DURRELL

CRITICAL ECOSYSTEM PARTNERSHIP FUND

CANARI

CANARI serves as CEPF's regional implementation team for the Caribbean Islands Biodiversity Hotspot.

Pest Management Plan

16 February 2023

CEPF Grant 112857

Durrell Wildlife Conservation Trust

Conserving the Saint Lucia racer and strengthening regional capacity for racer conservation

Saint Lucia, Lesser Antilles

Grant Summary

1. **Grantee organization.**
   Durrell Wildlife Conservation Trust

2. **Grant title.**
   Saint Lucia Racer: Catalyst for Capacity Development, Stability and Engagement

3. **Grant number.**
   112857

4. **Grant amount (US dollars).**
   $251,187.80

5. **Proposed dates of grant.**
   1 April 2023 - 31 March 2026

6. **Countries or territories where project will be undertaken.**
   Saint Lucia, Lesser Antilles

7. **Summary of the project [copy and paste Project Rationale and Project Approach from proposal].**

Project Rationale

This project aims to address two primary "conservation needs" paramount to the continued successful conservation and management of Saint Lucia's endemic wildlife. Firstly, to secure the population of the most threatened species in country and the worlds most threatened snake, the Saint Lucia racer (*Erythrolamprus ornatus*, CEPF Priority species 23). Secondly, to enhance the regional cooperation with the islands only civil society organisation mandated by law to conserve the heritage of Saint Lucia and its people, the Saint Lucia National Trust (SLNT), to deliver its environmental conservation mandate.
The Saint Lucia racer is considered the most threatened snake species in the world. Having been wiped out from the Saint Lucia mainland by mongooses and other invasive alien mammals by 1869, this species now survives only on Maria Major, an arid 9.4-hectare islet off the Southeast coast. It is believed the population is less than 50 adult individuals. Whilst the implementation of essential biosecurity measures (developed through 2012-2014 CEPF project "Islands without Aliens"); the protection of Maria Major in policy, and the Saint Lucia racer by law, have served to secure the species for the short-term, the risk from invasive alien species remains high. Mongooses, rats, cane toads and cats are all still abundant on mainland Saint Lucia and could feasibly spread to Maria Major. Commercial development of the area remains a real threat and would significantly increase this risk. This combined with the inherent risks of such a small, isolated single population i.e., inbreeding, genetic drift, and the potential impact of observed stochastic changes or events (e.g., drought, hurricanes, wildfires and tsunami) to the habitat, which will be exacerbated through climate change, mean that the racer is currently at a very high risk of extinction within the short to medium term unless ambitious targeted interventions are taken. Such targeted interventions to reduce the threat of extinction for the racer have been developed by the partners and outlined in the Saint Lucia racer Conservation Action Plan 2015-2024

(Supporting Document Sr#2). Critical amongst these is establishing a second population of racers.

Whilst not part of this project, plans for creating a mainland island on Saint Lucia are currently in development (Saint Lucia racer Conservation Action Plan Objective 4). A mainland island is an area of land surrounded by a pest/predator-proof fence and kept free of harmful invasive alien species where threatened native species can persist. There are numerous examples of mainland islands globally in New Zealand, Australia, Hawaii, the Azores and Mauritius, with the largest being 3,363Ha. Such a mainland island represents an opportunity for establishing a second racer population and reducing the species overall extinction risk. Prior to this however a captive breeding population needs to be established (Saint Lucia racer Conservation Action Plan Objective 2), which will act both as a safety-net population and source population for future reintroductions.

Protection of the Maria islands including their biosecurity falls under the remit of the SLNT. As part of the 2012 CEPF funding round awarded to FFI under the title of "Islands without Aliens: Building Regional Civil Capacity to Eradicate Alien Invasive Species" critical biosecurity protocols were developed in both Saint Lucia and Antigua. Also regional cooperation between SLNT and Environmental Awareness Group (EAG) who manage the Antigua racer programme was begun, allowing knowledge and skills exchanges. Whilst implementation of these with respect to invasive mammals have gone well in Saint Lucia with no invasions detected it is prudent these are revised and updated especially in relation to other potential invasives such as ants. This is something also recognized by EAG. The high-turnover in staff within the SLNT, as a result of impacts from COVID-19 and the loss of SLNT's government subvention (now reinstated), means that there is a strong need for further training to build this capacity. Additionally, the cooperation built during the past CEPF project has faded and this project now represents a great opportunity to reignite this and forge stronger links between two organisations working to conserve two of the world's rarest species of snake.

Impacts if the project does not happen
Without the enabling conditions (establishing a captive population) for the future creation of a second population, the Saint Lucia racer will remain at critical risk of extinction with its population restricted to a single, isolated island at high risk from invasive predators, stochastic events and future climate change impacts. The longer this situation persists the greater the chance of an event occurring that causes its extinction.

It has been 10 years since the "Islands without Aliens" programme was undertaken and the biosecurity protocols developed. Biosecurity is an area that requires constant review and attention to ensure that high standards are maintained and up-to-date practices implemented. Once a island has been invaded removal of the invasive species can be difficult, time-consuming and expensive and may result in the significant loss of species of conservation concern.

Project Approach

We will address the conservation needs identified above though three main objectives.

Component 1: Implementation of key objectives within the current Saint Lucia Racer Conservation Action Plan (CAP) to prevent the extinction of the only wild population of Saint Lucia racer, and other threatened island endemic reptiles on Maria Major, by increasing protection from the impacts of invasive alien species and climate change

Maintaining the integrity of Maria Major is critical to the survival of the Saint Lucia racer as well as the other endemic reptile fauna found there, including the Saint Lucia whiptail (*Cnemiodorphus vanzoi*; CEPF Priority species 19), Saint Lucia anole (*Anolis luciae*; CEPF Priority species 37) and the Saint Lucian threadsnake (*Tetracheilostoma breuili*; CEPF Priority species 34). Ensuring the island remains free of invasive predators (Saint Lucia racer Conservation Action Plan Objective 1) and undertaking monitoring of native species and habitat (Saint Lucia racer Conservation Action Plan Objective 7) are important components of this. Additionally, actions to help mitigate the impact of climate change e.g., reduced water and humidity, on the islands fauna have become increasingly important in recent years.

