GUIDELINE FOR BIOSECURITY

PURPOSE

- These Guidelines are to be used by Project Staff conducting invasive species management projects based on the PII Project Process.
- The Guidelines cover advice on planning and implementing biosecurity for project sites.

Note: The emphasis here is on invasive plants, but good Biosecurity is necessary to keep ALL unwanted organisms out of the site

1. INTRODUCTION

- The purpose of biosecurity is to:
    - Keep project sites free of the target species you have eradicated
    - Assist with keeping species that are under on-going control treatment down to agreed levels.
    - Keep project sites free of new invasive species.
    - Prevent the export of invasive species from one project site to other sites.
- Biosecurity activities involve prevention, surveillance and management of invasive species incursions.

2. IDENTIFYING THE RISKS

2.1 THE RISK SPECIES

- The key is to manage those threats that pose the most severe risk to the values of the project site. Concentrate on identifying the species that are the greatest risk to the project site. With limited resources it may not be possible to address all possible biosecurity threats, so effort should be directed where it is most needed.
- Consider the risk if the invasive species being targeted in the project site were to re-invade after the operation, and also any that are not currently on the project site but are on areas nearby.
- Confirm invasive species that are present on surrounding or neighbouring areas (including islands). Different species have different dispersal abilities and this is important information in determining the risk from potential sources and their proximity to the site being restored.
- Consult widely with the local communities when researching the biosecurity risks to the project site. Local communities are a great source of information on species present on the project site and in surrounding areas. It is also an effective way to find out what the local community perceives as the high risk invasive species.
- Invasive species that are common problems in the Pacific include:
    - Invasive plants
    - Mammals: rodents, cats, mongoose
    - Invertebrates: ants, snails
    - Reptiles: snakes, geckos, lizards
    - Amphibians: toads and frogs
- Information on these and other invasive species can be found on the Global Invasive Species Database -

< http://www.issg.org/database/welcome/> and Pacific Islands Ecosystems at Risk database < www.hear.org/pier >

2.2 THE PATHWAYS

2.2.1 HUMAN ASSISTED PATHWAYS

The main pathways are those used by people, such as different types of boats travelling between islands or vehicles or machinery travelling from site to site.

- Plants, particularly if they are in soil, can carry diseases, invasive plant seeds and insect, lizard and snail eggs.
- Footwear and clothing can carry invasive plant seeds.
- Machinery can carry many invasive species.
- Some examples of human-assisted pathways:

Pathway	Activity
Small boats	Fishing
	Transport and movement between islands
	Harvesting of local resources (legal and illegal)
	Tourism
Commercial boats	Cargo
	Ferries
	Fishing fleets
	Tourism
All types of boats	Ship wrecks
Research organization	Research
Government	Fisheries inspection, military, customs, police
Commercial aircraft	Cargo
	Passenger
Government aircraft	Fisheries inspection, military, customs, police
Private aircraft	Tourism
Clothing	Hiking/ Tourism
Machinery	Construction
	Road works

- When identifying pathways, consider illegal activities – as they are uncontrolled they can be significant pathways.

2.2.2 NATURAL PATHWAYS

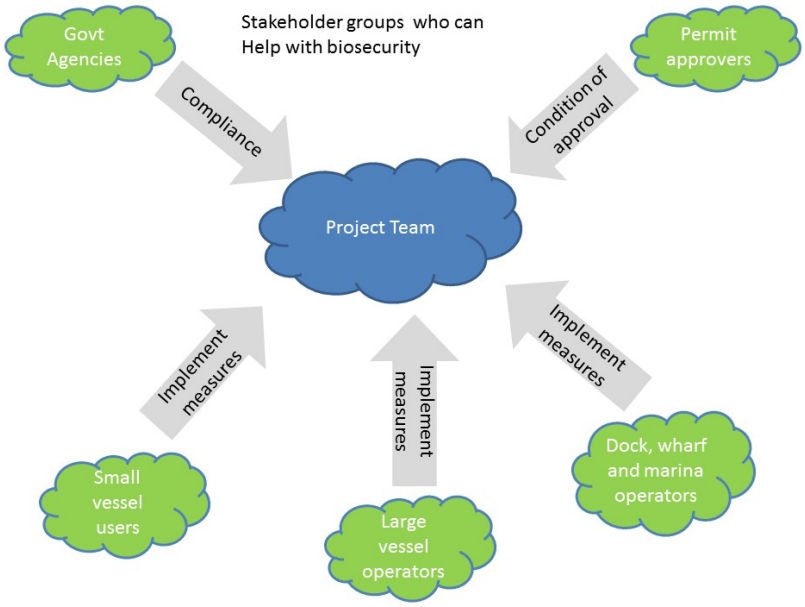
- Some examples of natural pathways:

