GUIDELINES ON

MANAGING ENVIRONMENTAL EFFECTS

PURPOSE

- These Guidelines are to be used by Project Managers conducting rodent eradication projects based on the PII Resource Kit for Rodent and Cat Eradication.
- The Guidelines help you evaluate the actual or potential effects your proposed eradication operation may have on the environment and the ways in which any adverse (negative) effects may be reduced or eliminated.
- It is also known as an environmental impact assessment (EIA) or an assessment of environmental effects (AEE). Negative effects are often referred to as risks.
- Non-target species are considered a special type of environmental effect.
- Non-target species general information is provided in this guideline. Species-specific information can be found in other Resource Kit Guidelines

1. WHAT ARE ENVIRONMENTAL EFFECTS?

- Often the main effects are to non-target species (may include people as well as native animals). You need to consider all of the proposed eradication techniques (e.g. hand baiting, use of traps) and the logistical and support systems required (e.g. cutting tracks, use of helicopters) to undertake the operation and review the effects of these on the environment.
- Where there are possible adverse effects, (e.g. crabs eating bait, non-target species gaining access to traps). This process allows you to identify practical steps to either reduce or eliminate that adverse effect or risk. It's also important to summarise positive effects to show that any adverse affects (e.g. the loss of some non-target species) are quickly outweighed by the recovery of that population in the absence of rats.

2. HOW MUCH DETAIL IS REQUIRED?

- The amount of detail included should correspond with the scale and significance of the actual and potential effects your project may have on the environment. For example, an aerial baiting project on a large inhabited island, with livestock and non-target species issues, would require more detail than a hand-baiting project on a small island with no inhabitants and no non-target species.

3. WHAT INFORMATION DO I NEED TO GATHER?

- First you need to know enough about the techniques you plan to use and what effects and/or risks they may have on the environment.

- Environment refers to social/cultural and economic as well as the natural environment. It helps to get information from other similar projects and advice from experienced people who have used your intended techniques elsewhere.

3.1 ERADICATION TECHNIQUES

- Know what techniques (e.g. toxins, traps, bait stations) you are using and how they work, (e.g. how does brodifacoum work, how does it breakdown in the environment, how toxic is it to various species, what support systems do you need, such as temporary accommodation, that may have some effect on the environment?

3.2 ISLAND USE

- Know whether the island is occupied or not – permanently, seasonally. How is the island used – land tenure and uses. Community interests – fishing, agriculture, tourism, cultural, social issues, domestic and feral animals

3.3 NATIVE SPECIES

- What native species are present (native fauna are generally at greater risk than flora other than for track cutting – knowledge about any characteristics that may put them at risk, e.g. feed or live on the ground, take any type of food (e.g. as crabs do), experience of this species or similar species being affected by eradication technique elsewhere.

- The operational plan for the eradication of Pacific rats from the Aleipata Islands has a useful table: Risk Assessment for Impacts of Aerial Baiting on Land Birds. This table lists each species and determines the level of risk for each based on diet and feeding behaviour and hence the risk of primary and secondary poisoning.

3.4 NON-TARGET SPECIES

- Environmental risks are most commonly associated with impacts on non-target species. Knowledge of characteristics of non-target species that may cause them to be at risk from a particular technique (e.g. ground-dwelling birds can be caught in traps) allows you to consider ways of reducing that risk by modifying how you use that technique (e.g. bird-proof barriers to prevent access to the trap, placing the trap up off the ground). Some common issues include:
    - What native and non-native (including livestock, domestic animals) are potentially at threat?
    - Which techniques pose the highest risk and why?
- Consider people here as well – you need to assess the level of risk to anyone who lives on or visits the island including your project personnel (e.g. do people come to the island to harvest crabs which may eat bait).

- Are there other species (particularly other pests) which may compete for bait thus reducing amount available for target species, e.g. pigs, crabs

4 EVALUATING AND MANAGING RISK

4.1 IS IT REAL?

- It's important to determine the actual level of risk because not all risks are real.
- The real risk has a high chance of occurring while the perceived risk does not and can be resolved by ensuring that community involvement includes discussion on which techniques are to be used, any concerns people may have and the provision of information and/or actions to alleviate them.
- For example: Crabs eating brodifacoum bait is a real risk, while pollution of water supplies or crops from brodifacoum is a perceived risk
- Perceived risks are often a result of lack of knowledge or poor consultation

4.2 POSSIBLE ACTIONS

- Consider the following when working on management actions:
    - Is the effect perceived or actual?
        - If it is a perceived effect what actions can you take to improve understanding and reduce concerns (e.g. provide simple fact sheets, talk to people, and take water samples). Do not underestimate the impact of perceived effects – the use of new techniques particularly toxins can make people very wary. Native species are often very important to local people. Ensure you explain why for example a critically endangered species is not adversely affected – this way you show that you have considered it.
    - Is it a short term or long term effect?
        - For example, perhaps rather than cutting access tracks for a hand baiting, trapping or bait station operation you can use GPS or mark lines with coloured tape or cloth or pegs.
    - What native and non-native (including livestock, domestic animals) are potentially at threat?
        - Consider people here as well – you need to assess the level of risk to anyone who lives on or visits the island including your project team.
    - Which techniques pose the highest risk and why?
    - Are there other species (particularly other pests) which may compete for bait?