Activity 1.1: Ensure ongoing effective monthly implementation of alien species detection, removal and monitoring on Maria Major. (Note: As part of this project biosecurity plans and protocols will be reviewed, updated and refresher training provided to staff from SLNT and Forestry. This is detailed in Component 2). Monthly biosecurity checks will be undertaken to Maria Major (and three other islands) by staff from Durrell, SLNT and Forestry to check and replenish baiting stations. Any reports of invasive mammals on the offshore islands will be responded to rapidly, through increased trapping (poison bait traps) and monitoring of existing poison bait networks. Additionally, Biosecurity checks of all visitors and visiting vessels to Maria Major will be carried out by Saint Lucia National Trust

Activity 1.2: Durrell, SLNT and Forestry staff will undertake annual surveys for Saint Lucia racer and other endemic reptiles on Maria Major. A monitoring framework (including timings and indicators) for this has been established using the Conservation Standards. Racers will be surveyed primarily using frequency-encounter transects (population density is too low for Distance or Capture-Mark-Recapture techniques) with new techniques or approaches trialed as needed. Endemic reptiles (whiptails and anoles) will be surveyed using Distance methodologies (transect and point counts). When caught, racers will have blood, buccal and cloacal swabs taken for genetic analysis (this will only be done by or under the close supervision of experienced individuals only. (Note: no animals will be killed for sake of collections). Results will be used to inform collection plans for populating the captive-breeding centre on the mainland. This work will contribute towards the increased capacity of SLNT and Forestry staff to manage the wild racer population on Maria Major, through the training of staff in prey-density monitoring, habitat monitoring and Racer Snake survey methods, data collection, data interpretation and the implementations of this into adaptive conservation action. This will increase their ability to reduce the threats of to this species as well as other biodiversity in Saint Lucia.

Activity 1.3: Trial experimental habitat manipulation and enhancement techniques to reduce the impacts of climate induced changes to the ecosystem on the Maria islands which threatens the resident native and endemic species of which there are two Critically Endangered endemics (*Erythrolamprus ornatus*, *Cnemidophorus vanzoi*), two Endangered endemics (*Anolis luciae*, *Tetrecheilostoma breuili*) and two Near Threatened endemics

(*Gymnophthalmus pleii*, *Sphaerodactylus microlepsis*). A variety of techniques will be trialled including rainwater collection and the provision of artificial water sources and development of supplemental refugia (e.g., cover boards, leaf piles). Camera traps and monitoring data will be used to assess the efficacy of the techniques trialled. Successful techniques will be incorporated into longer-term management plans for the islands. In addition, we will establish an automated weather station on Maria Major to collect climate data necessary to build an understanding of changing climatic conditions and inform future climate mitigation activities, SLNT and Forestry staff will be trained in the collection, management and interpretation of this data to inform management decisions for the island, climatic threats and changes going forward over time.

Activity 1.4: Review and update the Saint Lucia racer Conservation Action Plan. The current plan runs from 2015-2024. We will undertake a review of the plan and update it using the Conservation Standards approach, incorporating climate change impacts and mitigation activities. Environmental Awareness Group from Antigua will be engaged as part of the working group established in Component 2.

Component 2: Build on the previous CEPF investment "Islands without Aliens" by strengthening regional networks and facilitating capacity for collaboration, innovation and skill exchange between local and regional wildlife conservation organizations involved in Caribbean racer conservation.

This component aims to enable effective, and adaptive, long-term delivery of Caribbean racer snake conservations strategies along with the capture and dissemination of regional expertise through the establishment of inter-institutional and inter-island working groups/forums, and exchange opportunities, starting with Saint Lucia and Antigua and Barbuda to counter joint conservation concerns and challenges.

The 2012 CEPF project "Islands without Aliens" strengthened the capacity of CSO's Environmental Awareness Group (EAG, Antigua) and Saint Lucia National Trust (SLNT, Saint Lucia) in biosecurity measures through training, the development of targeted Biosecurity Plans and the delivery of invasive mammal monitoring and baiting protocols, with Durrell providing the biosecurity training in Saint Lucia. To date these have helped prevent the invasion/re-invasion of the offshore islands in Saint Lucia, and in Antigua EAG have been able to rapidly respond to counteract re-invasions where they have occurred. Despite this success it has been 10 years since this project, and a high turnover of staff has occurred within organizations since the original implementation of the project. It is therefore prudent to collectively review these protocols, highlight experience and lessons learned, identify current threats and needs and develop a rigorous positive feedback loop system of training and review.

The Biosecurity plans developed previously also identified multiple threats to these offshore islands and priorities to counter them beyond small mammal invasion, many of which have not been implemented or maintained e.g., robust monitoring for ants, invasive lizards, or plants.

To date Antigua has been the location of the most successful snake conservation initiative in the region for the Antiguan racer. Led in Antigua by the EAG there has in previous years been inter-island engagement between EAG, SLNT and the Saint Lucia Forestry Department

to exchange knowledge and skills in areas related to racer conservation including surveys, biosecurity, outreach, and education. This cooperation has been restarted in 2022 and increasing this will not only develop capacity within each individual organisation but also help build regional conservation cooperation.

Activity 2.1: Year 1 - Establish a regional "Offshore Island, Biosecurity and Species Management" working group, initially between Saint Lucia and Antigua & Barbuda, engaging all CSO's, NGO's and government departments involved in the protection and maintenance of bio-secure offshore islands. (A minimum of two representatives from each group, with a gender representation of 50% where possible)

Activity 2.2: Host a Biosecurity Review Workshop in Saint Lucia over 4 days to review and update biosecurity protocols, priorities, implementation (for both Antigua & Barbuda and Saint Lucia) established during the 2012 CEPF Islands without Aliens" Initiative. This will consider current institutional needs, desires and capacity and look towards emerging technologies and novel techniques. This will engage at least 2 members from each of the partner organizations with 50:50 gender representation where possible. Organisations include EAG, SLNT, FFI DWCT and Saint Lucia Forestry Department. This process will also establish an Annual Biosecurity Review Meeting amongst all partner groups to discuss progress, challenges and emerging opportunities.

Activity 2.3: Design and deliver a biosecurity training programme for all partners to deliver and manage across their various teams. A training programme will be developed (based on previous training and incorporating the biosecurity training toolkit currently utilized by EAG). The intention is to create a culture of biosecurity training amongst the working group so that key staff and partners engaged in island biosecurity undertake training of new staff, and regular annual refresher training and review sessions in the future. Initial training will be delivered to staff as part of the Biosecurity Review Workshop (Activity 2.2) with refresher training done annually as part of the biosecurity reviews. New staff within SLNT, Forestry and EAG will be trained upon joining. This will enable effective implementation of Activity 1.1 detailed above.

Activity 2.4: Undertake multiple skill and knowledge exchanges between Saint Lucian and Antiguan organisations working on racer conservation to develop the skill sets and reinforce regional network of racer conservation biologists. Over the three years of the project inter-island exchanges between EAG in Antigua and SLNT and Forestry Department in Saint Lucia will be undertaken every 6 months. In Y1 this will enable EAG to attend and participate in the biosecurity review and planning workshop in Saint Lucia (Activity 2.2) and staff from Saint Lucia travel to Antigua to participate in Antigua racer conservation activities. In Y2 and Y3, EAG staff visiting Saint Lucia will participate in filed activities on Maria Major including habitat manipulation trials and within the captive breeding centre. Saint Lucian staff visiting Antigua will gain experience in field skills (e.g., PIT tagging) and outreach and education work. In addition, funding from EAG will allow Saint Lucian staff to participate in their Antigua racer census and final rat eradication on Green Island.