Pathway	Invasive Species
Water	Rodents - swimming Seeds, Lizards, snakes, eggs - driftwood Seeds - floating
Storm winds	Invasive birds, seeds, insects
Birds	Seeds, snails, ants
Animals	Seeds – stuck to hair, in faeces, in hooves

3. PREVENTION

3.1 PREVENTION STRATEGY

- The principle of prevention is to place multiple barriers along the pathways of introduction to reduce the movement of invasive species onto the project site in question.
- Prevention actions include:
    - Placing several barriers in the way of invasive species getting from place to place.
    - Frequent inspection of all items loaded onto (or off) boats, aircraft, vehicles, machinery.
- As many stakeholders as possible need to be convinced to implement prevention measures, including tourists, residents and the operators of boats, aircraft, vehicles, machinery.
- There are a number of different stakeholders that can help the project team in ensuring biosecurity prevention measures are widely implemented.
- For operators of vessels (large and small) and docks, marinas etc., the project team need to convince them to implement a set of prevention measures specific to the risks and pathways you have identified in Section 2.
- For operators of vehicles or machinery (large and small), the project team need to convince them to implement a set of prevention measures specific to the risks and pathways you have identified in section 2. In particular, vehicles and machinery must be kept free of soil when moving from site to site.
- For access approvers and Government Agencies, the project team needs to convince them to make the implementation of relevant prevention measures a condition of access to the project site.
- The relevant prevention measures will depend on the risk species and pathways identified (see Section 2)
- When engaging with stakeholders emphasise the benefits to them of an invasive-free project site and the role of biosecurity in achieving it.
- Focus your effort on boats or vehicles and machinery that frequently visit the project site.
- Pay close attention to boats or vehicles and machinery that come from areas that have high risk invasive species.
- Keep the instructions to boat skippers and vehicle or machinery operators simple. People will soon stop doing difficult or time consuming measures.
- When engaging with stakeholders remember you will need to:
    - Inform: You will probably have to explain the background of the threat of invasive species and the need for biosecurity measures.
    - Motivate: If it is going to take effort on their part, people need to understand the importance of the actions and how they will benefit from the results of the actions.
    - Equip: Provide people with the knowledge and tools to carry out the measures. Instructions will need to be simple, easy to follow and not take too much effort. The project team may need to supply some pieces of equipment, such as bait or bait stations or power-washing equipment.
- Types of stakeholders relevant to biosecurity prevention actions on boats are shown below:



Stakeholders	Explanation	Their role in biosecurity prevention
Small vessel users, e.g. the community, tourists, local fisherman	The public that use small vessels to travel. The project team has direct access to the captain/user of the vessel. There could be a large number of these.	Implement measures.
Large vessel operators, e.g. cargo ships, tourist passenger boats, Government vessels.	Larger vessels owned by companies. Implementing measures would need approval by owner as well as captain.	Implement measures.
Dock, marina and wharf operators	Organizations that run the infrastructure at departure and arrival points.	Implement measures.
Access approvers, e.g. landowners, Departments of Conservation	Organizations and people who approve access to the project site.	Make implementing measures a condition of access approval.
Government Agencies, e.g. Ministry of Fisheries, Police Force, Quarantine Department	Statutory bodies that are responsible for ensuring regulatory compliance.	Ensure compliance with regulations.

3.1.1 SMALL VESSELS

- You want to convince as many small vessel operators as possible to adopt relevant prevention measures.
- Follow the steps
    - Identify which prevention measures from Section 3.2 are most appropriate to apply.
    - Design material that communicates what instructions you need boat users to follow.
    - Communicate the instructions to vessel operators.
- Consider using a range of ways of communicating the prevention measures, for example:
    - Placing signs at key departure and arrival points

  - Handing out information leaflets at key departure and arrival points
  - Distributing pamphlets
  - Holding community meetings
  - Placing adverts in newspapers
  - Running radio adverts
  - Television adverts
  - Public service announcements
- When designing the material, consult with your target audience to ensure your material is easy to understand and relevant to them.

