



**Restoring the seabird colony on Mabualau Island, Bau waters, Fiji.**

**ERADICATION REPORT  
July 2008**



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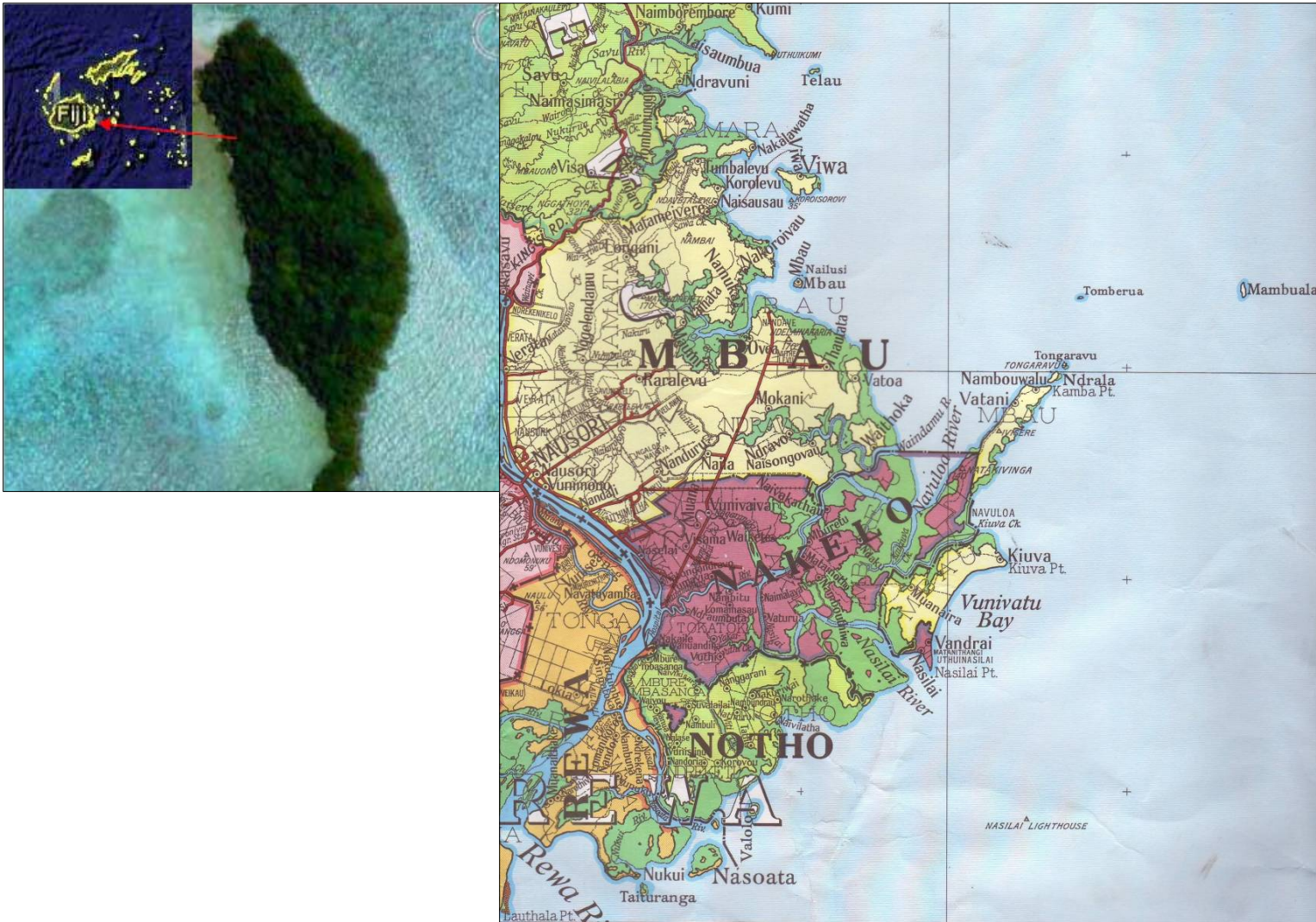
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# 1. Introduction

Mabualau (3.2 ha) uninhabited island in the south east coast of Viti Levu. The island has been listed by Fiji National Biodiversity and Action Plan (NBSAP) as a Site of National Significance. The island supports internationally important **sea bird colonies: Red footed booby, crabs and reptiles.**



**Figure 1:** Location of Mabualau Island in the south east coast of Viti Levu.

In early 2007, a team from BirdLife Fiji conducted a feasibility study on a rat eradication operation on the island. The team found a high density of Pacific rats on the island. Rats are believed to be the main threat to successful seabird breeding on an island as they feed on seabird eggs and chicks, feeds on sprouting vegetations and also feeds on other animals such as crabs, lizards and skinks.