Component 3: Establish a captive breeding program for the Saint Lucia racer on Saint Lucia mainland to provide a safety net population and to produce offspring for future reintroductions.

Given the situation of the Saint Lucia racer the only way to reduce its extinction threat is through establishing a second population. To do so a captive population must first be established to provide individuals for any other populations. This will also act as a safety-net population should the population on Maria Major be negatively impacted in the meantime. A secure in-country captive breeding centre has been constructed in Saint Lucia on Department of Forestry grounds and a Lead Technician recruited through Durrell to oversee this work. The captive breeding centre consists of two facilities: racer breeding facility and live food facility. The Department of Forestry provide power and water to the facilities as part of the project agreement. Once implemented the CAP will be updated as mentioned in 1.4 (above) and as part of this CEPF to account for the change in stance and status of risk extinction to the species, ensuring an updated and relevant management plan for the species at the end of the project.

Activity 3.1: Establish and maintain live racer prey base. Durrell's Lead Technician will work to establish and maintain a racer prey base by developing locally adapted breeding methods for food species (selected native and local reptile and amphibian species). These will serve as prey species for the racers and local invertebrates for the prey base species, and we will establish self-sustaining colonies at the live food breeding facility. Colonies will be considered established when they have sufficient individuals of different size and age classes to feed all size classes of racer (reptiles and amphibians) and racer prey (invertebrates). Work on establishing invertebrate colonies began January 2022 and we anticipate self-sustaining colonies of all species completed by end Year 1.

Capacity to manage the live food and racer facility will be developed within local CSOs and government partners. Local technicians from Forestry (two) and SLNT (two) will be trained by the Lead Technician in all necessary husbandry techniques. Inter-island exchanges with Montserrat (where a successful invertebrate breeding facility has been established) will also be undertaken to build skills and regional cooperation in captive management practices.

Activity 3.2: Ongoing maintenance and management of the racer breeding facility and live food facility. Ongoing annual maintenance to the facilities is required to ensure they remain fit for purpose, in particular, keeping them free of invasive predators (e.g., rats, mongoose) and ants and ensuring key equipment such as working incubators and fridges are in place. We will work alongside local CSO partners to secure follow-up funding in this area, promoting sustainability of the CEPF investment. Durrell Wildlife Conservation Trust are committed to long-term conservation interventions, our 40 year involvement in Saint Lucia demonstrates this and our intent to continue to support local partners in the pursuit of funding, grants and sustainable management practises to ensure the continuations of successful conservation initiatives.

Activity 3.3: Develop protocols for bringing racers into captivity. Capture and bio-secure protocols to safely remove racers from the wild will be developed prior to bringing snakes into captivity. Much of this will be based on protocols developed by Durrell for the analogue Endangered Leeward Island racer (Alsophis rijgersmaei) brought to Jersey Zoo in 2015.

Activity 3.4: Bring racers into captivity and develop specific husbandry guidelines. Once ready to receive snakes a small number of racers (maximum 2 pairs) will be brought into captivity. Timings of this depends on several factors, primarily the successful establishment of live prey colonies (Activity 3.1). The earliest this is anticipated is late 2022. Once in captivity specific husbandry guidelines will be developed for the species. This will be supported by the local Forestry and SLNT technicians. A local vet will also be trained in snake specific skills by Durrell's veterinary department.

8. Date of preparation of this document.

16 February 2023

Pest Management Approach: This section should describe your understanding of the problem, your experience with pest management issues, and your proposed actions during the project. Specifically, what do you intend to do and how will you do it? The information presented should include methods of application, e.g. by hand or via aerial spraying.

9. Current and anticipated pest problems relevant to the project.

Whilst the implementation of essential biosecurity measures (developed through 2012-2014 CEPF project "Islands without Aliens"); the protection of Maria Major in policy, and the Saint Lucia racer by law, have served to secure the species for the short-term, the risk from invasive alien species remains high. Mongooses, rats, cane toads and cats are all still abundant on mainland Saint Lucia and could feasibly spread to Maria Major.

Alien invasive rats, including the black rat (*Rattus rattus*) and brown rat (*R. norvegicus*) have colonized almost every vegetated island in the Caribbean, including remote offshore cays and are rated as two of the world's worst invasive species by the IUCN/SSC. These omnivorous and highly adaptable rodents have diverse negative impacts on native biodiversity through predation, competition and habitat degradation (Towns et al. 2006, Jones et al. 2008). These rats are major predators of land and seabirds, invertebrates, lizards and native mammals, and are voracious consumers of vegetation, seeds and fruit and have caused the extinction of a number of plant species, particularly those on isolated offshore islands (Atkinson 1985, Bell 1978, Imber 1985, King 1990).

The true extent of their impacts in the Caribbean is perhaps best seen when they are removed: The eradication of rats by FFI and their partners from 13 islands in Antigua's Offshore Islands KBA, for example, resulted in a 10-fold rise in the total population of Critically Endangered Antiguan racer snakes (*Alsophis antiguae*), 4-fold increase in red-billed tropic birds (*Phaethon aethereus*), 10-fold increase in brown pelicans (*Pelecanus occidentalis*) and 16-fold increase in near-threatened white-crowned pigeons (*Patagioenas leucocephala*) within 15 years. Native plant biomass on the same islands has also increased by at least 25%. A comparative study in 2010 and 2011 found a significantly higher density and diversity of birds, and three times the density of endemic lizards, on rat-free islands than on neighboring rat-infested islands. Rats can be successfully eliminated from even large islands, but the problem of reinvasion must also be addressed, because rats are adept at swimming between islands (albeit rarely further than 1km) and can be easily carried on boats from rat-infested ports.

Without revision and implementation of biosecurity measures in this project, there is a greater risk of the existing rat-free islands in Saint Lucia becoming reinvaded and local groups being unable to eliminate the rats unaided.

10.Current and proposed pest management practices.

Current practices

Rats have been eradicated from several islands in Saint Lucia since 1994, and the focus of current practices on these islands are on basic biosecurity only i.e., preventing rats (and other mammalian predators) from reinvading these islands. Maria Major has never been invaded by invasive mammalian predators and is the reason why the Saint Lucia racer still exists.

