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

**Pest Management Plan**

**31 March 2023**

**CEPF Grant 112938**

**Environmental Awareness Group**

***Accelerating Locally Led Conservation Action in Antigua and Barbuda***

**Antigua and Barbuda, Lesser Antilles**

**Grant Summary**

1. **Grantee organization.**
   Environmental Awareness Group

2. **Grant title.**
   Accelerating Locally Led Conservation Action in Antigua and Barbuda

3. **Grant number.**
   112938

4. **Grant amount (US dollars).**
   $350,000

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

6. **Countries or territories where project will be undertaken.**
   Antigua and Barbuda

7. **Summary of the project**

**Project Rationale**

The proposed project will focus on the two sites of conservation concern under the CEPF call for proposals in Antigua and Barbuda. Both sites have undergone considerable conservation management and activities under the umbrella of the Environmental Awareness Group (EAG)'s core programs: the Offshore Islands Conservation Program (OICP) and the Redonda Ecosystem Reserve (RER) (formerly the Redonda Restoration Program). This, therefore places the EAG in an ideal position to identify where gaps exist and take strategic strides to implement change through innovative methods that include a range of agencies with relevant technical expertise and high-capacity volunteers.

This project, "Accelerating Locally-Led Conservation Action in Antigua and Barbuda", seeks to address CEPF Strategic Direction 1 - to "Improve the protection and management of 33 priority sites for long-term sustainability". For EAG, this requires four core objectives that will have a measurable positive impact on critically endangered (CR) reptiles within the North East Marine Management Area (NEMMA) and Redonda KBAs and achieve our overarching vision; namely:

- Develop Sustainable Financing Mechanism for the EAG to facilitate effective co-management of the NEMMA KBA and the Redonda KBA;

- Through the completion of a Financial Feasibility Study, determine the fiscal viability of the Offshore Islands Nature Reserve for co-management of priority areas within the NEMMA KBA;

- Strengthen conservation management of the CR Antiguan Racer, CR Redonda Ground Lizard, and CR Redonda Anole in the NEMMA and Redonda KBAs through the development and implementation of species-specific Conservation Action Plans; and

- Develop a network of committed individuals for environmental conservation within Antigua and Barbuda's KBAs through a strategic conservation capacity-building programme.

The following, therefore, provides an overview of the urgent need for this project to be implemented, and the ways that the CEPF will support increased locally-led conservation action in Antigua and Barbuda.

Component 1: Develop Sustainable Financing Mechanism for the EAG to facilitate effective co-management of the NEMMA KBA and the Redonda KBA (2023 - 2025)

Problem the project seeks to address: EAG is not able to sustainably finance itself, despite its major contributions to natural resources management in Antigua, Barbuda, and Redonda. EAG is dependent on funding raised through grant-writing and its staff is consistently engaged in developing proposals to continue to fund programme activities and growing ambitions for the organisation. Focus must be placed on sustainable financing options that reduce EAG's donor dependency, while continuing strong conservation work.

As a small NGO that does not receive subventions from the Government of Antigua and Barbuda, the EAG is extremely dependent on external funding to cover its operational costs. In June 2021, the EAG hired a financial consultant to develop the Financial Sustainability Policy for the EAG, which estimated the organization's donor dependency at 98%. This extremely high figure indicates that EAG is nearly fully dependent upon donor funding and would not survive one month without project/donor financial support. Based on the recommendations outlined in the EAG's Financial Strategic Policy, the donor dependency goals for the EAG are 70% within 5 years (median term) and 50% within 10 years (long-term).

Further, the EAG's Reserve Policy assumes that EAG should have savings or reserves to cover core operational costs for a minimum of three months. These costs include: salaries; stipends for wildlife and invasive species monitors; equipment and field gear; transportation costs (boat and helicopter); rent and utilities; online subscriptions for key services; strategic meetings and consultations; training materials; education and public awareness; and reporting.Thus, the policy states that the EAG Reserve will be primarily governed by the maintenance of USD$60,095.45 (XCD$161,055.80) which will be used exclusively for core operational shortfalls. Once any portion of the reserves are used, then specific focus must be placed on replenishment. Despite having these financial policies being developed, the EAG, to date, has been unable to achieve these targets and reduce its donor dependency or generate sufficient unrestricted funding for the EAG Reserve.

