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sustainable environment, education & development

Progress Project Report For

Project Rufus:

***In situ* conservation of the *Pteropus rufus* fruit bat in the Sainte Luce littoral forest, southeast Madagascar**



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SEED Madagascar

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1. Introduction

Project Rufus is an *in situ* conservation project which supports the long-term survival prospects of the *Pteropus rufus* (*P. rufus*) fruit bat through collaborative research and local community engagement and conservation awareness-raising in Sainte Luce, southeast Madagascar. This report covers the 18-month period from 1st January 2016 to 30th June 2017.

P. rufus is a keystone species that has seen rapid population declines in recent years (>30% over the last 20 years), attributed to a combination of loss of suitable roosting sites and increased hunting pressures (Andriafidison et al., 2008; Roberts et al., 2016). Sudden decline in population has led to the species being classified as Vulnerable on the IUCN Red List of Threatened Species (Andriafidison et al., 2008). The colony in the Sainte Luce littoral forest (SLLF) is one of the few colonies roosting within a forest, not open degraded land, meaning it plays a crucial role in preserving the SLLF through seed dispersal and pollination. With the remaining SLLF fragments unlikely to provide adequate alternative roosting sites, loss of this species from the target roost site would have a significant impact on future reforestation and the preservation of the SLLF.

Project Rufus was designed to build local, national and international knowledge and capacity to ensure the sustainable protection for *P. rufus* and its habitat. The project has supported species conservation through working with local stakeholders and communities to establish one of the first instances of a community enforced conservation zone (Exclusion Zone) for *P. rufus*. The Exclusion Zone, which enforces a 'no logging and bat hunting' policy around the primary roost site, is one of the key achievements of the project. Originally designed to be 3.14 ha, the Exclusion Zone was finally agreed to be 47.61 ha in size; 15 times bigger than originally proposed.

The success of the Exclusion Zone for both the *P. rufus* colony and the local communities has been reflected in population census research and conservation income. Since December 2016, population census research has shown an approximate fourfold increase in numbers at the roost, with upwards of 450 individuals being recorded in June 2017. The construction of a bat viewing platform in the Exclusion Zone has provided the four local communities with monthly income generated through ecotourism. On average, 180,000 MGA (46.42 GBP) has been evenly distributed on a monthly basis to the four COBAs (local forest management bodies) co-managing the Exclusion Zone. The conservation efforts of the Exclusion Zone have been reinforced by: community education and awareness-raising; capacity building of local guides in bat monitoring and conservation; vital resource tree planting; and research to inform regional, national and international conservation strategies.

Unfortunately the project has faced setbacks as well as achievements. In early June 2016, project staff discovered that a secondary roost site, which had previously been identified and incorporated into Exclusion Zone plans, had been logged, rendering it uninhabitable by *P. rufus*. In addition to this unforeseen loss, *in situ* research activities are yet to be completed. This failure is attributed to increased disturbance from logging leading to the colony deserting the roost on two occasions, unsuccessful trapping attempts, the birthing and breeding season, and the Malagasy government delaying the required research permits due to changes in the regional and national DREEF (Directorate for Environment and Forests). SEED Madagascar (SEED) is now waiting to obtain the new research permits to resume research activities. Project Rufus will conduct research activities over the next 6 months, July 2017 to December 2017 (inclusive) at no additional cost to ensure

sufficient data can be collected to inform regional, national and international conservation strategies.

2. Project activities

2.1 Community meetings and surveys conducted in Sainte Luce, Mahatalaky and Tsiharoa (communities using the S6 forest fragment)

In early April 2016, 20 interviews concerning *P. rufus* hunting and consumption were conducted with community representatives from Sainte Luce, Mahatalaky, Tsiharoa North and Tsiharoa South. Interviews confirmed that *P. rufus* is viewed as a potential source of food, yet the majority (19/20) did not hunt bats.

Community meetings proved a powerful tool in facilitating the establishment and effective operation of the Exclusion Zone, allowing project staff to discuss community opinions, address concerns or questions, and ensure local endorsement of project activities. Four community meetings were held in the target communities in early November 2016 to reinforce local knowledge on *P. rufus*, including its critical role in maintaining the health of the forest, and to discuss project activities (*see figure 1.*). The meetings were attended by community representatives, the respective community COBA, Chef Fokontany (Community Chief), representatives from QMM (a regionally active mining consortium) and Manafiafy Beach and Rainforest Lodge.