The main preventative methods currently in place comprise permanent bait stations (established on 4 islands in Saint Lucia). These are plastic bait boxes, raised on short pedestals, which contain up to 160g Klerat™ or Talon™ (brodifacoum-based bait produced by Syngenta). The bait stations are visited monthly and bait checked for any signs of rats. In the rare event that rat signs are detected, additional bait is placed across the island in further bait boxes (i.e., increasing the density of bait boxes) and weekly checks carried out by staff until no further signs of rat activity are observed. This system is currently managed by Durrell, Saint Lucia Forestry Department and Saint Lucia National Trust personnel in Saint Lucia.

The 2012-2014 CEPF Grant led by our partners, Fauna and Flora International, titled "Islands Without Aliens: Building Regional Civil Capacity to Eradicate Alien Invasive Species" was successful in establishing biosecurity grids and protocols for the offshore islands of Saint Lucia which has been maintained by the Saint Lucian National Trust and Forestry Department with ongoing support from Durrell and FFI.

Biosecurity checks of all visitors and visiting vessels to Maria Major are maintained by Saint Lucia National Trust. If an IAS is discovered this will be released on mainland Saint Lucia. If present on transport, transport must return to the mainland and release IAS before proceeding to Maria Major.

Proposed practices

<u>Biosecurity</u>

Biosecurity measures on Maria Major (CEPF funded) and other offshore islands (non-CEPF funded) will continue to be implemented as outlined above i.e., monthly biosecurity checks, checks of vessels visiting Maria Major and rapid response to any reports of invasive mammals.

As part of this project Durrell will host a Biosecurity Review Workshop to review and update biosecurity protocols, priorities, implementation (for both Antigua & Barbuda and Saint Lucia) established during the 2012 CEPF Islands without Aliens" Initiative – for both Saint Lucia and Antigua. This will consider current institutional needs, desires and capacity and look towards emerging technologies and novel techniques. This will engage at least 2 members from each of the partner organizations with 50:50 gender representation where possible. Organisations will include Environmental Awareness Group (Antigua), SLNT, FFI DWCT and Saint Lucia Forestry Department. This process will also establish an Annual

Biosecurity Review Meeting amongst all partner groups to discuss progress, challenges and emerging opportunities.

A biosecurity training programme for all partners to deliver and manage across their various teams will be developed (based on previous training and incorporating the biosecurity training toolkit currently utilized by EAG). The intention is to create a culture of biosecurity training amongst the working group so that key staff and partners engaged in island biosecurity undertake training of new staff, and regular annual refresher training and review sessions in the future.

Alongside this the project will establish a regional "Offshore Island, Biosecurity and Species Management" working group, initially between Saint Lucia and Antigua & Barbuda, engaging all CSO's, NGO's and government departments involved in the protection and maintenance of bio-secure offshore island to facilitate cooperation in biosecurity.

Ongoing maintenance and management of the racer breeding facility and live food facility will include keeping them free of invasive predators (e.g., rats) and ants and include the use as required of poison bait boxes as described above.

Eradication

No rat eradications are scheduled to take place in Saint Lucia during the CEPF grant period utilizing CEPF funds.

Relevant integrated pest management experience within the project area, country or region.

In Saint Lucia, Durrell Wildlife Conservation Trust has led the eradications (and in two cases, re-eradication) of rats from three offshore islands since 1994 (including Praslin Island in Mandele Dry Forest KBA, for which FFI's Jenny Daltry was hired by Durrell to lead the eradication in 2000) and established permanent bait stations that were modeled on the pilot biosecurity system in Antigua (developed for the Antigua racer project in which Durrell were a partner at the time). Elsewhere, Durrell has undertaken the successful eradication of rats from several offshore islands in Mauritius and implement strict biosecurity in coordination with local authorities for these islands to prevent reinvasion by invasive mammals. Durrell also undertakes invasive mammal control at a number of field sites e.g., Floreana, Galapagos Islands; Madagascar; Montserrat where we have active projects.

The 2012-2014 CEPF Grant led by our partners, Fauna and Flora International, titled "Islands Without Aliens: Building Regional Civil Capacity to Eradicate Alien Invasive Species" provided training to the Forestry Department and SLNT on biosecurity measures. Durrell, Forestry, SLNT and FFI were all key partner organizations involved in the development of the Saint Lucia Racer Conservation Action Plan 2015-2024 that this proposal is built on and the targets of which it is working towards implementing. Since its development Durrell and these partners have worked collaboratively in establishing and managing biosecurity protocols for Maria Major and Saint Lucia's other offshore islands, as well as the fundraising for the creation of the Saint Lucia Racer Breeding Facility and on-going monitoring and biosecurity on Maria Major as well as the planning and consultation work for the Mainland Island Site. The work proposed in this grant takes the next steps towards furthering these endeavors and securing the species for future generations.

The 2012-2014 CEPF Grant also developed and implemented biosecurity process in Antigua in relation to the Antigua racer project, now managed by Environmental Awareness Group. They are being engaged through this project as part of the biosecurity reviews and training processes.

Our partner, FFI, has been the leading instigator and implementer of rat eradication programs in Antigua since 1995 (including eradicating black rats from 13 islands in Antigua's Offshore Islands KBA) and the Bahamas in 1998 (Sandy Cay). In April 2012, they eradicated rats from three islands in Anguilla (including the 207-hectare Dog Island). FFI. together with rat eradication expert Karen Varnham, co-designed the permanent bait station monitoring systems that are currently in place on Antigua and Saint Lucia and are now under the day-to-day management of local organizations.

11. Assessment of proposed or current pest management approach and recommendations for adjustment where necessary.

As outlined above, the current management of rats in Saint Lucia is focused on biosecurity, i.e., preventing rats from invading or reinvading islands of outstanding importance and is based on the protocols developed during the 2012-2014 CEPF Grant led by our partners, Fauna and Flora International, titled "Islands Without Aliens: Building Regional Civil Capacity to Eradicate Alien Invasive Species". To date these have helped prevent the invasion/re-invasion of the offshore islands in Saint Lucia, and in Antigua EAG have been able to rapidly respond to counteract re-invasions where they have occurred. Despite this success it has been 10 years since this project, and a high turnover of staff has occurred within organizations since the original implementation of the project. It is therefore prudent to collectively review these protocols, highlight experience and lessons learned, identify current threats and needs and develop a rigorous positive feedback loop system of training and review. The Biosecurity plans developed previously also identified multiple threats to these offshore islands and priorities to counter them beyond small mammal invasion, many of which have not been implemented or maintained e.g., robust monitoring for ants, invasive lizards, or plants.

For this reason, the project will be undertaking a Biosecurity Review Workshop in Saint Lucia over 4 days to review and update biosecurity protocols, priorities, implementation (for both Antigua & Barbuda and Saint Lucia) established during the 2012 CEPF Islands without Aliens" Initiative. This will consider current institutional needs, desires and capacity and look towards emerging technologies and novel techniques. A biosecurity training programme for all partners to deliver and manage across their various teams will be developed (based on previous training and incorporating the biosecurity training toolkit currently utilized by EAG). The intention is to create a culture of biosecurity training amongst the working group so that key staff and partners engaged in island biosecurity undertake training of new staff, and regular annual refresher training and review sessions in the future.