3.1.2 LARGE VESSELS

- For larger commercial and government vessels you will need to seek the approval of the management or owners of the vessel for the captain and crew to implement prevention measures.
- Identify which prevention measures from Section 3.2 are most appropriate to each type of vessel.
- Work collaboratively with the owners, shipping agencies and captains of each vessel to agree what measures the vessel operators will implement.
- Consider providing supporting material, training and equipment, e.g. bait stations, to the boat operators.
- Ensure the project budget covers any expenses.

3.1.3 DOCK, WHARF AND MARINA OPERATORS

- Identify which prevention measures from Section 3.2 would be useful at each place of departure and arrival.
- Work collaboratively with each operator to agree what measures they will implement at their facility.
- Consider providing supporting material, training and equipment, e.g. bait stations. Ensure the project budget covers any expenses.

3.1.4 ACCESS APPROVERS

- An approval process for access to the project site, e.g. a protected conservation area, provides an opportunity for making the implementation of prevention measures a condition of access.
- Identify which prevention measures from Section 3.2 would be most useful and would be able to be made part of an approval application.
- Consult with the people or organization authorized to approve access and work to have them make the implementation of the measures a condition of approval to access the project site.

3.1.5 OTHER CONSIDERATIONS

- Types of transport stakeholders relevant to biosecurity prevention actions on aircraft, vehicles or machinery are shown below:

Stakeholders	Explanation	Their role in biosecurity prevention
Vehicle owners/drivers	The community and project team(s) that use vehicles to access the site. There could be a large number of these and the project manager may not have direct access to them all.	Implement measures.
Machinery owners/operators	Machinery is usually owned by contractors or companies and operated by a skilled person.	Implement measures.
Aircraft operators	Organizations and people responsible for the loading, unloading and operating of aircraft	Implement measures.
Airport operators	Organizations and people responsible for the running of runways and airports	Implement measures.
Access approvers, e.g. landowners, Departments of conservation	Organizations and people who approve access to the project site.	Make implementing measures a condition of access approval.
Government Agencies, e.g. Ministry of Fisheries, Police Force, Quarantine Department	Statutory bodies that are responsible for ensuring regulatory compliance.	Ensure compliance with regulations.

3.2 PREVENTION MEASURES

- Reducing the frequency of vessels/vehicles travelling to the project site will reduce the likelihood of an incursion.
- Focus effort on detecting and stopping the highest risk invasive species (as determined in section 2.1).
- When planning to visit a number of locations, visit those that are invasive-free (or have less chance of invasive species escaping onto your transport) before visiting the locations with invasive species. Visiting these locations in order of least risk decreases the chances of you transporting invasives from invaded locations to invasive-free locations

3.2.1 BEFORE TRAVELLING TO THE PROJECT SITE

- Keep canoes, small boats, vehicles and machinery away from food sources and known locations of invasive species. This reduces the risk of invasive species stowing away when items are left unattended.
- When not in use, remove anything from boats, vehicles, aircraft or machinery that could attract invasive species, e.g. food, freshwater, fish remains, rubbish, etc. This reduces the risk of invasive species stowing away when items are left unattended.
- Clean all equipment and clothing before packing. This reduces the risk of transporting invasive plants, seeds, insects etc.
- Clean footwear of any soil and mud. Insects and seeds often stow away on them. Many disease-causing fungi and bacteria are carried in soil on footwear.

- Transport and store all food and supplies in sealed water tight containers. Food in any open containers attracts rodents and ants – smell is a key food trigger. Once they find the source they will chew through packaging. Water-tight also means "insect tight" and it will save your gear if it accidentally goes for a swim overboard
- Avoid use of cardboard boxes, tramping packs for transportation etc. Rodents can easily gain access by chewing through. Use plastic boxes, dry bags: containers that cannot be chewed through, that can be sealed and can be easily inspected.
- The loading area where any luggage and containers etc. are packed should be clean, tidy, well lit and rodent-proof. This will reduce the risk of invasive species getting into the containers during loading.
- When making containers or rooms rodent-proof seal all holes with material that rodents cannot chew through, e.g. steel wool. Rats can get through holes as small as 12 mm; mice can get through holes as small as 6 mm.
- Educate crews, teams and passengers on how to avoid transporting invasive species.
- All personnel should search for invasive species when packing their personal luggage.
- Luggage and containers must be sealed once packed. invasive species are difficult to detect if they are able to get into unattended containers.
- Wharfs, docks, marinas, garages, storage areas should be kept clean and free of food and rubbish. Reducing food sources will reduce the size of resident rodent or ant populations.
- Implement invasive species control (such as bait stations, traps, insecticide, etc) at wharfs, docks, marinas, garages, storage areas. Smaller populations will reduce the chance of invasive species getting aboard transport.
- Search all risk items (soil, timber, and food supplies) prior to loading. This is particularly relevant for bulk shipments which are normally consolidated in a warehouse before being loaded. Ideally everything should be in the warehouse a minimum of 24 hours before loading. Consider any space an invasive could occupy or any item it might be attracted to – they need to be checked prior to departure.
- Light up gangways and ramps at night in docks, wharfs and marinas. The light will discourage nocturnal rodents.