- This will reduce the amount available for target species, e.g. pigs, crabs

- What are the direct effects?
  - For example, curlew eating bait and dying, a bird being caught in a trap
- What are the secondary effects?
  - For example, crabs eating bait and then being eaten by a bird or people.
- Can the effect be eliminated?
  - For example, placing bait stations off the ground so non-target ground-dwelling native species do not access them
- Can the effect be reduced?
  - For example, ensure people using toxic bait wear gloves, wash hands after handling, reducing non-target effects by undertaking operations outside the times a non-target species [e.g. a seabird species] is present or breeding on the island, closing crab harvesting areas or having warning signs for a set period during and after the eradication. Make sure people know why and for how long.
- Can the effect just be accepted?
  - For example, the cutting of tracks for access, grid lines.
- Are the adverse effects outweighed by the gains?
  - For example, the loss of income to a tourist operator over the time an island is closed will be outweighed by the eventual increase in native species that his visitors come to see, the loss of a few individuals of a non-target species is outweighed by population recovery in the absence of invasive species.

4.3 IMPLEMENTING THE ACTIONS

- Some actions may require work to be undertaken prior to the eradication operation commencing. For example you may need to do crab density surveys before and after to show people effects on these species are minimal, you may have to catch some of a particularly threatened non-target species and hold them in captivity. In the case of a bait station operation where you need to affix them off the ground make sure people doing the work know this and why it needs to be done.
- As a general rule most actions will be undertaken during the eradication operation. For every action make sure that you clearly identify when it is to be done, if there are stages (e.g. a before and after survey, signage or closure of areas) and by whom. Include this information in your Operational Plan

4.4 MONITORING THE EFFECTIVENESS OF THE ACTIONS

- If you identify serious risks to the environment and put in place a management plan, part of that plan should include monitoring of the effects so that you can assess the actual impacts. This monitoring should be included in your Monitoring Plan

5 RECORDING THE INFORMATION

- Information on managing environmental and non-target effects is recorded in the Operational Manual. Below are listed several different examples of how you could present the information.

5.1 USING TABLES

Description of effect	Remedial measures	When to act	Who is responsible
Poisoning of local community when harvesting crabs.	1. Non- toxic bait trial on crabs to determine levels of uptake	Prior to eradication operation	Project Manager
	2. Bait breakdown monitoring (place set number of baits in a rodent- and crab- proof wire cage and monitor breakdown rates	During eradication operation but could be done before as part of community education to reduce concerns.	Eradication Team leader
	3. Close harvesting areas for set period during and after eradication operation and/or warning signs to advise no take for set period	Agreement with harvesters , signage and information out prior to operation	Team member responsible for community liaison
	Meetings and information for people who harvest the crabs		Team member responsible for community liaison

5.2 USING TEXT

- The following example is from the Mabualau Island project in Fiji:

> ***Land crabs***
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> Mabualau has two species of crabs (coelonbita sp -hermit crab and cardisomia sp-landcrab).
>
> ***Issues***
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> - Mabualau Island is covered with makatea rocks (70%). During the feasibility study the team were unable to conduct a crab density assessment as the landcrabs were nocturnal and as also because of the rough terrain. However, the crab density is estimated as abundant from field observation. Crabs affect the availability of baits for rats.
> - People harvest landcrabs from Mabualau; they could be at risk of secondary poisoning
>
> ***Actions***
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> - Warning signs will be erected near the landing areas/campsites on Mabualau. The sign contains information advising people against harvesting land crabs and or visiting the island in the three-month period.
> - Options are still being explored by OM to restrict access on Mabualau for a three-month period as a safety procedure.
> - During community awareness: people are constantly advised against harvesting crabs from the island.
> - Fact sheets, leaflets and posters will be circulated to all stakeholders.

5.3 ANOTHER EXAMPLE

- The following example is from the Vahanga Atoll project in French Polynesia.
- Note that this example highlights the benefits of the project and then discusses the effects.

Target benefit species	The main species to benefit from this work is the Polynesian ground dove (*Gallicolumba erythroptera*) and Tuamotu sandpiper (*Prosobonia cancellata*). Other species that are also likely to benefit are listed in Tables 2 & 3.
Effect of operation on native species	Invertebrates, including crabs, will not be affected due to their blood clotting mechanisms. Individuals of some bird species will be at risk from either eating baits directly or, by eating crabs, other invertebrates/lizards, or dead rats that may have consumed the baits. These are discussed below. Polynesian ground dove It is possible that ground-doves could eat poison baits. This species is critically endangered (20-50 at Tenararo, 20-30 at Morane) and all precautions will be taken to avoid poisoning them. Intensive surveys will be undertaken on Vahanga and any individuals (potentially up to c.5) found will be captured and placed in temporary enclosures on Vahanga, and released again when all sign of poison baits have gone. Fruits and cereal will be provided to these captive birds. Tuamotu sandpiper It is expected that few birds will be present (all past visits have recorded fewer than five individuals). They are unlikely to consume baits or crabs, but could consume other invertebrates attracted to baits, so there is a risk of mortality. Because there are other situations where these birds occur in the presence of kiore (Pierce et al. 2003) it is important to determine whether they are at risk during standard rat eradication operations. Therefore these few birds will be radio-tagged if possible, and monitored throughout the operation to determine their fate. Any additional birds caught could be colour-banded. In the event of fatalities occurring, the loss will not be significant given 600+ present on neighbouring Tenararo and the potential for recovery on Vahanga. Any fatalities would however allow methodology for other atolls, e.g. Reitoru, Tahanea, to be refined.