Pesticide Selection and Use: This section should provide a comprehensive understanding of the pesticide that will be selected, why it was selected and what efforts were made to assess risks to human health. Note that this section should also present information on the potential impacts that the selected pesticide(s) will have on natural ecosystems and non-target species.

12. Description of present, proposed and/or envisaged pesticide use and assessment of whether such use is in line with international good practice.

The only pesticide to be used in this project is the rodenticide brodifacoum, at a concentration of 0.005% in Klerat™. As described above, this will be used for biosecurity (placed in the permanent bait stations to detect and kill invading rats) and, if rats reinvade any of the target islands, it would also be used for eradication. Note: No personnel will be permitted to handle and deploy rodenticide until they have been trained to do so. At no time will bait be accessible to the general public.

Biosecurity

Brodifacoum, in the form of waxy blocks (Klerat™), is currently in use in the locked permanent bait stations on Saint Lucia, on the offshore islands. These bait boxes are in turn secured to metal posts concreted into the ground. This prevents any human visitors to the islands accidentally handling the bait or the bait and bait boxes being stolen. Placing them in bait boxes prevents other species such as birds accidentally consuming the bait. This serves a dual purpose of killing invading rats and indicating their presence (rats leave visible teeth marks on the waxy surface of the bait). This will continue to be used for biosecurity by this project.

Brodifacoum is a second-generation anticoagulant poison that acts by reducing the animal's ability to coagulate blood (i.e. inhibits the synthesis of Vitamin K1 and as a result rats die of internal hemorrhaging, Eason & Wickstrom 2001). Death usually occurs between three and ten days after consumption of a lethal dose. For a 250 g black rat, the LD50 for brodifacoum is less than 5g of bait, which can be obtained in a single feed. As a result, bait shyness is avoided. More information on this rodenticide is given below.

Other second-generation poisons (e.g. bromadiolone and difenacoum) and even first generation poisons (e.g. diphacinone) have also been used successfully in eradications around the world (Bell et al. 2000, Bell 2004, Howald et al. 2007, Witmer et al. 2007, Bell et al. 2008). However, as these poisons require rats to eat much larger amounts of bait (c. 18 g for difenacoum or c. 12 g for bromadiolone) or require multiple feeds regularly over several days to obtain a lethal dose (3 mg/kg over 5 days for diphacinone), they are less suitable for tropical islands when rats need to be targeted quickly and when other natural food options are still available.

13. Indication of the type and quantity of pesticides to be financed by the CEPF grant (in volume and dollar value) and/or assessment of increase in pesticide use resulting from the project.

Klerat®Waxblocks Rodenticide, block bait, 0.005% Brodifacoum. Unit price for one box is $225. 12 boxes to be purchased with CEPF funding (4 boxes per year). CEPF funds will also be used to transport and deploy rodenticide for biosecurity purposes.

14. Chemical, trade and common names of pesticide(s) to be used.

Brodifacoum (Bromfenacoum), $C_{31}H_{23}BrO_3$. The trade name of the bait used in this project is Klerat™, which contains 0.005% brodifacoum, but the same rodenticide is the active ingredient in Biosnap™, d-Con™, Finale™, Fologorat™, Havoc™, Jaguar™, Matikus™, Mouser™, Pestanal™, Pestoff™, Ratak+™, Rodend™, Ratsak™, Talon™, Volak™, Vertox™ and Volid™.

15. Form(s) in which pesticide(s) will be used (e.g., pellet, block, spray).

Block wax bait. The central hole in each block allows them to be secured in baiting stations and prevents rodents carrying them away. The brodifacoum is provided at 0.005% concentration in 20g blocks or briquettes. Based on our experience, success in other eradication operations in the Tropics, and preference trials we have conducted with rats and non-target species in the Caribbean, we proposed to use Klerat™ both for eradication and biosecurity purposes. We prefer not to use pellets because these are harder to monitor and may be more likely to be eaten by lizards and birds.

16. Specific geographic description of where the pesticide(s) will be applied: province, district, municipality, landowners [do not give names of individual persons], and map coordinates (if available); and the total area (hectares) to which the pesticide(s) will be applied.

This pesticide will be used as part of biosecurity measures on Maria Major (13.724338, -60.931719; 9.4 hectares), Maria Minor (13.728293, -60.929973; 1 hectare), Praslin (13.875195, -60.889644; 1 hectare) and Rat Islands (14.033675, -60.981447; 1 hectare). All of these are vested in the Saint Lucia National Trust, apart from Praslin (privately owned).

Though small, these islands contain a disproportionately high percentage of Saint Lucia's rare and endemic species. Many globally threatened species survive only on these islands, including the Critically Endangered Saint Lucia racer and Critically Endangered Saint Lucia whiptail lizard.

17. Assessment of environmental, occupational and public health risks associated with the transport, storage, handling and use of the proposed products under local circumstances, and the disposal of empty containers.

Brodifacoum is highly toxic and a potential risk to humans and other mammals and birds but is completely harmless to invertebrates and a low risk to most reptiles. The median lethal dose (LD50, i.e. 50% of test subjects will die from level of poison ingestion) of pure brodifacoum for several species is as follows: Rat 0.27 mg/kg; Mouse 0.4 mg/kg ; Dog 0.25-3.5 mg/kg; Cat 0.25-25 mg/kg; Rabbit 0.2 mg/kg; Pig 0.1 mg/kg; Sheep/Goat 5-25 mg/kg; Gull 0.75-5 mg/kg; Duck 4.6 mg/kg. Reptile LD50s have not been documented, but experimental studies indicate a high resistance (e.g., snakes exhibited no ill effects from being fed on rats poisoned with similar anticoagulant rodenticides). This toxin is cumulative and can persist in the liver and other internal organs for several months.

Importantly, to minimize the risk of it being eaten by humans or non-target animals, the bait is designed to be unattractive, even repellant to any vertebrates other than rats. The brodifacoum is provided by the manufacturer in waxy blue blocks impregnated with Bitrex™, which are not only technically difficult for most native animals to peck or bite, but taste extremely bitter and waxy. The bait is dyed blue (by the manufacturer) to ensure birds and other animals do not even notice it or recognise it as food.

Furthermore, the concentration of brodifacoum in the bait is only 0.005% (an adult human would therefore need to eat 300 grams, or 15 blocks, for a potentially fatal dose, which is far too much to ingest by accident). In over 20 years' experience of using this bait in the Lesser Antilles, partner's from FFI have never observed any native birds, reptiles or other vertebrates showing the slightest interest in this bait, even when presented to the animals

in crumbs rather than complete blocks. In the few cases where rat eradication has occurred on islands with livestock (e.g. York Island, Antigua, in 2006, and Dog Island, Anguilla, in 2012), even goats have ignored this bait. There has been no non-target poisoning cases on Saint Lucia's offshore islands since biosecurity baiting was begun in 2012.

