PROJECT REPORT

Title: Project Report for the Eradication of Rats from Far and Away Islands, Republic of Pacifica.

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Reviewers: N. Moore (Moore Consulting) and R. View (Moore Consulting).

Version History:

VERSION	DATE	AUTHOR	REASON FOR CHANGE
Version 0.9	15th February 2013	V. Reed and M. Toa	First complete draft for independent review
Version 1.0	1st March 2013	V. Reed and M. Toa	Changes made after independent review
Version 1.1	10th March 2013	V. Reed and M. Toa	Inclusion of Appendix 1 detailing the eradication operation.

Citation:

This report should be cited as:
Reed , L and Toa, M. 2010. Project Report for the Eradication of Rats from Far and Away Islands, Republic of Pacifica. Unpublished report prepared for Republic of Pacifica's National Parks and Conservation Department (NPC).

[NB. This is a fictitious example that is intended for training purposes, based on real islands but with some details altered to present a particular scenario. Be aware that some situations, references and a few names are real, most are not!]

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EXECUTIVE SUMMARY

Explanation: *Preview the main points of the report and contains enough information for the reader to get an overview of what is discussed in the full report.*

Prompts

- *Write the executive summary after you write the main report, and make sure it is no more than one page in length.*
- *List the main points the summary will cover in the same order they appear in the main report.*
- *Remove this Help Box when The Project Plan is complete.*

In July 2011 the National Parks and Conservation Department (NPC), Republic of Pacifica undertook the eradication of the Pacific rat (*Rattus exulans)* from Far and Away Islands, Republic of Pacifica. The eradication of the rats is a necessary step in the restoration of the native environment of the two islands, both of which are important conservation sites.

The hand broadcasting of a brodifacoum based bait has proved successful in eradicating rats from both islands. The extensive surveillance in place since the operation has found no sign of rats. Biosecurity measures have been implemented for visitors to the islands: surveillance to date suggests that these measures have been effective in preventing re-introduction of Pacific rats and the introduction of other potential invasive species.

One set of annual post-eradication monitoring has been completed and is presented in this report. Population sizes of indicator bird species show healthy increases since the eradication, for example, on Far Island the number of nesting brown noddy have increased by 76% and the number of nesting black terns have increased by 60%. Significant changes in vegetation cover are not yet apparent.

Further annual monitoring will continue to assess the benefits of the rat eradication. Biosecurity measures will continue indefinitely to safeguard against re-invasion of the Pacific rat and the threat from other invasive species.

1. INTRODUCTION

Explanation:

Explain the purpose of this document, and set the scene for the following sections

Prompts:

- *Remove this Help Box when the Project Plan is complete.*

In July 2011 the National Parks and Conservation Department (NPC), Republic of Pacifica undertook a rat eradication operation on Far and Away Islands, Republic of Pacifica. The operation was the implementation phase of the project that began with the completion of a Feasibility Study in September 2009 (Toa and Reed, 2009).

This is the report for the project. After a brief recap of the site and project objectives (sections 2 and 3), section 4 reports on the how the project progressed through the planning stages to the operational stage. Section 5 reports on the results of the monitoring to date and progress towards realizing the anticipated outcomes. While monitoring to date has been able to verify some of the outcomes have been achieved, only preliminary conclusions are available for the longer term outcomes regarding the improvements to the native environments. Surveys will continue to monitor the progress of these outcomes. The report concludes with a discussion of the project, the outcomes and lessons learnt in undertaking eradication operations in the Pacific.

2. THE SITE

Explanation: Describe the eradication site & the target species

Prompts:

- *You are giving the reader only enough information to understand the context of the document – refer the read to the Feasibility Study and the Operational Plan for the details.*
- *Remove this Help Box when The Project Plan is complete.*

Far and Away Islands are two of the four islands making up the Windward Islands of the Republic of Pacifica. Both islands have significant conservation value. They are home to a number of endemic and internationally threatened species including: the tooth billed pigeon *(Didunculus strigirostris)* (endemic; Endangered); the friendly ground dove *(Gallicolumba stairi)* (regional endemic, Vulnerable); Pacifica broadbill *(Myiagra pacifica)* (Endemic, Vulnerable) and the coconut crab (*Birgus latro*) (Vulnerable). They provide habitat for a number of other locally and regionally endemic birds and the Endangered endemic Pacifican 'flying fox' bat (*Pteropus pacificus*). They are also breeding grounds for the red footed and brown boobies (*Sula sula* and *Sula leucogaster*), black terns (*Sterna sumatrana*) and white terns (*Gygis alba),* greater frigate bird (*Fregata minor)*, brown noddy (*Anous stolidus*), black noddy (*Anous minutus*) and other seabirds, and is the last nesting seabird colony in Republic of Pacifica (WMPA, 2008). However, the presence of extensive populations of Pacific rats on the islands is thought to be threatening many of these species.