In an effort to conserve seabirds, BirdLife international has undertaken the task of eradicating rats off seabird's islands around the Fiji group. BirdLife International is working in close collaboration with the traditional owners *Nadrukuta clan*, Toberua island resort and neighboring coastal villages (Bau, Kiuva and Kaba) in running the project.

The restoration of Mabualau Island has been made possible funding provided by the Pacific Seabird Group (PSG). In mid July 2008 the rat eradication operation commenced whereby the youths from

the landowning community assisted BirdLife staff in the hand broadcasting of Brodifacoum baits. There were two baiting operation on Mabualau approximately 14 days apart.

## 2. Objectives

The main objectives of the eradication operation were to:

- To undertake a successful rat eradication operation on Mabualau island.
- To completely eradicate rats on the island.
- To transfer eradication skills to local youths (Nabou village) during the eradication.

## 3. Personnel

The Mabualau rat eradication team consisted of:

- Josefa Sauma, Nabou, Bau.
- Kalivati Waisake, Nabou, Bau.
- Akariva Pio, Nabou, Bau.
- Tuverea Tuamoto BirdLife Fiji
- Elenoa Seniloli, BirdLife Fiji.

Supporting team

- Lemeki Waisake Nabou, Bau.
- Buck John, Nabou, Bau.
- Sue Waugh, Forest and Birds, New Zealand.

## 4. Schedule Activities

- July 15 Preparatory team arrive on Mabualau set up rat transect lines, and set up rat traps for overnight index trapping
- July 16 Support team arrives on Mabualau to assist in the hand broadcasting of baits.
- July 17 Monitor bait take, conduct crab survey and nesting seabird count.
- July 18 All team members return to Suva.
- July 29 Second operation: team arrives on Mabualau to hand broadcast baits and install notice board.

## 5. Conditions of Mabualau

Cyclone Gene (Feb 28) caused considerable damage to the forest canopy on Mabualau, this was observed during the early February trip. However, forest canopy seemed to have recovered as *Pisonia grandis* branches have re-grown.

Upon arrival on Mabualau, there were no signs of recent camping; grass and trees on the campsites have re-grown. However a shed has been set-up on campsite by landowners to discourage cutting trees and clearing campsites. A recent taboo on overnight fishing in the Bau waters (*qoliqoli*) set by the Bau Tikina council in an effort to manage over fishing issues. The Taboo is good for Mabualau operation as people do not use the island for over-camping.





**Caption 2:** showing the campsite on Mabualau and bait buckets upon arrival.

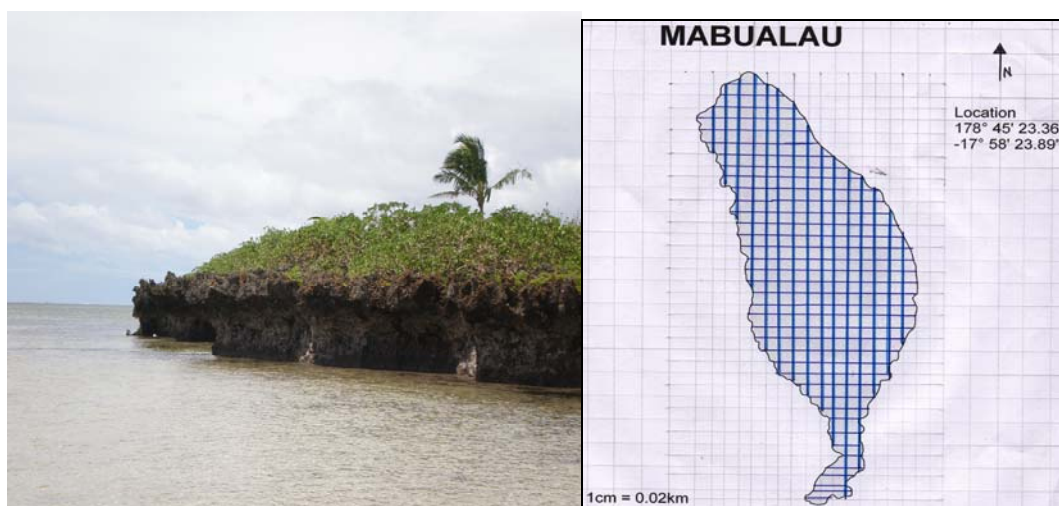
It was noted that hermit crab numbers were fewer than the last visit (Elenoa Seniloli. per. comm.). Few dead chicks were found on the forest floor, mainly Red footed booby chicks. Upon close inspection there are no signs of predation which leads us to believe that the chicks might have been knocked off their nests by strong winds. Some chicks were still alive but eventually it will die of starvation.

