trips to the islands. However we can minimise the risks. Any non-compliance with the checklist above means that you personally are putting the flora and fauna of the islands at an unnecessarily increased level of risk. Please do your bit to help preserve the conservation values of these islands.