The Exclusion Zone was discussed in detail with attendees to ensure they understood its exact location and the rules in operation. The meetings also provided a platform to review, discuss and address community questions and concerns related to the management of the Exclusion Zone and the S6 forest fragment. Information gathered from each community meeting informed discussions at a regional stakeholder meeting in December 2016 (*see sub-section 2.2*) and facilitated the development of a COBA management strategy for the Exclusion Zone and S6 forest fragment.



Figure 1. Community meeting, held in Sainte Luce

In March 2017, further community meetings were arranged with the four target communities to ascertain community opinions on the rules of the Exclusion Zone, and discuss the penalties that should be associated with infraction of each rule. During their travel to the meetings, project staff were informed that key stakeholders from Tsiharoa North, Tsiharoa South and Sainte Luce were participating in a regional meeting and therefore would be unable to attend. As a result, only the meeting in Mahatalaky came to fruition. Although at the time deemed an unsuccessful trip, the results of the Mahatalaky meeting were of great significance as it was agreed that an Exclusion Zone site visit would be conducted with key representatives from each of the four communities. The site visit was requested as there were concerns about the size of the Exclusion Zone and community access to forest resources. Details of the site visit are provided below (*see section 2.2*).

Following the site visit, a final community meeting was held in Tsiharoa North in April 2017 to discuss the outcomes of the visit and ensure community members were supportive of the Exclusion Zone rules and penalties for infraction. This was attended by project staff, community representatives, the respective COBA members, Chef Fokontany, and QMM representatives. All community members confirmed they were satisfied with Exclusion Zone size and its provisions. Meeting minutes were noted and signed by all attendees to record the discussions and agreement.

The communities of Mahatalaky, Sainte Luce, and Tsiharoa South rely less heavily on the S6 forest fragment and therefore decided to conduct community meetings on the site visit without participation from SEED project staff. In each meeting, community members also confirmed their approval of the Exclusion Zone provisions and the proposed penalties for infractions.

Outputs:

- ✓ Six community meetings held
- ✓ Community agreement on Exclusion Zone
- ✓ Community surveys on *P. rufus* hunting and consumption in Ste Luce, Mahatalaky and Tsiharoa conducted

2.2 200m Exclusion Zone around *P. rufus* roosting site

The Exclusion Zone was first proposed to stakeholders at a regional stakeholder meeting held on the 23rd June 2016 (*see Figure 2*). All attendees welcomed the proposal, recognising the ecological and potential livelihood benefits of implementing the Exclusion Zone to conserve *P. rufus*.



Figure 2. The regional stakeholder meeting, held in Mahatalaky

Project staff and COBA and FIMPIA representatives visited the S6 forest fragment in August 2016 to provisionally GPS map the Exclusion Zone. All attendees agreed upon an area totalling 47.61 ha, 15 times larger than originally envisaged (*see figure 3.*). The Exclusion Zone perimeter was marked with paint by SCP staff in May 2017 and a main sign was erected on the path next to the roost site providing detailed information on the Exclusion Zone and the *P. rufus* colony in Sainte Luce (*see figure 4.*).

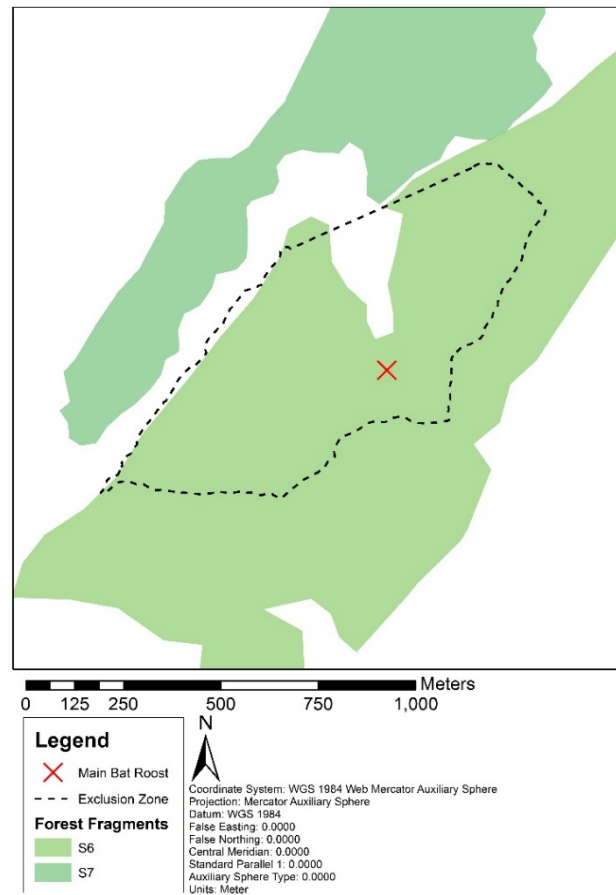


Figure 3. Map of the Exclusion



Figure 4. Red paint marking Exclusion Zone (left); Exclusion Zone sign

In late July 2016, the two Forestry Police were selected from the Tsiharoa North community and have been patrolling since October 2016. Alongside enforcing the Exclusion Zone rules, the Forestry