The other two Windward Islands (Near and Furthest Islands) were excluded from the scope of the project due to their proximity to the mainland (and associated threat of re-invasion) and their low conservation value (Toa and Reed, 2009).

Further details of the site can be found in the Feasibility Study Report (Toa and Reed, 2009) and the Operational Plan (Toa and Reed, 2010).

3. PROJECT OBJECTIVES

Explanation: Define what the project hoped to achieve (objectives) and the changes that would result (outcomes) and why these changes are important (the goal).

Prompts:

- *Copy and paste from the Project Plan.*
- *Remove this Help Box when the Project Report is complete.*

3.1. Goal

The goal of the project was the:

"*Restoration of Far and Away Islands, Windward Group, as key sites for the conservation of Republic of Pacifica's indigenous biodiversity, through the eradication of Pacific rats*"

3.2. Objectives, Outcomes and Indicators

The objectives of project and the outcomes that were anticipated as a result of achieving these objectives were:

Outcome	Indicator
Objective 1: Eradicate Pacific rats (*Rattus exulans)* from Far Island	
1.1 No Pacific rat population on Far Island.	Absence/presence of Pacific rats
1.2 Increase in population size of native bird species on Far Island.	All forest bird populations
	Population size of crimson pigeon
	Population size of common noddy
	Population size of black tern
1.3 Increase in native vegetation densities on Far Island.	Photo points
Objective 2: Eradicate Pacific rats (*Rattus exulans)* from Away Island	
2.1 No Pacific rat population on Away Island.	Absence/presence of Pacific rat
2.2 Increase in population size of native bird species on Away Island	All forest bird populations
	Population size of crimson pigeon
	Population size of common noddy
	Population size of black tern.
2.3 Increase in native vegetation densities on Away Island	Photo points
Objective 3. Safeguard the ground dove populations on Far and Away Islands	
3.1 Increase in population sizes of ground dove on Far and Away Islands.	Population size of ground dove
Objective 4. Improve the capacity of NPC to undertake larger eradication projects.	

4.1 NPC staff have skills to undertake further eradication projects of a similar size to current project.	Skills and knowledge in areas of planning and implementation of current project

Objectives 1 and 2 reflect the direct goal of improving the health of the native environments on both islands by eradicating the rat populations. The rationale for selection of indicators was:

- Monitor the three representative island environmental components:
    - Sea birds
    - Forest birds
    - Forest vegetation
- Include a mix of general indicators, i.e. all forest bird counts and specific species indicators, e.g. black tern
- Reflect community values, i.e. choice of common noddy as an indicator species for sea birds.

During the Feasibility Study it became apparent that the hand-broadcasting of toxin presented a particular threat to some of the ground feeding birds on the islands. Due to the threatened and vulnerable status of these ground feeding species any eradication project could not endanger the long term survival of these populations. The ground dove was chosen as the indicator species for the ground feeding at-risk species and a third objective was included in the project scope to reflect this success factor.

Objective 4 reflects NPCs long term organizational strategy to continue to build its in-house capacity to undertake eradication projects.

Further information on the objectives of the project and the details of the monitoring can be found in the Feasibility Study (Toa and Reed, 2009) and the Monitoring and Evaluation Plan (Reed, 2010).

4. METHOD

<u>Explanation:</u> Describe how the project progressed through the project stages

<u>Prompts</u>

- *Tell the story of the project*
- *Include key events and decisions made in each stage*
- *Include reference to the project documents created in each stage*
- *Remove this Help Box when The Project Report is complete.*

The project has followed the Pacific Invasives Intiative (PII) Project Process from the Resource Kit for Rodent and Cat Eradication (PII, 2011).

The implementing agency is the National Parks and Conservation Department (NPC), Republic of Pacifica. Windward Marine Protected Area (WMPA) are taking responsibility for the biosecurity prevention measures. PII assisted NPC in finding any required external expertise. Advice and guidance on using the PII Resource Kit was also provided by PII.

4.1. Feasibility Study Stage

Funded by Biodiversity International, the Feasibility Study was completed in March 2010. The Feasibility Study Report (Toa and Reed, 2009) concluded that the proposed eradication of rats from Far and Away Island was feasible. Near and Furthest Islands were dropped from the scope of the project due to the threat of re-invasion.