## 6. Methods and techniques

### 6.1 Preparatory Work

- *Bait Line establishment*

Transect lines were laid starting from the north end of the island running towards the southern end. Each transect was flagged with the different colored crusing tape; 10 m apart. Different colored crusing tapes are used as it avoids confusion and also allows good visual locations for baiters. There were thick vegetation (*Vau*) covers on the south end of the island. Tracks were cut on the southern end to enable baiters to broadcast baits on this end of the island.



**Caption 3:** Showing the south end of the island with thick Vau bushes and the map showing the baiting lines established on the island

- *Rat monitoring*

Rat traps were run overnight to get an indication of rat population and reconfirm rat species on the island.

*Method*

Rat traps were set using the baiting lines, three lines were used to monitor rat index. A total of 25 traps were set overnight. Snap traps were nailed off the ground to minimize the crab interference.

*Results*

Only 7 rats were caught from the overnight trapping. Rat activities on the island were very low from incidental observations and trapping results. Rat tails were sampled and stored in 70% alcohol.

**\*\*Note:** Rat monitoring was scheduled to be done for both operation however, after the first monitoring results the Operational manager and Senior Technical Advisor agreed that from the results of the first monitoring (low rat population) it is highly likely that there will be any rats caught in the traps. So the rat monitoring was called off during the second operation and the team, upon arrival re-baited the island to counter any surviving rats on the island.

## 6.2 Mabualau Rat Eradication Operations

The hand broad casting operation was used for the Mabualau operation. There were two baiting operation approximately 13 days apart @ 13k/ha for each operation. In total the Mabualau operation used approximately 103 kg of Brodifacoum baits. The eradication was scheduled for July which is the dry season in Fiji.

- **Weather condition**

The eradication operation was scheduled for July, falls in the dry season in Fiji, substantially increasing the likelihood of having multiple days without rain. The south eastern side of Viti Levu experienced torrential rains two days before the eradication, however there were no rains experienced during the first operation and even 5 days after. The second operation there was no heavy rainfall in the region even 5 days after. The weather was closely monitored by the Operational manager with constant update from the Fiji Weather office in Nadi.

- **Hand broadcasting**

The baiting operation started from the west end of the island near camp site and proceeds downwards to the south. (Refer to map on Appendix 3). Bait spreaders were encouraged to work together at a certain pace keeping in contact with each other. After a line has been baited, the baiter is required to remove the flagging tape. A measured amount of bait is spread at every 10 m along the 10m transect lines.



**Caption 4:** A baiter fills up bait bucket and hand broadcasts baits around the island

- **Baits and Lures**

- **Poison baits**

The baits used were 2g Pest off rodent baits 20R pellets containing 0.002% Brodifacoum supplied by Animal Products Ltd, Wanganui, New Zealand. Brodifacoum is a second generation anticoagulant that works by stopping the normal blood clotting processes of the body. It is toxic to animals with hemoglobin based systems such as mammals and birds but is non toxic to invertebrates such as crabs (Oliglive S.C et al., 1997).



**Caption 5:** pest off baits stored in sealed bucket.

- **Lures**

Roasted coconuts were used to lure rats to the traps. The coconuts were cut in to small cubes and fixed firmly to the snap traps. The roasted coconut gives off a sweet aroma attracting rats to the traps.

- **Bait uptake**

- *Crab density survey*

- Method*

Five transect lines were followed and using a head torch crabs encountered 2m from each side of the line were recorded. This survey was conducted at night as land crab activity peak during the night. The time was recorded and species of crabs and color were also noted.