3.2.2 DURING TRANSIT

- When visiting more than one location, visit the invasive-free ones first. This will minimize the risk of moving invasive species between locations.
- Check the transport for signs of invasive species before you load up.
- Implement control methods, e.g. bait stations, on large boats. This will help kill any invasive species that evade onshore measures.
- Keep boats, vehicles, aircraft, and machinery clean, tidy and free of food, rubbish and soil. This reduces the places for invasive species to hide.
- Educate crews, teams and passengers on how to detect invasive species and what to do if they find any.
- If an invasive species is discovered do not throw it away alive, even if you are on a boat, as you do not know where it will end up – rodents are good swimmers and some invasive plant seeds will float. Humanely dispatch any caught animal invasive and destroy any seeds. Search for further sign of invasives before reaching the destination (or turn back to the point of departure, if possible, for a thorough search).

3.2.3 AT THE SITE

- Before unloading at the project site, all packed gear should be thoroughly inspected for sign of rodents (chew marks, gnawed holes, etc), ants, insects or other invasives.
- Only unload what must be unloaded. The less taken off, the less chance of transporting invasive species onto the project site.
- Unpack containers, luggage and cargo in enclosed, well-lit, tidy areas. This will allow easy detection and capture of any invasive species that do escape. The more secure the area the easier to stop the invasive species escaping onto the project site.
- Remember that some ants can fly and some invasive plant seeds can blow in the wind.
- When leaving, remove all rubbish from the project site. Rubbish provides a great food source to many invasive species.
- All food waste, particularly fruit and vegetables, must be collected and removed from the island.
- Ensure you do not take invasive species from the island or site - do not remove anything from the project site that could contain invasive species.
- Wash soil from vehicles or machinery.
- Check footwear, clothing and personal gear for invasives: seeds, other plant parts, insect/snail/lizard eggs.

<u>For boats:</u>

- Do not land at night, unless you absolutely need to - rodents are more active at night and some insects are attracted by lights.
- Do not run mooring lines ashore unless you absolutely need to. When tying up in port, look for ways rats or ants could board or escape from your boat, and take steps to stop them.
- For boats moored on buoys or at anchor (i.e. around villages) position the mooring so the boat remains in the water at low tide, fix mooring hoods to mooring lines (where possible use a fixed mooring instead of an anchor), ensure nothing is suspended over the side of the boat, moor boat in areas free from shore-based rubbish and other food sources or concentrated rodent habitat.
- Larger ships should use line-guards on ship-to-shore lines to stop rodents using mooring lines to get on and off the ship.

4. SURVEILLANCE

- Surveillance should start as soon as possible. There is no need to wait for an operation to be completed.
- Each invasive species will require specialized surveillance techniques – seek advice from experts on specific species.