4.2. Project Design Stage

In April 2010, Biodiversity International approved funding of the Project Design Stage and preparation of the project plan began. For continuity, NPC allocated the same project manager, V. Reed, who had led the Feasibility Study. The same expert technical co-ordinator, M. Toa, was also engaged during this stage to retain the technical knowledge built up earlier. The Project Plan (Reed and Toa, 2010) was independently reviewed and completed in July 2010. The approach to the project was for NPC to lead the operation, supported by contracted technical experts where necessary and to continue the upskilling of NPC staff. It was agreed that, given their local presence and relationship with local communities, WMPA would take the lead in the biosecurity prevention activities. The eradication operation was planned to take place in July 2011. On the basis of the project Plan and the findings of the Feasibility Study, Biodiversity International, approved funding of the eradication operation and the supporting biosecurity and monitoring activities.

4.3. Operational Planning Stage

Operational planning commenced in August 2010, earlier than planned in the Project Plan, but as the funds had been made available to NPC there was no reason not to commence the planning. Consequently by the end of 2010, the Operational Plan (Toa and Reed, 2010), the Biosecurity Plan (Sagolo and Reed, 2010) and the Monitoring and Evaluation Plan (Reed, 2010) had all been independently reviewed and completed. Even though the planning was a little ahead of schedule, the target date for the eradication operation was kept at July 2011.

4.4. Implementation Stage

Staffing for the project was generally made up from a combination of NPC staff and local Magaia villagers, with some input from WMPA staff. An experienced rat eradication consultant from New Zealand was employed to assist the Project Manager in technical aspects of the project. An NPC Eradication Officer was included in the project as an opportunity to build NPC technical eradication expertise by working alongside the contracted technical co-ordinator. Auckland Zoo donated the time of an experienced aviculturalist to lead the captive friendly ground dove aspect of the project.

Planning and pre-operational activities proceed well throughout early 2011. The readiness check on June 15th 2011 (View and Moore, 2011) indicated the project was on course for the July

eradication and highlighted the outstanding milestones needed to be achieved before the operation could commence. Throughout the early part of 2011, WMPA worked closely with the local villages, boat operators and fishermen on raising awareness of the biosecurity measures to be implemented on all trips to the islands. Pre-operational monitoring of indicators was completed just before baiting commenced.

The eradication operation was completed as planned in July 2011. No major issues occurred during the operation and the operation completed by mid-July. A detailed account is included in Appendix 1. NPC conducted an internal Operational Review in late July 2011 (Reed, 2011)

4.5. Sustaining the Project Stage

BIOSECURITY

Prevention measures were commenced in early 2011 and WMPA conducts follow up meetings with the main island visitors every few months to remind boat operators of the prevention measures they should be taking. Anecdotal feedback is that most island visitors are continuing to take care to check for invasive species on trips to the island. However, with the newspaper coverage the project and islands have received recently an increase in tourist boats has been noticed and greater effort may be needed to inform tourists coming from the larger resorts on the north coast of the mainland. Surveillance activities continue. No evidence has been detected of the presence of rats on either island. The false alarm (reported by a tourist) of January 2012 has been the only time the response team have had to investigate any sightings.

MONITORING

Post-operational monitoring commenced in June 2012 and will continue annually as defined in Monitoring and Evaluation Plan (Reed, 2010). Results from the monitoring are discussed in Section 5.

5. PROJECT OUTCOMES

Explanation: Describe progress towards achieving the outcomes of the project.

Prompts:
- *Describe the pre-operational and post-operational indicator results.*
- *Has the outcome been achieved?*
- *Include brief outcome of monitoring undertaken for each indicator*
- *Remove this Help Box when The Project Report is complete.*

Refer to the Monitoring and Evaluation Plan (Reed, 2010) for the details of the indicator measurement plan.

5.1. Outcome 1.1 No Pacific rats on Far Island

Monitoring

The indicator used to monitor for this outcome was the absence or presence of rats on Far Island. A total of more than >5,000 tracking tunnel nights and >500 trap-nights have occurred in 2012-2013, commencing 1 year after the baiting operation concluded. Other detection devices used include: wax tags, monitoring at seabird colonies, nocturnal searches, and permanent bait stations.

A series of wax tag devices were attached to tree trunks at c. 25m intervals along major tracks on both islands. These were left in place between visits, and rechecked on each visit for distinctive rodent chew marks. Deteriorated or damaged tags were replaced as required.