The bait is transported in waterproof containers with tight-fitting lids (this is particularly important when moving the bait to the islands by boat). Only 1kg of bait is transported at any one time, this is the minimum amount required to replace bait in the 12 stations across the island.

Every pail in storage holds 10kg and is clearly labeled in English with details of the contents and a safety sheet (including what to do if any bait is consumed). An example bait label for Klerat™ is available from the following link: https://www.syngentappm.com/sites/g/files/kgtney981/files/media/document/2023/01/17/uk_klerat_waxblocks_label.pdf. The bait is stored under lock and key at the Saint Lucian National trust's Southern Office, with only a small circle of individuals (notably SLNT's Conservation Manager & Coordinator) having access.

The permanent bait stations on the offshore islands are locked at all times, to prevent tampering by people or pets, and are securely bolted in place on cement pillars. It is not possible to dismantle these boxes without a key. The stations are cleverly designed to prevent people from reaching the bait (not even a child could reach the bait by inserting a hand inside the rat entry holes, because the bait is held behind a partition wall). Furthermore, every block of bait is also embossed with a skull and crossbones, as an unmistakable warning to people that it is toxic.

No rat eradications are planned to take place in Saint Lucia during the grant period, but, in the unlikely even this is necessary (i.e., if rats reinvade any of the project islands), announcements will be made on radio and local papers before additional bait is deployed and warning signs will be placed around all entry points on the island, similar to the example below:

Figure 1. Warning sign prepared by Fauna & Flora International for Dog Island Restoration Project, Anguilla, February-April 2012. Every block of bait used in the present project is individually embossed with a skull and crossbones.

The antidote for brodifacoum is Vitamin K1, which is available as injections or tablets from any veterinary clinic or hospital. The poison is slow acting, which gives ample time (days)

for a person to seek medical attention. Locations of hospitals offering this treatment and emergency contact details are available at all times.

In the field, any brodifacoum dropped or defecated by animals binds to soil. The probability of any brodifacoum leaching into the surrounding sea is very small and the quantities involved are too minute to have any effect on fish or other marine life (the concentration of brodifacoum in the bait is only 0.005%).

The bait removed from the containers leaves almost no residue (<1 gram), and these containers are easily washed out using plenty of water. Any waste bait, including bait that is past its sell-by date, will be incinerated and buried in secure landfill sites in accordance with the manufacturer's guidelines. The United Nations Environmental Program and World Health Organisation endorse this approach (http://www.inchem.org/documents/hsg/hsg/hsg093.htm#SectionNumber:4.6). "Burn or bury any uneaten bait. Do not dump it in water. Look for dead rats and mice and burn or bury them". Brodifacoum is fully combustible and fumes from incineration are harmless at the very low concentration and quantity involved in this project.

18. Description of plans and results for tracking of damage to natural ecosystems and/or harm to non-target species prior to pesticide application and subsequent to pesticide application.

Not even one non-target death of a bird, reptile or any other native animals has been observed in all previous rat eradication and biosecurity projects in this region using the same or similar methods. That is in spite of intensive monitoring on the ground, which we expect to continue to be a feature of the CEPF project. For example:

Biosecurity

All permanent bait stations are checked monthly, during which time any dead or sick non-target animals will be reported and any fresh carcasses examined for evidence of internal bleeding. In addition, key target species, partly as a means of measuring trends after rats have been eliminated. Although no suspicious decreases have been recorded to date, these monitoring data will help to indicate any problems that may be linked to the biosecurity program.

Rat eradications

If the offshore islands are reinvaded by rodents during the grant period, the rats would be eradicated by the project team. Using ground-based methods for eradicating rats (detailed above), personnel will monitor the islands deployment of bait (typically 21 days) and for several weeks after the rats have been killed, and monitor all parts of the island at least once a day throughout. Any dead or sick non-target animals will therefore be detected promptly, and carcasses examined for evidence of internal bleeding and for the presence of blue wax in the alimentary canal that would indicate they have consumed the bait.

In both cases, if any non-target species are found or suspected to be suffering from the pesticide, the key contacts (Durrell Caribbean Programme Manager, SLNT Conservation Manager, Forestry Head of Wildlife) must be notified immediately, and the project team will halt operations until a suitable mitigation measure has been identified. This is a conservation project, and it is not our intention to endanger anything other than the alien mammals.

19. Prerequisites and/or measures required to reduce specific risks associated with envisaged pesticide use under the project (e.g., protective gear, training, upgrading of storage facilities, etc.).

All personnel involved in the storage, transport and deployment of the rodenticide will be trained by the project leaders. No personnel will be permitted to handle and deploy rodenticide until they have been trained to do so. At no time will bait be accessible to the general public.

No specialist equipment is required, but personnel are advised to wear gloves (which will be provided) when handling bait. Bare hands may be used because the rodenticide cannot be absorbed through skin, but it is important to wash hands afterwards to avoid accidentally transferring the bait to the mouth.

All facilities used to hold bait should be locked, and access to keys restricted to only a few individuals directly involved in this project. The storerooms do not need to be refrigerated, but the bait should not be exposed to unduly high temperatures, as it will gradually degrade and may even melt. Suitable storage facilities have already been identified and are in use on Saint Lucia (locked cellar within Saint Lucia National Trust's Southern Office).

20. Basis of selection of pesticide(s) authorized for procurement under the project, taking into consideration the risks identified under Section 19, and the availability of newer and less hazardous products and techniques (e.g. bio-pesticides, traps).

There are no bio-pesticides, traps or other measures sufficiently powerful to completely eradicate rats from an island – at best, they are merely a temporary means of reducing the population size.

Rats are naturally very wary of any new objects or foods in their environment, especially when they detect other rats becoming trapped or dying. Anticoagulant rodenticides have the advantage of having a relatively slow action, which usually means that the entire rat population has consumed a fatal dose before the first individuals start to die. Their delayed action also means that if a human or non-target animal were to consume the rodenticide, there is ample time to seek treatment (Vitamin K1).

The project team has considered a variety of options, including coumatetralyl, diphacinon, pindone, warfarin, bromadiolone, flocoumafen and difencaoum. Brodifacoum remains the rodenticide of choice because:

- Very potent to rodents – a single feed is fatal
- Delayed onset of symptoms (which prevents neophobia and bait shyness as noted above)
- Insoluble in water (does not wash away in rain)
- Widely used in eradications (including proven track record in Caribbean) and has the highest rate of success of any known method
- Efficacy data are widely available
- Non-target impact data are widely available
- Range of bait formulations available (rats can be choosy)

Brodifacoum has been used successfully in over 70% of the eradications completed worldwide and on most of the eradications within the Caribbean region (Howald et al. 2007,

Varnham 2010). Although some of the other second-generation anticoagulants share many of these same advantages and could potentially work as well, none have any additional advantages over brodifacoum.