As the EAG's conservation programmes are expanding and evolving from conservation to protected area management, more personnel are required to conduct the day-to-day operations of the organization. The EAG is currently at its largest staff complement of 8 individuals (3 staff hired since Financial Sustainability Policies created) and plan to expand

further by hiring 3 additional staff by the end of 2023. Thus, with the increased staff, management and operational costs and guided by the recommendations of the EAG's Financial Policies, there is an immediate need to develop a sustainable financing mechanism for the EAG to reduce donor dependency and generate unrestricted funding for the co-management of the NEMMA and Redonda KBAs.

Finally, EAG is an important organisation in the fabric of environmental management in Antigua and Barbuda, having been at the forefront of this work for over 30 years. Within this role, the EAG has contributed to nearly all data collected on the natural environment in Antigua and Barbuda, which is then used by the Government of Antigua and Barbuda in its reporting under Multilateral Environmental Agreements. It therefore means that the baseline for environmental management, and the furtherance of the same, is dependent on the continued work of the EAG and its core programmes. The EAG must therefore be able to execute its work without spending considerable time in the development and management of projects, but should be able to manage any shortfall lost through the lack of consistent donor funding.

Component 2: Through the completion of a Financial Feasibility Study, determine the financial viability of the Offshore Islands Nature Reserve for co-management of priority areas within the NEMMA KBA (2024)

Problem the project seeks to address: Environmentalists in Antigua and Barbuda have not been able to demonstrate a clear connection between ecology and economic benefit. Because of this mismatch, developmental pressures outweigh conservation considerations, and the government often does not demonstrate an understanding that the two principles can work in harmony. The NEMMA, as the largest marine reserve, must demonstrate economic benefit to the government, landowners, communities, tour operators and other users within the space, while allowing for continued natural resources management.

The EAG has successfully implemented the OICP through public-private partnership or co-management for just over 25 years within the NEMMA. This program has been implemented through a partnership with relevant government agencies, international NGOs, landowners, and tour operators, who have maintained vested interest for the duration of the program. The partnership is focused on the conservation priorities for the area and the ways that the varying agencies either benefit from the conservation action, or can add value to its implementation.

The NEMMA encompasses almost 10,475 hectares and is the country's largest legally protected area. The offshore islands and their surrounding seas within the NEMMA are of high conservation, tourism, and research significance nationally, and are globally recognized as an Alliance for Zero Extinction Site, an Important Bird and Biodiversity Area (AG006) and a CEPF Key Biodiversity Area. Many are home to threatened wildlife such as the Vulnerable West Indian Whistling-duck (Dendrocygna arborea), the CR Hawksbill Turtle (Eretmochelys imbricata), Elkhorn Coral (Acropora palmata) and the entire population of the CR Antiguan Racer (Alsophis antiguae) - the country's sole endemic snake.
The NEMMA includes diverse marine and terrestrial ecosystems including sandy beaches, fringing coral reefs, seagrass beds, mangrove wetlands and coastal lowland dry forest. Their importance is exemplified through the range of services they provide, including: improvement of water quality by trapping pollutants and sediments from agricultural runoff; sustenance of