4.4 VISITORS PARTICIPATION

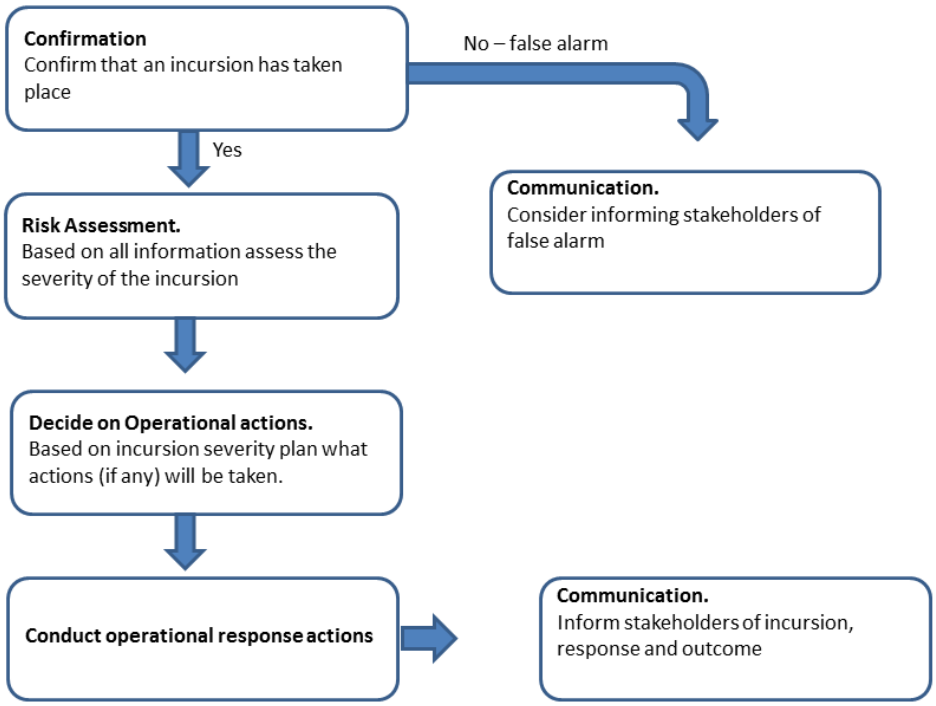
- Utilise visitors to the project site as part of the invasive species surveillance. Encourage all visitors to look out for invasive species. The more people looking, the more likely you are to detect an incursion sooner rather than later.
- You will need to provide visitors with information to tell them what to look out for, how to identify the invasive species, and who to contact if they think they have detected one.
- Confirm all sightings. Be aware: many casual sightings are false alarms.
- Request visitors to record as much information as possible on any sightings. Including: the time, the place (as accurately as possible), photographs and a detailed description of what they saw.
- Providing invasive species sighting forms for visitors to complete is a way of making it easy for visitors to report a sighting. Standard format forms are also an effective way of ensuring the correct information is captured. You would need to create a template form for your project.

5. INCURSION RESPONSE

- Consider using community members as part of the incursion response team. With local knowledge and a sense of connection to the project site, the community will be a great asset to the team.
- If an incursion is confirmed review the biosecurity prevention measures to see if any changes are required to stop further incursions.

5.1 STRATEGY

- The operational response will depend on the exact details of a particular incursion. As there are many different factors that affect a scenario you will NOT be able to pre-emptively create a detailed operational response plan for every likely scenario.
- Response planning should concentrate on preparing a management decision making plan that will help the project manager to make the right decision based on relevant information gathered at the time of the incursion.
- Key parts of a decision making plan are:



- Time is of the essence in responding to incursions - The response should occur as soon as possible, ideally before the invasive has a chance to reproduce and establish a population.
- The decision management plan will be recorded in the Biosecurity Plan.

5.2 PREPARATION

- An incursion response kit should be put together, and held in storage by the agency responsible for dealing with such events.
- The response kit should include all the equipment that will be required immediately a possible incursion is notified to complete the confirmation and any immediate eradication.
- Assign a person who is to lead the response. This person should have experience in the invasive species, the project site and the community in question. They can then plan and delegate tasks as required.

5.3 CONFIRMING THE INCURSION

- Confirm all sightings/evidence of incursions before planning any operational response actions. The information required to confirm the incursion should be recorded in the Biosecurity Plan.
- Also collect any information that will be needed to plan a suitable response.
- If physical evidence (such as fur, captured animal, etc) is found and is of the target species, and you have taken DNA samples from the species on the project site before the eradication, use the DNA to establish whether the individual is from the original project site population (if so, the operation did not eradicate all target species) or from a population from off the project site (if so, it is a new introduction that evaded the biosecurity measures).