21. Name and address of source of selected pesticides [do not give names of individual persons].

(Manufacturer headquarters) Syngenta International AG P.O. Box CH-4002 Basel, Switzerland.

The rodenticide is actually produced in Hungary and from there flown or shipped by the manufacturer to the Caribbean where it is sold via retailers. The mode and cost of transport is the responsibility of the manufacturer.

22. Name and address of vendor of selected pesticides [do not give names of individual persons].

Rwnwick & Co Ltd, Beanfield, Vieux Fort.

23. Name and address of facility where pesticides will be stored.

Saint Lucia National Trust - Southern Office, Sandy Beach, Vieux Fort, Saint Lucia.

Policy and regulatory framework, and institutional capacity: This section should describe the institutional and legal framework under which the pesticide(s) will be applied, with reference to the documentation and standards required under local and national law and international good practice. Where a particular pesticide is not regulated at the target site, you must identify similar pesticides and the applicable regulation in neighboring countries that could apply, and international good practice. You must also explain why this particular pesticide is necessary, even in the absence of national laws.

24. Policies on plant/animal protection, integrated pest management, and humane treatment of animals.

Brodifacoum is harmless to plants, micro-organisms and invertebrates. This project complies with all existing legislation that refers to animal protection and treatment of animals in Saint Lucia:

Saint Lucia

- The Animals Act (2003, revised 2005 and 2019) addresses animal cruelty, including prohibiting poisoning of animals, but this does not to apply to rats and other small vermin and is only applicable 'without reasonable cause'.
- The Wildlife Protection Act (1980, revised 2019) classifies all mongoose, rats and mice as 'unprotected wildlife'. No protected species will be harmed by this project.
- The brodifacoum bait used in this project is available off-the-shelf in most hardware stores and is widely used by local farmers and homeowners.
- All field work by Durrell Wildlife Conservation Trust adheres to our internal Ethical and Legal Code of Conduct – Policy Document, which is in turn based on the detailed ethical code set out by Oryx – The International Journal of Conservation, which governs ethical treatment of local people and other stakeholders, as well as treatment of animals. The use of an anticoagulant rodenticide is admittedly not very humane from the rats' perspective (PSD 1997), but unfortunately there is no

genuinely humane alternative that is as effective in wiping out entire rat populations. Its use has to be weighed against the lack of alternatives and the ultimate outcome of restoring and conserving native biodiversity.

- The planned project will also abide by the Vertebrate Control Policy established by the Royal Society for the Protection of Birds, which is applied to vertebrate control in the UK and UK Overseas Territories. In order to satisfy the policy, four tests must be passed: (i) that the seriousness of the problem has been established, (ii) that non-lethal measures have been assessed and found not practicable, (iii) that killing is an effective way of addressing the problem, and (iv) that killing will not have an adverse impact on the conservation status of other non-target species.

This project has also been assessed using the ethical principles of Humane Vertebrate Pest Control (developed by RSPCA Australia, Humane Vertebrate Pest Control Working Group 2004) and will satisfy all criteria:

- The aims, benefits and harms of the eradication operation have all been clearly established, and efforts are ongoing to maximize the benefits and minimize the harms, thereby strengthening the ethical justification (Principle 1);
- The eradication operation is technically feasible and likely to succeed (Principle 2);
- The proposed rodenticide to be used, brodifacoum, is the most humane method that will achieve the aims of the eradication operation with a high likelihood of success, having already been used in many successful island operations (Principle 3);
- Methods which are proven to be effective on similar islands will be used (Principle 4);
- Established best-practice removal techniques will be followed wherever practical, and the project has be externally reviewed by the world-leading experts (such as Island Eradication Advisory Group, IEAG) (Principle 5);
- Monitoring will take place two years after the operation in order to assess whether the precise aim has been achieved (Principle 6);
- A wide-range of biosecurity measures are being progressed to ensure that the islands remain rodent-free after the operation and that no further control therefore needs to be undertaken (Principle 7);
- On the balance of factors, the method chosen is the only one which is likely to succeed on this island (Principle 8).

25. Description and assessment of national capacity to develop and implement ecologically based invasive alien species control [where relevant].

As described above, relevant CSOs had training in rat eradication and biosecurity under the previous 2012-2014 CEPF project "Islands without Aliens", which was successful in establishing biosecurity grids and protocols for the offshore islands of Saint Lucia, which have since been maintained by the Saint Lucian National Trust and Forestry Department.

However, it is prudent 10 years on to review these protocols and make sure they are still fit for purpose and being implemented appropriately, given significant staff turnover in SLNT. Building capacity among the relevant CSOs, by means of training, mentoring and provision of equipment and other resources to 'learn by doing', is a primary objective of this project.

The project will undertake a review of the biosecurity protocols established under the last CEPF project and develop and implement a refresher training course with all local partners on Saint Lucia and with Environmental Awareness Group from Antigua (Component 2).

Description and assessment of the country's regulatory framework and institutional capacity for control of the distribution and use of pesticides.

This project complies with all existing legislation in Saint Lucia that refers to toxins:

- The Biosafety Act (2006) governs only the management of genetically modified organisms.
- The Pesticides Control Act (1975) empowers the Minister to make regulations on the use of certain pesticides and allows inspectors to examine the use of pesticides. No regulations have been issued that apply to brodifacoum.

To reiterate, the brodifacoum bait used in this project (Klerat™) is available off-the-shelf in most hardware stores in Saint Lucia and is widely used by local farmers and homeowners. The fact that our imports of Klerat™ are facilitated by the Government (the Saint Lucia Forestry Department in Saint Lucia) further demonstrates that its use does not conflict with government policy.

The only significant restrictions we have encountered concern dropping bait by helicopter, which requires prior approval from the relevant Aviation Authority to ensure that the helicopter is not overloaded and still able to fly safely. However, the present project will use only manual ground-based methods.

Saint Lucia has a National Invasive Species Strategy (2012 - 2021), which was expected to lead to the ratification of an Invasive Species Bill, not yet enacted. Both documents are referenced in the Saint Lucia's Resilient Ecosystems Adaptation Strategy and Action Plan (REASAP) 2020–2028. Saint Lucia also has a Medical Waste and Other Bio-Hazardous Wastes Management Plan, approved in 2006, which deals with the disposal of pesticides, reporting incidents, and PPE, among other things.