Seabird colonies were regularly inspected during the breeding seasons. Eggs and eggshells of the smaller ground-nesting species (noddies and terns) were checked for evidence of predation by rats, which can usually be readily determined by the nature of the damage to the shell. A number of abandoned eggs, hatched egg-shell and some dead chicks were observed at the colonies, but none bore any sign of rodent predation. Prior to the eradication, predation of eggs especially was abundantly obvious.

During all monitoring trips to the islands, regular nocturnal searches were made along the track network. Calm nights were especially targeted, so any noise in the leaf litter could be detected and investigated. Over 40-person hours of effort were made, with no sign of rats. Prior to the eradication, rats were readily seen within minutes of starting any nocturnal travel.

The permanent wooden bait stations established on or near the landing beaches and camp sites on both islands were periodically baited. There were some issues with invertebrates and crabs scavenging bait, so entrance holes were modified, but there was no obvious rat sign at any of the bait stations in over 500 station-nights.

Results

No evidence of rats has been detected by any of the monitoring since the eradication operation. The large rat population present before the eradication appears to have been successfully eradicated from Far Island.

5.2. Outcome 1.2 Increase in population size of native bird species on Far Island

Monitoring

5-min bird counts were made at established points over islands. Baseline data was collected prior to the bait operation, and repeat counts were made at similar times of year, commencing one year after the baiting operation.

The population size of the Endangered crimson pigeon (*Didunculus strigirostris)* was a specific focus during 5-minute bird counts.

The population size of common noddy was monitored by the counting and mapping of all nests at the known nesting sites. Counts of occupied nests (= no. of pairs) were made from five set vantage points. The same vantage points were used for the pre and post-eradication monitoring.

The population size of the black tern (*Sterna sumatrana*) was monitored through counts of occupied nests (= no. of pairs) at known colonies from pre-established vantage points, using binoculars and digital camera to observe and document numbers of nests.

Results

Summaries of 5-minute bird counts made before and after the rat eradication were compared statistically, using analysis of variance. Of the species included in the counts, statistically significant increases have been recorded for the Crimson pigeon, Ground dove (*Gallicolumba stairi)*, Pacifican triller (*Lalage bluntei)*, Scarlet robin (*Petroica multicolour)*, Pacifican starling (*Aplonis pacifica*), Pacifican fantail (*Rhipidura pacificosa*) and Pacifican whistler (*Pachycephala brevifrons*).

No statistically significant changes of population have yet been recorded for the other species recorded in the counts, namely the Many-coloured fruit dove (*Ptilinopus perousii)*, White throated pigeon (*Columba vitiensis),* Pacific pigeon (*Ducula pacifica),* Crimson crowned fruit dove (*Ptilinopus poriphyraceus),* Wattled honeyeater (*Foulehalo carunculata*), Pacifica broadbill (*Mylagra pacifica)*, and Flat-billed kingfisher (*Todirhamphus recurvirostris*).

Insufficient data was collected for several species (White-rumped swiftlet (*Aeroramphus spodiopygius*), Banded rail (*Rallus phillippensis)* and Barn owl (*Tyto alba*)) which meant statistical analysis was not possible for these species.

No species had any statistical decline in population.

The number of common (brown) noddy breeding pairs on Far Island has increased significantly by 76% from a mean of 25 pairs in pre-eradication monitoring to a mean of 44 pairs after the rats were eradicated. This data is supported by anecdotal evidence that chick survival has become considerably higher and these chicks are now returning as young adults to form breeding pairs

Black tern breeding pair numbers increased significantly by 60%, from a mean of 47 pairs prior to the rat eradication to a mean of 75 pairs after, with an apparent continuing upward trend, possibly as a result of increased breeding success and juveniles now returning to breed.

Although not formally monitored, it has been observed that another rat-sensitive species, the Blue-grey noddy (*Procesterna cerulea*) has successfully bred on Far Island for the first time in recent memory.

This outcome has been achieved in principle. Some native bird species have increased, but others have not as yet.

5.3. Outcome 1.3 Increase in native vegetation densities on Far Island

Monitoring

A series of photo-points was established at marked five-minute bird count stations, with a baseline set of photos established just prior to the baiting operation. Comparison between 'before' and 'after' photos will visually illustrate any changes in vegetation.

Results

Only one repeat of the photo-points has occurred, two years after the eradication operation. No obvious difference is apparent in vegetation before and after. However, it is probable that any changes will be more long term, particularly in relation to sub-canopy and canopy composition. Some anecdotal observations indicate a noticeable increase in the number of small seedlings of some native forest species, but this is yet to be obvious in the established photo-point sites.