- Results*

The crabs presence on Mabualau was very low as within 20 minutes of search effort following the transect lines no (0) crabs were seen. Surprisingly, very few crabs were observed from by walking around at random direction even during the night survey. The team walked around the island to looking for land crabs but could not find any despite repeated searches. It could be possible that the eradication timing (July) is not a season for land crabs. So this could be an added advantage to the operation as it means higher chances for rats to eat baits.

- *Bait uptake*

Mabualau Island is covered with makatea rocks; it was very difficult to monitor the bait uptake. Most of the baits broadcasted would fall in to the rock crevices and we have had difficulty in trying to locate it. While baiting, the team rested for 15 minutes and we could hear rats squeaking under logs and crevices, we were absolutely sure they were feeding on the baits. From incidental observations, there were still a lot of baits were still left on the ground after the third day of operation. Upon returning for the second operation the team found a few baits left from the second baiting but the baits were not in good condition.





**Caption 6:** Makatea rocks fragile and steep at places covering almost 60-70% of the island.

Three sick rats were seen the next day after the broadcast. These were seen on the grass area next to the camp site. However, there were no foul smells of dead rats on the island during our stay or during our return after 14 days.

### 6.3 Non Target Impact

After the eradication operation, carcass searches were conducted for non targets that may have eaten the baits. The two non target species identified in the operational plan were Swamp harrier and human poisoning through consumption of land crabs (Seniloli et al, 2007). Human poisoning was mitigated by installing warning signs on key landing sites around the island and through community awareness programs. The only carcass on the island was from seabirds which we had observed earlier, that have been knocked off their nests by strong winds. The island owners they will frequently visiting Mabualau, to monitor people to refrain from harvesting crabs.

## 7. Issues during implementation

1. In early February this year, half of the bait lines were marked, five months later upon returning there were no signs of our marked transect. The team had to remark the whole island again. This was time consuming and at times tiring.
2. The baiting strategy was a great challenge for each baiter as they had to carry half bucket filled with baits and at the same time support to prevent falling on sharp coral lime-stones. The makatea rocks were very risky to walk on in some places was fragile. This not only slowed down the pace of baiting but it also led to fatigue and frustration among baiters.
3. As noted in the feasibility study that almost 60% of the island is covered by makatea rocks with deep channels and rock crevices (Seniloli et. al 2007). When applying baits it was really hard at times to look for baits on the ground as most had fallen inside the crevices. This led me to start questioning if rats would be able to access the baits.
4. The south end of the island was a huge gap area, when tracks were cut ,on the southern end the thick under bushes made it impossible to cut through easily and in some places there were steep rock crevices filled with sea snakes, if one was not carefully ,he would most likely to fall causing severe injury.
5. Reservations about the weather conditions as the winds had picked up during the operation and making it hard to get to the island at the planned time.
6. The timing of the second baiting took longer not 10 days as planned because the Operational manager had other work commitments which required her to be in Taveuni.



## **8. Lesson learnt**

1. Small teams are easy to manage, organize logistics and cost effective. However, it would be an added bonus if they are trained prior to eradication. This saves time and effort trying to explain to them what they should be doing.
2. When planning eradication also leave a window of 2-3 days and 2-3 hours as often operations do not always go according to planned day or time. There are factors such as weather, wind conditions (can delay boat), engine problems etc. *Flexible time*.
3. To always try to stick to operational plan, if for some reason carry out some methods in the plan, I should document in a report and explain why.
4. During the operation period, it is best that the eradication team and managers are concentrating on the task at hand because if they have other commitments could put the operation at risk.

## **9. Achievements**

1. The successful completion of the eradication operation and hopefully successfully eradicating all rats from Mabualau.
2. Most of the team comprised of Nabou village youths from Bau, they were able to learn benefits of conservation and eradication skills.
3. During the operation there was close collaboration between Toberua Island Resort, Nadrukuta clan and BirdLife International. The Toberua Island Resort was on standby in an event of emergency weather medical or lack fuel.
4. There has not been any negative reports of non target poisoning was reported or observed during the operation.
5. A notice board and warning signs were installed on the island, advising people not to eat crabs and advising visitors to take care while visiting Mabualau.
6. The Mabualau operation was a big learning opportunity for the operational manager to conduct eradication with the topography of Mabualau (makatea rocks). This has given BirdLife staff confidence with the lesson learnt from this operation can be used for future operations.