local fisheries by providing foraging and spawning grounds for several commercially important species (e.g. EN Nassau Grouper, Caribbean Spiny Lobster); provision of sustainable livelihoods in fisheries, aquaculture, and tourism; prevention of flooding and erosion by absorbing floodwater and stabilizing shorelines; mitigation of climate change impacts by acting as carbon sinks; and reduction of impact from natural disasters by acting as the first line of defense to local communities. Natural marine ecosystems such as coral reefs, mangrove swamps, and coastal wetlands, maintained within protected areas, are recognized as being pivotal in strengthening climate resilience. This is of critical importance for the NEMMA as most hurricanes affect the North Eastern side of the island first, making it an extremely vulnerable area spanning 22 communities (~12% of the population).
The EAG has worked in the NEMMA since 1995 with a specific focus on the Antiguan Racer, and has done restoration work through the removal of invasive mammalian species (specifically black rats and mongooses) on fifteen offshore islands. A significant impact of this removal are the long-term indirect positive effects on non-target species such as the:
Golden Talinum (Talinum cf. fruticosum,KBA endemic, VU),
Lignum Vitae (Guaiacum officinale) (regional endemic, EN)
Hawksbill Turtle (Eretmochelys imbricata, CR),
Green Turtle (Chelonia mydas,EN),
Leatherback Turtle (Dermochelys coriacea,VU),
West Indian Whistling Duck (Dendrocygna arborea, regional endemic, VU),
White-crowned Pigeon (Patagioenas leucocephala, regional endemic, NT),
Antiguan Ground Lizard (Pholidoscelis griswoldi,national endemic, qualifies as EN),
Antiguan Spotted Anole (Anolis leachii, national endemic), and
Caribbean Brown Pelican (Pelicanus occidentalis regional endemic, West Indian populations listed as EN)

This acknowledgement has led to a more holistic approach to the offshore islands of conservation interest within the NEMMA, as the survival of the Antiguan Racer is dependent upon a flourishing habitat that provides adequate shelter and food for the species. It is within these parameters, therefore, that the OICP has been functioning. Now there is a need to revisit the implementation of the program within the NEMMA because of persistent human and environmental pressures, which may have an adverse impact on the on-going conservation efforts, if not managed effectively and sustainably moving forward.
In 2016, the Government of Antigua and Barbuda granted a company legislative right to develop a Special Economic Zone (SEZ)in the heart of the NEMMA, whose operations had no environmental sustainable responsibilities built into it, which was noted as a challenge in the previous CEPF grant. Concerns were raised that the development would have an impact on the conservation work done in the area over the past two decades by the OICP, with specific threats being levered at the threatened wildlife populations found within the area. The entire global population of the Antiguan Racer is limited to four offshore islands within the NEMMA, and one of these is slated for development under the SEZ.
The NEMMA was officially declared a marine reserve in 2005 under the 1983 Fisheries Act (Cap 173, Section 22), and is currently under the remit of the Fisheries Division. Despite having a 2007-2010 management plan drafted, and the appointment of a NEMMA Manager, the plan was never implemented. The area is presently under-managed, posing a significant threat to the vulnerable species and habitats that are found there and to the diverse ecosystem services the area provides.
Despite the tangible evidence of the impact of EAG's conservation efforts within the NEMMA, pressures such as habitat degradation for development, and invasive alien species continue

to threaten these fragile offshore island ecosystems. These factors have always posed a threat to the NEMMA, but their impacts are now compounded by the joint biodiversity and climate crises which bring additional effects (e.g. drought stress, increasing warm temperatures) that threaten species survival and necessitates an adaptive management approach. Additionally, the NEMMA's large size and mixed-use nature have resulted in weak enforcement and reduced protected area management, which compounds the effects of the harmful activities taking place within the area.

Challenges of this nature are not unique to Antigua and Barbuda alone, and the burden to demonstrate value beyond the obvious, short term/immediate economic benefit often lays heavily upon environmentalists. Understanding this, the EAG's approach to tackle this as a public-private partnership will create buy-in from the many stakeholders within that space, as solutions are found to address the real problems of economic and environmental sustainability. Through the support of landowners and technicians within the government, there is significant potential for this to be an innovative solution to a considerable challenge.

To reduce the likelihood of these factors negatively impacting the vital work being done to conserve the CR endemic Antiguan Racer and its associated habitats, the EAG is proposing the development of the Offshore Islands Nature Reserve (OSI Nature Reserve). This partnership will differ from the existing OICP partnership as it will include the legal parameters for the management of the OSI Nature Reserve, and will have a targeted approach to developing economic outputs and not just conservation ones.