This outcome has yet to be achieved.

5.4. Outcome 2.1 No Pacific rats on Away Island

Monitoring

The indicator used to monitor for this outcome was the absence or presence of rats on Away Island. A total of more than >1,000 tracking tunnel nights and >200 trap-nights have occurred in 2012-2013, commencing 1 year after the baiting operation concluded. Other detection devices used include: wax tags, monitoring at seabird colonies, nocturnal searches, permanent bait stations.

As per the monitoring on Far Island, the presence/absence of rats was also measured on Away Island by the same methods: wax tag devices, monitoring of nesting seabirds, nocturnal searches, and permanent bait stations.

12-person hours of nocturnal search effort were made, with no sign of rats. The permanent wooden bait stations established on or near the landing beaches and camp sites on both islands were periodically baited, with 105 bait nights recorded with no bait take attributed to rodents.

Results

No evidence of rats has been detected by any of the monitoring since the eradication operation. The conspicuous rat population present before the eradication appears to have been successfully eradicated from Away Island, and this outcome has been achieved.

5.5. Outcome 2.2 Increase in population size of native bird species on Away Island

Monitoring

Monitoring was similar to that conducted for Far Island, but in lower overall quantity due to its smaller size and greater access difficulties.

Monitoring included 5-min bird counts for all forest bird species (and crimson pigeon in particular) at established points over the island, and monitoring of the number of breeding pairs of common noddy and black tern

Results

Summaries of 5-minute bird counts made before and after the rat eradication were compared statistically, using analysis of variance. Possibly due to the lower overall number of counts, and smaller population sizes on Away Island as compared to Far Island, the change in many species populations is less clear cut.

Of the species included in the counts, statistically significant increases have only been recorded for the Ground dove (*Gallicolumba stairi)*, Pacifican triller (*Lalage bluntei)*, Scarlet robin (*Petroica multicolour*), and Pacifican fantail (*Rhipidura pacificosa*).

No statistically significant changes of population have yet been recorded for the other species recorded in the counts. Further monitoring may be required to accumulate more data, which will assist in statistical analysis and determination of any significant trends.

There was a statistical decline in numbers of the Flat-billed kingfisher (*Todirhamphus recurvirostris*), but the low numbers of this species using Away Island and its relatively high mobility mean this could just be a chance occurrence.

The small population of common noddy on Away Island has undergone a small increase from 5 breeding pairs in 2011 to a total of 8 pairs in 2013. The change is not yet statistically significant but chick survival, as for Far Island, has notably improved and it is expected the population will continue to grow

Black tern breeding pair numbers have increased but as yet not significantly, from a mean of 12 pairs prior to the rat eradication to a mean of 15 pairs after. Restrictions in suitable breeding habitat may be hindering expansion of the population here, and it is possible that ‘surplus’ birds are joining the Far Island colony instead.

This outcome has been partly achieved.

5.6. Outcome 2.3 Increase in native vegetation densities on Away Island

Monitoring

A series of photo-points was established at marked five-minute bird count stations, with a baseline set of photos established just prior to the baiting operation. Comparison between 'before' and 'after' photos will visually illustrate any changes in vegetation.

Results

Only one repeat of the photo-points has occurred, two years after the eradication operation. No obvious difference in apparent in vegetation before and after. However, it is probable that any changes will be more long term, particularly in relation to sub-canopy and canopy composition. Some anecdotal observations indicate a noticeable increase in the number of small seedlings of some native forest species, but this is yet to be obvious in the established photo-point sites.

This outcome has yet to be achieved.

5.7. Outcome 3.1 Increase in population sizes of the ground dove on Far and Away Islands

Monitoring

5-min bird counts were made at established points over islands. Baseline data was collected prior to the bait operation, and repeated at similar times of year from one year post-baiting.

Twenty-one ground dove were captured and colour-banded on Far Island in the months leading up to the baiting operation. By comparing proportion of sightings of banded birds to un-banded birds, an approximation of the total population could be made. The 21 colour-banded birds made up 37% of all sightings in the two months prior to the baiting commencement, suggesting a total population of 57 birds.

Post-eradication, the minimum number alive of banded birds could be calculated from re-sightings of uniquely colour-marked individuals, and this could be compared with sightings of un-banded birds.

Monitoring was limited to Far Island, as the Away Island population was probably too small for useful statistical interpretation.

Results

The five-minute bird counts showed a significant increase in numbers of ground dove present on Far Island since the rat eradication occurred.