Police have been recording data on: instances of hunting, logging and forest use; viewing platform activity (*see sub-section 2.3*) and colony population census. A strategy for co-management of the S6 forest fragment, including equal division of income from eco-tourism, was agreed between the four COBAs at a second regional stakeholder meeting held on the 12th December 2016 in Mahatalaky.

A site visit to the Exclusion Zone was proposed and agreed during the community meeting in Mahatalaky in March 2017. In April 2017, the visit was conducted by SEED project staff with participation from Chef Fokontany, Chef COBA (COBA Chief), and a local community representative from each of the target communities. Attendees were firstly shown the roost site and then taken around the perimeter of the Exclusion Zone, before a meeting was held in the forest (*see figure 5.*).

There had been previous concerns that the Exclusion Zone was too large and would significantly decrease community access to forest resources. After the site visit, all attendees confirmed they were satisfied with the size of the Exclusion Zone and agreed there would be sufficient resources from other forest areas for community use. Attendees also discussed the fine system for infractions of the Exclusion Zone and agreed a 20,000 MGA (5.16 GBP) fine for hunting and 5,000 MGA (1.29 GBP) fine for logging. The minutes of the meeting and decisions were recorded and signed by all attendees.



Figure 5. Stakeholder meeting in the S6 forest fragment, conducted after site visit

The establishment of the Exclusion Zone is a major achievement for Project Rufus, not only protecting the colony in Sainte Luce, but also protecting 47.61 ha of threatened littoral forest.

Outputs:

- ✓ Establishment of patrolled and legally enforced Exclusion Zone

2.3 Community managed elevated P. rufus viewing platform

To promote ecotourism opportunities and provide a sustainable source of income for local conservation activities, a community managed elevated *P. rufus* platform was constructed in August 2016 and finalised in September 2016 (*see figure 6.*).

Manafiafy Beach and Rainforest Lodge conduct guided tours to the viewing platform, whilst SEED staff and volunteers use the viewing platform to support research activities. Visitors to the viewing platform pay a 10,000 MGA fee. The distribution of income received is collectively managed by the four community COBAs. At the end of each month, the total amount collected is evenly distributed to the President COBA of each target community. Original plans to deliver financial training to the Miaro Committee were revised as this body is not involved in the management of money received. Instead SEED supported the four COBAs to develop a sustainable financial management plan for collecting and distributing the ecotourism income.



Figure 6. The bat viewing platform (left) and the view from the bat viewing platform (right)

Payments for using the bat hide commenced in December 2016, when Manafiafy Lodge distributed 110,000 MGA (27 GBP) to the four COBAs. In June 2017, Manafiafy Lodge distributed 140,000 MGA to the four COBAs. SEED distributed 50,000 MGA in January 2017, and distributed 60,000 MGA in June 2017. On average approximately 180,000 MGA (46.42 GBP) is distributed each month, totalling 552 GBP per annum in sustainable conservation income. Project Rufus currently pays for the Forestry Police salaries however upon project completion, the income from ecotourism will be used to sustain the Forestry Police positions. Any surplus will be evenly shared between the four COBAs to support building sustainable forest management capacity.

SEED will continue to search for new opportunities that may provide additional ecotourism income. SEED is currently aware of a new hotel opening in Sainte Luce and intends to contact the hotel once open to discuss the possibility of providing guided tours to the viewing platform.

Outputs:

- ✓ Elevated camouflaged bat roost viewing platform constructed and managed by the community
- ✓ Development of a sustainable financial management plan by the community COBAs, which ensures effective management of the income from the bat-viewing platform

2.4 Tree-planting site for fig and guava trees

Fig and guava are an important source of calcium for *P. rufus*, required particularly when nurturing young, but are also a key source of human-bat conflict. To increase access to fig and guava fruits and decrease conflict, 134 fig and guava seedlings were planted in four locations within and surrounding the S9 forest fragment, one of two protected forest fragments in Sainte Luce. Fig and guava seeds were collected from the forest by SCP staff and planted in the SCP tree nursery by the children attending Club Atsatsaky (Club A) on World Environment Day 2016, 5th June 2016 (see figure 7.).