In August 2022, EAG conducted a Technical Feasibility Study for the development of the OSI Nature Reserve. The objective of this study was to determine the design and implementation of a new public-private partnership and the mechanisms needed to ensure the success of the OSI Nature Reserve. The feasibility of this project was guided by literature reviews, site assessments, stakeholder consultations (using survey instruments, namely semi-structured interviews and questionnaires) and a rapid willingness- to-pay study. The Technical Feasibility Study highlighted the findings of a Situational Analysis which identified six main user activities in the NEMMA. Following consultations,the stakeholder assessment concluded that several stakeholder groups will support the OSI Nature Reserve and the EAG as the lead management agency in the implementation of this project.

The study considered the overall implementation of the OSI Nature Reserve inclusive of sociocultural, ecological, legislative, institutional and financial criteria; and further identified challenges, risks and appropriate strategies for balancing ecological, sociocultural and economic objectives. The study concluded that the OSI Nature Reserve is feasible, however, not in the short to medium-term and outlines a seven-year implementation pathway toward the designation and effective management of the OSI Nature Reserve.

This feasibility study, funded by the Linbury Trust, therefore lays the foundation for the development of a plan to manage areas within the NEMMA of conservation significance. Some of the work to be implemented that was identified in the Technical Feasibility Study has already received funding support through the Linbury Trust, however the scope of the Technical Feasibility Study does not include how to generate income from the activities within the OSI Nature Reserve, or how those activities will lead to the sustainable management of the area, while supporting sustainable livelihoods and overall economic benefit. This is a critical component that needs to be developed. There is great need to demonstrate that the economy and the natural environment can coexist in harmony in the NEMMA despite the existing developmental pressures.

As such, the lack of a Financial Feasibility Study is a significant gap that must address and identify the pathways for sustainable financing within the Reserve. This project will therefore be integral in completing this component.

To further support the continued work of the EAG, specifically the OICP, there is a need to develop other sustainable financing options that reduce donor dependence. In June 2021 EAG, with support from Fauna & Flora International (FFI), conducted a Strategic Financial Planning session which indicated that EAG's donor dependency is 98%, which means that for every dollar spent, 98 cents is derived from donor funding. This dependence means that significant technical resources are assigned to grant writing and reporting, which both limits the scope of work that can be done, but also puts considerable strain on all team members to meet donor requirements. Further, sustainable financing options that are recommended for an environmental NGO are often tourism-related and this requires additional skill and training. Financing options must therefore be developed for the EAG that provide for cohesion within the existing work plan, with high economic returns for it to be worthwhile. Understanding not only the needs of the organisation and the requirements under the scope of sustainable financing, and options that exist regionally and internationally for similar organisations, will help the EAG to develop a program that can be implemented in the NEMMA. Not only is this necessary for the sustainable management of the EAG, but it is also important as it will again demonstrate that there can be positive connections between economic and ecological activity.

Component 3: Strengthen conservation management of the CR Antiguan Racer, CR Redonda Ground Lizard, and CR Redonda Anole in the NEMMA and Redonda KBAs through the development and implementation of species-specific Conservation Action Plans (2023-2024)

Problem the project seeks to address: Climate change has dramatically impacted the projections for humans because of the ecosystems and biodiversity it will affect. This needs to be reflected in plans for the conservation of CR EN species in the NEMMA and Redonda KBAs. Conservation Action Plans need to be developed and programmed into the work of the EAG so that management of CR EN species is appropriately considered.

The CR EN Antiguan Racer once existed all over Antigua and Barbuda. However, it suffered from relentless predation by harmful invasive rats and mongooses, which were introduced to Antigua and Barbuda during colonial times. Ravaged by the predation pressure and far from its original numbers and range, a mere 50 individuals were discovered by locals in 1995 on Great Bird Island, which is 8.4 hectares in size. Through the work of the Antiguan Racer Conservation Project, which later expanded its scope to become the Offshore Islands Conservation Programme (OICP), there was a significant increase in the Racers' population through the removal of these invasive mammalian predators and its range has been expanded through reintroductions on three other offshore islands. While the EAG continues to conduct regular wildlife monitoring and biosecurity checks on these priority islands, the threats to the Racers' survival are a consistent issue to be managed, and are further exacerbated by development pressures on the offshore islands.