Re-sightings of colour-banded individuals has proved difficult to interpret statistically, but it is clear that from such monitoring that 1) survival of colour-banded birds that remained on the island during the baiting operation has been very high (minimum of 73% survival over two years), 2) survival of colour-banded birds held in captivity during the baiting operation has also been high (at c. 75%), and 3) proportion of un-banded birds, particularly juveniles, has increased in relation to known minimum number of banded birds alive.

An anecdotal observation of a successful nesting of ground dove occurred on Away Island 1 year after the rat eradication, the first time a successful nesting attempt has been recorded here.

It is considered that this outcome has successfully been achieved.

5.8. Outcome 4.1 NPC staff have skills to undertake further eradication projects of a similar size to current project.

Note: This section was completed by the reviewers: Moore and View.

Monitoring

The success of this outcome was assessed based on a review of all the project documentation, how the project team handled the project and a subjective assessment of the team's skills by the reviewers.

Results

Prior to the current project, NPC had only undertaken simple rat eradications on small atolls. The size of the previous projects and lack of clear project methodology meant there was little documentation to review. Interviews with the project team indicated that the team had a good understanding of the theory of eradications but lacked the experience of the planning required for larger, more complex eradications.

The project team have performed well on the current project. Planning and documentation has been completed to a high quality throughout the process. Few major revisions of the documentation have been required indicating an understanding of the planning that needs to be completed. The team have made good use of the availability of the expert contract technical co-ordinator and it is apparent the project manager, V. Reed, and the NPC Eradication Officer, F. Paua, have gained significantly in their eradication expertise.

During the eradication operation, the field team demonstrated the disciplined approach to bait application required if the necessary 100% coverage is to be achieved. Much of this was due to the strong leadership and communication skills of V. Reed as project manager.

We feel that as a result of the experience gained on this project, NPC have significantly increased their capability in undertaking eradication projects. Hence, we believe this outcome has been achieved.

6. CONCLUSION

Explanation: *Wrap up the Project Report*

Prompts:

- *Recap the project status*
- *Summarize how successful the project has been in achieving the goal, objectives and outcomes.*
- *Include any lessons learnt that you wish to share with stakeholders*
- *Describe what is left to complete on the project*
- *Remove this Help Box when The Project Report is complete.*

Progress towards achieving the goal

With all of the surveillance indicating no evidence of rats on the islands, the project team are confident in concluding that the project has been successful in eradicating rats from Far and Away Islands.

The toxic bait risk to the ground dove population appears to have been adequately managed, with no decreases in the populations evident. In fact, the population increase observed on Far Island would seem to show that the population is already benefitting from the absence of rats.

With the eradication of rats from the two islands we believe we have laid the foundations to achieve the project goal of *'The restoration of Far and Away Islands…'*. While it is too soon to see wide scale improvements in the native environment, early monitoring results do suggest that many of the indicator species are already demonstrating increased population sizes. It is hoped that with each set of annual monitoring results the benefits of the rat eradications will become more apparent.

Lessons learnt

As part of this project the National Parks and Conservation Department has learnt a number of useful lessons on how to conduct eradication projects. Some of the more important lessons include:

- Capacity building through buddying

  Throughout the project a less experienced eradication officer worked side by side with the contracted expert; giving the eradication office the opportunity to learn on the job and directly from an expert. We found this a very effective way of upskilling NPC staff and it is recommended that future project adopt a similar approach to NPC staff training.

- Eradication mind-set in the operation team

For members of the operation team that were either new to eradication projects or only had experience in invasive species control projects more time should have been invested in explaining the details unique to a successful eradication. Some of the team did not have a full appreciation of how essential it was to achieve 100% bait coverage across the island. With anything less giving some rats the chance to escape the bait and survive the operation.

From this experience, NPC have developed a standard presentation on the fundamentals of eradication operations that will be incorporated into all future pre-operation briefings.

- Don't be over ambitious

  In hindsight, the combined sizes of the 2 target islands was ambitious for NPC given the amount of experience in the team at the start of the project. While the proximity of the two islands meant they needed to be eradicated together, a project of a smaller size would have been a more suitable next step for NPC. We learnt it's not about how many rats you kill; its making sure you kill them all – however many and this gets significantly harder with larger islands.

- Ensure monitoring receives required focus

  Leaving the pre-operation monitoring until close to the operation meant that some staff were stretched to complete both the preparation for the operation and the monitoring activities in the period immediately before the operation began. In future, NPC will conduct the pre-operational monitoring as early in the project as possible so that the team can focus on preparation in the lead upto the operation.

Where to from here?