- The best method of confirming a rodent incursion is to use a certified rodent detection dog to indicate whether a rodent is present – it should also be able to locate where on the project site the rodent is (if the project site is small enough). However it is unlikely that such a dog would be available in most instances, so other methods (such as tracking tunnels, etc) need to be available for use.
- If the sighting of the invasive species was made by another person, interview that person as soon as possible (do not rely on second-hand information) and record or write everything down, including when the sighting took place and when the interview took place. Take account of their experience but do not judge a sighting on one experience alone.
- The most important factors are how well they saw it, i.e. how close, how long, what visibility. Ensure the exact location of the sighting is recorded, if necessary take them back to the location. Try to establish other evidence that supports or challenges the story.
- Detail exactly what has been seen, where this occurred, who saw it and who reported it. If possible ask the person to describe exactly what they saw.
- Do not ask leading questions like 'was it brown?' or 'was it this big?' as this can lead to false information. Ask 'open' questions like 'what did you see', 'what colour was it', 'how big was it', 'where did you see it' and 'how long did you observe it for'.
- 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. However, if the project site is distant, ensure you take a range of management options with you to use just in case. Be prepared to stay on the project site for some time, or allow for replacement personnel after a set period.

5.4 ASSESSING THE RISK

- Based on the information gathered during the confirmation assess the severity of the risk.
- Consider seeking independent expert advice for the decision.

5.5 RESPONSE ACTION OPTIONS

- A response uses many similar techniques to surveillance but the clear aim here is not only to find if any invasive species are present, but to kill or remove them before they breed or do significant harm to native wildlife or plants.
- The level of response can vary enormously, depending on a range of factors, such as the size of the project site, the type of invasive species detected, the location and distribution of the sign located, the vulnerability of any native species on the project site to the invasive species, whether there are already some invasive species on the project site, etc. There is no one standard response.
- 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 is to use a trap/bait station network already in place on the project site or where this is not possible, establish a grid of traps and bait stations. Having a network in place reduces the risk of neophobic

rats (i.e. afraid of new objects) avoiding newly established traps or stations. However if mice are the target, they may be more prone to investigate new objects.

- A sparse but extensive network covering as much of the project site as possible is probably better if a grid has to be established. Try to extend the grid for at least 500m from the site of the sighting or sign that has been detected. One or two devices per hectare targeting preferred habitat is sufficient, but it doesn't need to be an exact grid because invading rodents are likely to travel. Wider spacing's between traps can be used for larger rat species, use shorter spacing if mice or Pacific rats are suspected. Cover all major habitat types, but focus on preferred sites and known invasion sites. When targeting mice broadcast bait if possible unless the presence of non-target species that eat bait prevents this. A high density bait station grid for mice has a lower chance of success but can work.
- All traps and bait stations should be numbered and GPS 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.
- If in any doubt about the species of invasive species e.g. which species of rodent it is, take photos and keep samples of any evidence found (e.g. animals caught in traps, droppings, damaged bird eggs, etc.) for future reference. Keep any part-eaten baits, fur caught in traps etc. for future reference if needed, to confirm what species may have caused it (and for DNA testing where possible). Use experts to verify the evidence and confirm the species.
- In addition to the grid of bait stations or traps, check for signs in likely areas where the rodents or cats may be attracted to (or even have originated from) e.g. landing sites, wharfs, 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 project site. Once there has been a prolonged period with no bait take or captures, the response can be downgraded, and standard surveillance methods should resume.
- For cats, a wider range of methods may be available. Searching for sign may be as effective as setting traps to determine areas where the cat(s) are – refer to surveillance methods in Guidelines on Cat Eradication and Monitoring Techniques. Effective methods include spotlighting at night for eye-shine (particularly effective in open areas such as beaches), looking for footprints in sand, looking for droppings. Once areas frequently used by cats are found, various options are available – shooting, either by ambush or at night using a spotlight (though great care need to be taken and experienced shooters only should be used); cage traps baited with a suitable bait such as fresh fish, chicken, red meat or commercial cat food; or leg-hold (Victor 1 ½ soft-catch) traps with suitable bait.
- If the invasive species has become too well established to undertake localized management measures (i.e. is widely dispersed over the project site or very numerous) in some cases the best option may be to abandon any attempt for immediate management and save resources in order to plan for another complete project site eradication at a later date. Consult experts for their advice on this.

5.6 COMMUNICATION

- Stakeholders should be informed of the outcome of any possible incursions: whether real or false alarms.

- Communication can be included as part of the routine stakeholder communication.
- For major incursions or false alarms that may receive extensive publicity, consider sending out a special communication explaining what has happened.
- Remember it is important to keep key stakeholders correctly informed of project status at all times.
- It is especially important to tell all stakeholders when the invasion has been managed, and the project site is once again free of that invasive species. Use this communication as an opportunity to further push the biosecurity prevention messages.