Institutional capacity is limited across both civil society and government, and is greatly constrained by low numbers of technical staff and limited funding. However, Saint Lucia recognizes its need and responsibility to control alien invasive species and has signed up to relevant international agreements including the Convention on Biological Diversity and St George's Declaration. The government-endorsed management plans for the Point Sable Environmental Protected Area (including the Maria Islands) also specifically identifies the need for effective rat control on the offshore islands and highlights the management roles and responsibilities of the Saint Lucia National Trust.

26. Proposed project activities to train personnel and strengthen capacity [list the number of people and what they are being trained in].

All project activities are to do with building local capacity, but those that are specific to pest management, invasive species and biosecurity are listed below.

Activity 2.1: Year 1 - Establish a regional "Offshore Island, Biosecurity and Species Management" working group, initially between Saint Lucia and Antigua & Barbuda, engaging all CSO's, NGO's and government departments involved in the protection and maintenance of bio-secure offshore islands. (A minimum of two representatives from each group, with a gender representation of 50% where possible)

Activity 2.2: Host a Biosecurity Review Workshop in Saint Lucia over 4 days to review and update biosecurity protocols, priorities, implementation (for both Antigua & Barbuda and Saint Lucia) established during the 2012 CEPF Islands without Aliens" Initiative. This will

consider current institutional needs, desires and capacity and look towards emerging technologies and novel techniques. This will engage at least 2 members from each of the partner organizations with 50:50 gender representation where possible. Organisations include EAG, SLNT, FFI DWCT and Saint Lucia Forestry Department. This process will also establish an Annual Biosecurity Review Meeting amongst all partner groups to discuss progress, challenges and emerging opportunities.

Activity 2.3: Design and deliver a biosecurity training programme for all partners to deliver and manage across their various teams. A training programme will be developed (based on previous training and incorporating the biosecurity training toolkit currently utilized by EAG). The intention is to create a culture of biosecurity training amongst the working group so that key staff and partners engaged in island biosecurity undertake training of new staff, and regular annual refresher training and review sessions in the future. Initial training will be delivered to staff as part of the Biosecurity Review Workshop (Activity 2.2) with refresher training done annually as part of the biosecurity reviews. New staff within SLNT, Forestry and EAG will be trained upon joining.

27. Confirmation that the appropriate authorities were approached and that the appropriate licenses and permissions were obtained by the project.

Durrell has an active Memorandums of Agreement with the Ministry of Agriculture, Fisheries, Food Security and Rural Development which endorses Durrell's role in collaborating on biodiversity management, capacity building and invasive species management within Saint Lucia. This Ministry in which the Forestry Department sits is the legal authority for all activities related to species conservation in Saint Lucia.

Durrell also has a Memorandum of Agreement with Saint Lucia National Trust. Most of Saint Lucia's offshore islands concerned are vested in Saint Lucia National Trust, which strongly endorses rat control and biodiversity conservation (since 1994).

Participatory preparation: This section aims to outline the range of informed consultations that you have had both with experts to optimize the potential for success, and with stakeholders, particularly local communities, who are potentially affected by the use of pesticides (due to, for instance, proximity, use of certain areas for free-ranging livestock or non-timber forest product collection, etc.).

28. Dates, and results of expert consultations, if necessary.

As this project involves only updating, reviewing and continuing current biosecurity protocols, based on expert-led processes in previous projects, including the 2012-2014 CEPF project "Islands without Aliens", it is not considered necessary to bring in additional external expert consultations. The review workshop of the biosecurity protocols will be led by experts from Durrell and other regional experts e.g., from FFI will be invited to participate.

29. Dates, and results of consultations with local communities.

Local communities are not involved in the biosecurity work which is done by SLNT, Forestry and Durrell. This project will review the protocols and implement training and measures to boost capacity within SLNT and Forestry (lots of new staff) and enable them to train new staff as they come on. All offshore islands are restricted access to the public. Forestry

maintain signs and information related to poison and biosecurity as part of their remit. As part of the review it will be assessed as to whether new/updated consultations with local communities will be needed. Consultations with local communities were done prior and during the last CEPF project (2012-2014) and the initiation of the offshore island biosecurity measures. Since being implemented there has been no issues from local communities with the offshore island baiting. As part of the biosecurity protocol reviews the partners will assess whether new or updated consultations with local communities are required.

Although no people live on the target islands, many people – some from the coastal villages – use them for recreation and other purposes. The direct risk to people from the pesticide is almost inconceivably low (even a child would need to eat a very large quantity of bait to suffer ill effects, and the bait tastes disgusting) and very easily treatable with the antidote Vitamin K1. It is important to note that the same pesticide has been used in all previous rat eradications in Saint Lucia (and other countries) without any problems or objections being raised by local communities, nor indeed any signs of local communities being inconvenienced or harmed by its use.

Monitoring and evaluation: This section aims to outline the steps you will take to monitor and evaluate the purchase, storage, application and effects of the pesticide(s) in the target area.

30. Description of activities related to pest management that require monitoring during implementation.

Biosecurity

The most important monitoring activity in Saint Lucia is to regularly check and maintain permanent bait stations on the rat-free islands. Permanent bait stations should be placed around the islands, especially in areas with optimum rat habitat and in high-risk areas, to aid with detecting and intercepting invading rats. Every station must be visited at least once every 5-6 weeks (more often monthly) to check whether there are any signs of rats, ensure the stations are in good working order, clear away any overhanging vegetation (that may allow hermit crabs to enter and raid the stations) and to replenish the bait where necessary.

Impact monitoring

Regular monthly surveys of racer and other reptile populations on Maria Major will be undertaken by Durrell, Forestry and SLNT staff.

31. Monitoring and supervision plan, implementation responsibilities, required expertise and cost coverage.

Monitoring of the pesticide's use is primarily the responsibility of the Durrell Caribbean Programme Manager, Saint Lucia National Trusts Conservation Manager and the Department of Forestry's Head of Wildlife, although all field personnel and trainees will be expected to cooperate in monitoring bait uptake and any changes in native wildlife (described above). The Caribbean Programme Manager, Head of Wildlife and Caribbean Programme Officer are expert in managing, monitoring and use of this pesticide; and will pass on these skills to the other participants (some of whom are already accustomed to handling brodifacoum) as part of this project.

Monitoring costs are integrated into the operational costs of the project. Wherever possible, monitoring and supervision are combined with other project activities, to minimize costs. (For example, visits will combine routine supervision with providing training and working on other project activities, and field personnel will monitor bait stations and wildlife on the islands during the same field trips). Additional monitoring and supervision visits by donors are also welcomed at any time.

32. <u>Disclosure</u>: CEPF requires that pest management plans are disclosed to affected local communities and other stakeholders prior to project implementation. Please describe the efforts you have taken to disclose this plan.

The pest management plan will be shared with local partners prior to project implementation.