With the Implementation Stage complete, the project is now in the Sustaining the Project Stage with the emphasis on continuing the biosecurity measures to prevent re-invasion and monitoring the project indicators so that we can assess and demonstrate the benefits of the eradication of rats from Far and Away Islands.

Biosecurity measures will continue to be applied. Under the current project budget the biosecurity activities are funded until 2016. See the Biosecurity Plan (Sagolo and Reed, 2010). After this date, NPC will take on the financial responsibility. Key island visitors will be regularly reminded of the importance of implementing the prevention measures on each and every visit to the islands. The response team and equipment readiness will continue to be available to respond to any reported incursions.

Annual monitoring of the indicators will continue to at least 2016, see the Monitoring and Evaluation Plan (Reed, 2010) for details. Results from the monitoring will be recorded in an annual monitoring report.

7. ACKNOWLEDGMENTS

Explanation: Use this section to record other documents that have been used and referred to in preparing the Final Project Report

Prompts

We'd like to thank the many people involved in making this project happen:

T. Wilson (Director) and all the staff of the Department of National Parks and Conservation, particularly R. Suleosi. T. Tokoa and F. Paua for their support and hard work.

Thanks also to D. Sagolo, S. Jolie, A. Talofa and L. Matenga and others of the Windward Marine Protected Area (WMPA) project for their strong support and contribution to this project.

We gratefully acknowledge the effort of the leaders and all the people of Magaia Village for their hard work, support and good wishes. Thanks to the villagers who helped in all the fieldwork – cutting tracks, helping catch the ground doves, and in the baiting. Special thanks are due to P. and T. Matipo for their outstanding boatmanship to get us safely to and from the islands on many occasions.

Thanks for A. Eagle and B. Hawke (Auckland Zoo), and K. Hoffman (Egerton Bird Park, England) for advice and contributions to the captive care of the friendly ground doves.

8. REFERENCES

Explanation: Use this section to record other documents that have been used and referred to in preparing the Final Project Report

Prompts

- *List the references alphabetically*

NB. **For the purposes of this example document some references have been invented and some are real. The real documents are shaded like this and some are valuable references for developing projects. The others in the example reference list do not exist!**

Jameson, G., Smith, R., Singer, A. & T. Hugtree. 1992. The conservation of biological diversity in the coastal regions of the Republic of Pacifica. Unpublished report, Department of Conservation, Wellington, New Zealand.

Pacific Invasives Initiative, 2011. PII Resource Kit for Rodent and Cat Eradication. www.pacificinvasivesinitiative.org

Paua, F. & Hawke, B. 2010. Outline of plan and requirements to capture and hold friendly ground doves from Far Island during rat eradication project. Unpublished report, Dept of National Parks and Conservation (Republic of Pacifica) and Auckland Zoo, New Zealand.

Sagolo, D. & Reed , V. 2010. Biosecurity Plan for the Eradication of Rats from Far and Away Islands, Republic of Pacifica. Unpublished report prepared for Pacific Invasives Initiative, Auckland.

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APPENDIX 1. ERADICATION OPERATION

The basic outline of the fieldwork was (in sequence) pre-operational monitoring, track-cutting, capture of friendly ground doves for holding in captivity, marking bait points and establishing bait depots, first baiting application, second bait application, implementation of long-term biosecurity measures, and lastly post-operational monitoring.

Track-Cutting

Track cutting was undertaken by a team of 10 people, under the direction of the Project Manager.

The establishment of track network basically consisted of:

1. Cutting of central access line across each island, using GPS to record exact track position.
2. Cutting of perpendicular lines (i.e. at 90^{o}) to central line, at 25m intervals, to edge of coast or cliffs, using GPS to record exact track positions.
3. Examining the resultant network (GPS analysis and/or physical measuring) to ensure no gaps of more than 30m.
4. Re-cutting or adding of any additional tracks needed, and identifying any areas where tracking was not possible (i.e. cliffs) where special efforts to place bait would be required.
5. Re-examining the baiting grid to ensure the network is satisfactory, and repeating the above process if necessary.

Ground Dove Capture

A total of 25 friendly ground doves were captured within four days of effort, and transferred to captivity. The ground doves generally adapted well to their captivity, and most remained in good health for the c.6 weeks of their confinement. One bird died in captivity of unknown causes. The remaining 24 were successfully released on Far Island, and through colour-band combinations their subsequent survival could be monitored. Eighteen of the birds were re-sighted over the following two years, including one which was sighted on neighbouring Away Island.