## **10. Recommendation**

1. Set up permanent bait stations on Mabualau.
2. Work in collaboration with the landowners and Toberua to maintain the bait stations on the island.
3. Monitor Mabualau for the presence of rats using rodent trapping, rodent ink pads and tracking tunnels.
4. Production of awareness materials to disseminate to island visitor's advising them of the biodiversity values of Mabualau and urging them to main bio-security measures.

## **11. Acknowledgements**

Many thanks to the Nadrukuta clan and Jale Gavidi for their logistical support and to the Nabou village youths for helping out with the eradication operation.

Thanks also to the Toberua Island resort management and the Nadrukuta clan leaders for giving us their blessings and permission in the restoration project.

Many thanks to the Island Eradication Advisory Group (DOC-NZ), Pacific Invasive Initiative and BirdLife staff for providing their technical advising towards planning this operation.

## 12. References

Ogilvie, S.C., Pierce R.J., Wright G. R. G. and Booth L.H (1997) *Brodifacoum residue analysis in water, soil, invertebrates, and birds after rat eradication on Alice Island*. New Zealand Journal of Ecology Publication, 21(2):195-1

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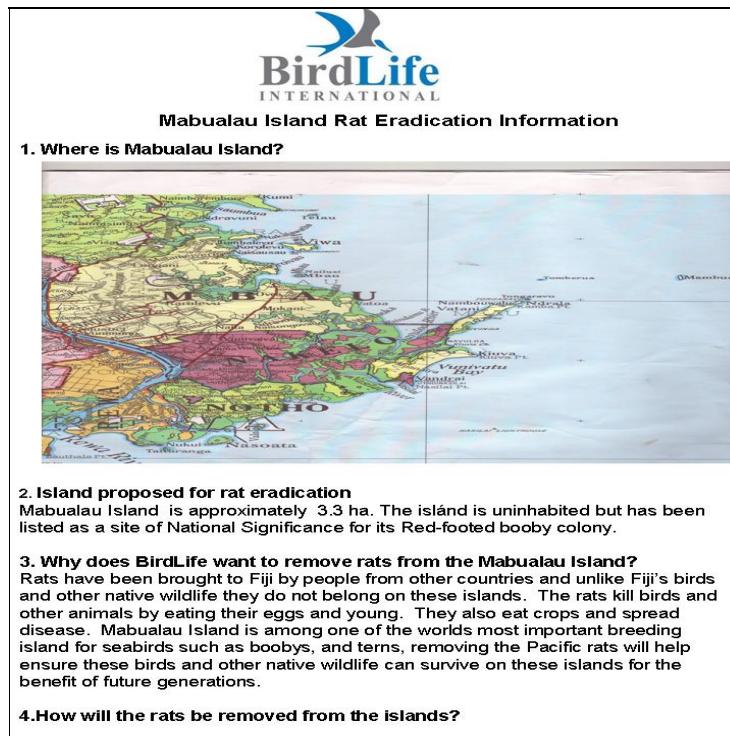
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## 13. Appendices

### Appendix1: Awareness materials



Brodifacoum warning signs on Mabualau nailed to trees in landing sites.



A copy of a fact sheet about the eradication operation, were circulated to stakeholders before and during the operation





#### NOTICE

As the landowners for Mabualau island, the Nadrukuta clan publicly acknowledge Mabualau as a Site of National Significance. Mabualau has an internationally important seabird colony and is free of introduced predators including rats and mongoose. To protect the island's wildlife, the landowners request:

- That permission is obtained from Nadrukuta clan before visiting the island.
- Not to cut trees ,harvest eggs or birds and keep away from seabird nesting areas.
- Do not light fires on the island.
- Not to litter on or around the island .

The Nadrukuta clan and the Government of Fiji appreciate the support in protecting a valuable part of Fiji's natural heritage and in helping ensure that it will remain for the enjoyment of future generations.

Eratou gadreva na tokatoka Nadrukuta mo ni kila ni sa bihi me maroroi ko Mabualau ena vuku ni yaubula .Esa mai vakabulabula taki na yanuyanu ena kena sa vakamatei na vei meca eso me vaka na kalavo kei na manipusi.

O ni sa kerei mo ni tagomaka na yanuyanu kei na veiyaubula :ena kena sa vakatabui na musu kau ,benu ca,vakasagai ira na manumanuvuka ,duvani ika kei na vakamakama.

Tokatoka Nadrukuta  
Lakau (Bau), Tailevu.



Government of Fiji



the David  
Lucille  
Packard  
FOUNDATION



Notice board on Mabualau set up near the landing area.