Figure 7. The Children of Club A planting the Fig and Guava seeds in the nursery

The seedlings were left for one year in the nursery to develop. On World Environment Day, 5th June 2017, the children attending Club A each collected a fig or guava seedling from the SCP nursery and paraded through Ambandrika, one of three hamlets that make up Sainte Luce (see figure 8.). The children then planted 50 fig and 84 guava seedlings in and around forest areas. The seedlings' development will be monitored by SCP past project completion. Planting 134 vital *P. rufus* food resource trees will increase food availability in years to come and help sustain a larger population.

Outputs:

- ✓ 134 trees of fig and guava planted



Figure 8. Children of Club A parading with fig and guava

2.5 In-situ research

Research activities have been postponed a number of times and are yet to be completed. Highlighted below are the challenges experienced by project staff in completing the activities.

Initial delays in starting research activities were caused by the *P. rufus* colony temporarily deserting the roost site in May 2016, and delays in obtaining the necessary research permits. The bat specialist's visit took place from the 21st – 29th September 2016 with the primary aim of trapping three *P. rufus* individuals with GPS collars. Trapping attempts were conducted over five nights using mist nets erected next to the flowering section of an *Agave sisalana* and a *Eucalyptus sp.* (see figure 9.). *P. rufus* individuals were sighted in the area, and on occasion flew close to the nets, yet the numbers were relatively low and unfortunately, no bats were caught.



Figure 9. Mist nets on the *Agave sisalana* (left) and the *Eucalyptus sp.* (right)

Following the unsuccessful trapping attempts, two local bat trappers were employed in late October 2016. The trappers implemented a similar method, using bigger mist nets and different food sources, over a 14 day period but again were not successful. At this point *P. rufus* started to enter birthing season, with pups clearly visible from the viewing platform (see figure 10.). As the pups are fully dependent on their mothers at all times for the first few months trapping attempts were again suspended.



Figure 10. Two suckling *P. rufus* pups

In late February 2017, the colony temporarily deserted the roost site. This signalled to the SCP that the pups had become independent from their mothers, as they would not leave the roost site if pups were still dependent; however, this also caused further delays to the *in-situ* research activities. The

colony returned to the roost site in early April 2017. Upon their return the SCP started conducting initial surveys to determine suitable trapping locations. These surveys were suspended as the SCP research permit had expired. There has since been an extensive delay in acquiring the required research permits due to changes in the regional and national DREEF ministry's delaying the process.

Population research was initially postponed to align with the trapping activities. Since January 2017, population numbers have been recorded on a monthly basis. Population counts are only estimates as certain parts of the roost tree, or surrounding trees, are not clearly visible making it difficult to see all bats that are roosting. Population estimates have suggested that there has been an increase in population size over the past nine months. An initial approximate population census was conducted in September 2016, during the bat specialist's visit, in which 100 individuals were recorded. In January 2017, 250 individuals were estimated, and in June 2017, upwards of 450 individuals were estimated.

The bat specialist supported the SCP in establishing the dietary analysis research. Initial research methods were revised shortly after commencement, and a new dietary analysis was developed in December 2016, using germination trails to identify the seeds collected from faeces (*see figure 11.*).



Figure 11. Germination trails for dietary analysis

The dietary analysis was suspended when the bats deserted the roost site in February 2017. Upon the bats return, SCP staff agreed not to resume dietary analysis, as there were concerns that collecting faeces so close to the roost tree was causing the colony too much distress.

Outputs:

- Sainte Luce *P. rufus* colony population documented over a six-month period

2.6 Training and capacity building of local guides in monitoring and habitat analysis of *P. rufus*

Whilst in Sainte Luce, the bat specialist worked with local guides, building their skills and knowledge in the ethical trapping, handling, and collaring of *P. rufus*, the use of equipment to track collared bats, and data collection techniques for the dietary analysis and population census.

In addition to patrolling the Exclusion Zone, the Forestry Police also collect data for the SCP on: instances of hunting, logging and forest use; viewing platform activity (*see sub-section 2.3*) and colony population census. Recent population counts conducted by the Forestry Police raised concerns of unreliable data, with up to 1,000 individuals being recorded. To build capacity amongst

the Forestry Police and increase the reliability of the data, SCP provided training to the Forestry Police in estimated data counts and direct counts, and data sheet completion.

Training also provided an opportunity to reinforce the Forestry Police's knowledge of *P. rufus*, its conservation, and the threats it faces. After training, Sambo, one of the Forestry Police, gave a presentation to the children of Club A on *P. rufus* conservation, including the threats it faces, the importance of its pollination role, and information on the Exclusion Zone (see figure 12.). This highlights the commitment of Sambo to conserve this keystone species and is an exciting prospect following project completion.