Baiting Strategy

A team of 10 people were engaged in the baiting operation. The basic strategy for the baiting operation was:

1. Marking of 25m intervals along each track using tape measure and marking tape.
2. Shifting of bait in required amounts to pre-determined bait re-supply depots.
3. Baiters apply bait at 25m intervals along all tracks, and broadcast bait down cliff areas (application of bait at bottom of cliffs to be done by accessing the points around the coastline).
4. Supervisors to do random but thorough assessments of bait coverage
5. Wait a minimum of 7 days, then spread bait in 2nd application.

In general, the rat eradication followed the prescription for hand-broadcasting as outlined in the PII Rodent and Cat Eradication Resource Kit's Guideline for Bait & Baiting. This involved the marking out of a 25m x 25m grid system of baiting points across the entire island. Parallel tracks 25m apart were cut across the island, and along every track intervals of 25m was marked using coloured marker tape.

Any areas inaccessible by foot (e.g. cliffs) were identified using GPS mapping to determine the size of the gaps, so that a baiting strategy for that area could be developed. In all such cases, bait was thrown both from the top and the bottom of the cliffs to ensure adequate coverage of these areas. No cliff area on either island was more than 30m in height, therefore it is very unlikely that there would be any significant gaps (of 30m or more) in bait coverage.

A few bait grid-points on the coast (below cliffs) were accessed (guided to precise areas by GPS directions), by walking around the coast at low tides.

Tracks were of a 'rough' nature only, just enough to be comfortably walkable for a fit and experienced person. Each track was given a unique identification letter and the number of baiting points along each track was known, so it was possible to determine how much bait was required for each track. Strategically placed depots of bait were established before baiting commenced, so that return along already baited areas was minimised and baiters could replenish supplies close to the point where they would recommence baiting.

The bait used was Pestoff 20R cereal pellets (10mm diameter) containing brodifacoum. A small increase in bait rates above that normally recommended will be made to take account of possible bait loss through consumption by hermit and coconut crabs.

As per the Guideline, two separate baiting applications were planned, at least 7 days apart.

Bait was to be spread at a nominal 10kg/ha over the bulk of the islands for the first application and 6kg/ha for the second.

Extra bait was to be laid through the coconut plantation on Far Island (an additional 4kg/ha per application) where rat and hermit crab densities are relatively high, and also on cliff areas (10kg/ha and 4kg/ha extra in respective applications) where the slope may have hindered access and/or thorough distribution of bait.

The track system was established before baiting, and the 25m intervals along each track were marked with coloured tape. Adjacent tracks were marked using different coloured tape so there could be no confusion about which markers to follow in more open areas. When baiting commenced, the baiting team was able to focus solely on moving along each track to throw bait out at each pre-identified baiting point. Baiters carried bait in a 20-litre plastic bucket with a lid, and a plastic scoop that had been pre-prepared to hold 125g of bait. Extra bait was carried in backpacks or in additional buckets carried by the second team member.

For ease of logistics the same-sized scoops were used for both bait applications. In the first application 5 scoops full of bait were distributed at each baiting point. In the second application only 3 scoopfuls were cast out at any stop, but it was thought this should still ensure bait was well spread out for any surviving rats to gain access to it.

There were 4-5 baiting teams of two people each, and 1-2 supervisors (the Project Manager and Technical Co-ordinator). Bait teams were usually each made up of an NPC staff member and a local Magaia villager.

It was technically feasible for baiters to work individually which could have speeded up the operation. However, ensuring accuracy of bait coverage was considered paramount, so two-person teams were employed for the whole of the first baiting round and part of the second. Each team could therefore self-check that bait had been applied correctly - the chance of failure due to an individual person deliberately or accidentally making errors in bait distribution was considered to be much less as a result.

The actual operation went pretty much to plan with no major changes required.

GPS-derived data shows c.48km of track was cut on Far Island, and a further 9.5km on Away Island, with each two-person team cutting at least 2km of track per day.

A total of 2025kg of bait was distributed on Far Island (1275kg in the first application and 750kg in the second application 10 days later).

On Away Island, 450kg of bait was used (275kg and 175kg respectively in the two applications, which were 7 days apart).

In both cases the amount applied was slightly higher than the prescribed quantities, but not significantly so. This largely derived from operational recommendations always to err on the side of applying too much rather than too little bait in any instance, and some repeat application where accuracy of prior bait spread was in doubt.

The two bait applications took 4 days and 3 days respectively to complete on Far Island, and 2 and 1 ½ days respectively on Away.

It was 7 days between bait applications on Away Island, and 10 days for Far.