Outputs:

- Two guides from the local community trained in bat monitoring and conservation
- Local guides hold community information session on *P. rufus* conservation



Figure 12. Forestry Police conducting education session with the children of Club A

2.7 Educating the community about *P. rufus* and the importance of conserving its habitat

Project Rufus has supported youth education through SEED's free conservation club, Club A, which reaches over 200 children both in and out of school.

During 2016, education sessions were delivered: on the importance of *P. rufus* conservation; the threats faced by *P. rufus* and the role of reforestation in conservation efforts (see figure 13.); the role *P. rufus* as a key pollinator; the life cycle of *P. rufus*; and the negatives of tavy (traditional slash and burn agriculture).

In April 2017, further education was delivered on *P. rufus* conservation with a review of knowledge retention conducted through a quiz. In total 85 children participated in the quiz which contained six questions on human bat conflict, pollination, threats, and the role of *P. rufus* in the ecosystem. 100% of children answered three questions correctly and on average 84% of questions were answered correctly. This shows a 6% improvement from a similar quiz in April 2016.

In addition to the Club A sessions, environmental education posters on the subject of *P. rufus*, its conservation, and the Exclusion Zone were created and distributed to five schools across the Mahatalakay Commune in December 2016. It is anticipated that the children will pass on information to their parents and family members, facilitating the spread of key project messages through the wider community.



Figure 13. Club A conservation education sessions in Sainte Luce

2.7.1 World Environment Day

Building on the successes of World Environment Day celebrations in 2016, World Environment Day 2017 provided an opportunity to raise awareness of *P. rufus* conservation in the local community. Fig and guava seedlings that had been planted in the SCP tree nursery on World Environment Day 2016 were transferred to forest areas (*see sub-section 2.4*). In conjunction with this activity, the SCP ran a four stage activity session where the children who attended had opportunities to take part in a colouring competitions, quiz and two games about pollination and seed dispersal.

Outputs:

- ✓ Monthly environmental education sessions held at two schools in Ste Luce
- ✓ World Environment Day festival held in Sainte Luce to raise awareness of *P. rufus*

2.8 Stakeholder coordination

SEED utilises stakeholder engagement platforms to facilitate capacity building in local communities. Stakeholders were actively engaged in community meetings and regional stakeholder meetings and all project information was shared with stakeholders on a regular basis (*see sub-section 2.1 and 2.2*).

Liaison with private sector stakeholders has been particularly important to coordinate use of the viewing platform. Building on successful meetings with Manafiafy Beach and Rainforest Lodge in November and December 2016, SEED has since been in continuous discussion with the Lodge during 2017 regarding their use of the viewing platform. This has included discussions on numbers using the viewing platform and payments to the COBA. SEED will continue talks to optimise revenue for the communities.

Outputs:

- ✓ Four stakeholder meetings held

3. Conclusion & Future Action

Over the 18-month reporting period, Project Rufus has made considerable progress, notably: the agreement of the Exclusion Zone and establishment of a forest management strategy; the operation of two Forestry Police; the construction of the viewing platform; and the planting of 134 fig and guava trees.

The rules of the Exclusion Zone are in force but are now awaiting formal ratification in the *dina*. Once ratified, the rules will become legally enforceable at the community level and the associated fines will apply. Project staff have written the *dina* but the process of ratification has been delayed due to the absence of the Director of DREEF. The Director is required to attend a stakeholder meeting to finalise the *dina* but has been unavailable since May 2017. A meeting has been scheduled for the 14th August 2017. Project staff will review the *dina* with four community representatives, the Director of DREEF and the President of FIMPIA to ensure all parties are satisfied with the proposed wording and to make any amendments if required. The *dina* will then be signed by all parties and eight signs stating the rules of the Exclusion Zone and the associated penalties will be erected around its perimeter.

Due to the delays in *in-situ* research activities, SEED has requested a six-month no cost extension. This allow research activities to be completed with sufficient data collected to understand the movements of individuals, and to map their diurnal and nocturnal activity patterns. SEED is currently awaiting DREEF to grant the research permit. As soon as the research permit has been granted, trapping activities will resume. The SCP will identify suitable food sources for trapping and it is expected that the fourfold increase in *P. rufus* individuals at the roost site compared with previous trapping attempts will improve chances of successful trapping and GPS tagging of three individuals. Population census research will continue on a monthly basis until December 2017.



Figure 14. *P. rufus* in the roost tree

5. References

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