Racer work across the Caribbean has been identified as an important next step for conservation, and the EAG has welcomed the collaboration potential with the Re:wild and FFI project proposal (CEPF 112943) to support the development of Conservation Action Plans for threatened species in the region. The Antiguan Racer Conservation Action Plan (ARCAP) will determine the conservation efforts necessary for the Antiguan Racer and will be further supported by the data obtained from the rapid survey that focuses on this keystone species this summer. Previous reports on the Antiguan Racer noted that in order for its population to expand, there is urgent need to find suitable islands with appropriate habitat and resources for reintroduction. Notably, despite its recovery in numbers, the population is still classified

as Critically Endangered on the IUCN Red List, due to its limited geographic range (~62 hectares). To ensure long-term viability of the population, and genetic diversity, investigating areas with appropriate habitat and resource needs and absence of invasive mammalian predators is a crucial step.

There are significant gaps in the data on the status of the Antiguan Racer across all four islands (Great Bird, Rabbit, Green, York) that it inhabits. A rapid census of the Antiguan Racer population was last completed in 2015, but only focused on three of the offshore islands where it can be found. This census indicated that the population had grown from the initial 50 individuals on one island to approximately 1200 individuals distributed over 62.53 hectares of invasive mammal-free habitat. In 2021, during the eradication of black rats from Green Island, the eradication team captured 106 individual snakes; of which only one of these had been tagged/processed since 2015, prior to the eradication. Recognizing that (1) surveys have been inconsistent over the past 8 years; (2) that the islands are facing increasing development pressure, and (3) the increased volumes of human traffic to these areas post-pandemic, there is therefore an urgent need to assess the population size, determine the carrying capacity for the islands, and investigate areas suitable for expanding their range.This conservation work will help improve their population and fill crucial data gaps, which will have significant spin-off effects on the other threatened species that inhabit these islands.

The rapid population surveys will be carried out in the summer of 2023, over a period of 60 days and nights across the 4 islands, and will be led by a local field biologist who has had over 20 years of experience in this area, with support from the EAG's staff, field officers and volunteers. During these surveys, a mark-recapture method will be employed to estimate population size, and encounter rates on each island. A critical component of the survey will also be to build the capacity of locals to ensure that this work is sustained over generations, with a special focus on encouraging youth involvement.

The results of the survey will also have far-reaching effects as the experience built during the development of the ARCAP will result in a regional capacity-building exercise strengthening technical expertise in Caribbean nationals continuing the history of synergy and exchange across programmes. It is anticipated that fellow biologists and organisations from St. Lucia (St. Lucia National Trust/Durrell Wildlife Conservation Trust) and St. Vincent will visit the offshore islands to gain insights into the protocols being employed by the EAG. Similarly, team members from the EAG will visit these organizations to provide technical support and recommendations for the development or updating of their wildlife conservation action plans.

Further, to be able to adequately recognise trends within the population, it is necessary to conduct continued monitoring of the Antiguan Racer and other species. The previous rapid census indicated that the Antiguan Racer should be surveyed annually. This kind of continued monitoring will not only feed into the ARCAP, but will also feed into the national State of Environment Report needed for Antigua and Barbuda's reporting under the Convention of Biological Diversity. Further surveys or biodiversity monitoring necessary for the Antiguan Racer includes monitoring of lizard species, who are their main prey species. Understanding the composition and distribution of native flora in the areas where the Antiguan Racer and its prey exist is also critical as reptiles require refugia for basking and cover. These markers for the habitat of the Antiguan Racer tell the full conservation story of the Antiguan Racer, and allow for more comprehensive management of the species.

It is this recognition of habitat that must also drive the inclusion of climate change impacts into the ARCAP, especially considering that EAG Staff has already noted that when caught, some racers appear to be dehydrated. Projections for Antigua and Barbuda indicate that climate change will cause extreme weather conditions including drought, flash flooding, and intensified storms. In all the studies done nationally, the primary focus has been on the impact on humans. This is, of course, necessary, but with the development of the ARCAP, consideration must be given to the impact on critically endangered endemic species and the habitats they rely on. Hence, this will be included as a required component in the action plan.

The ARCAP, therefore, is a critical living document that will allow for the expansion of conservation work on the species and its habitat. It will provide the guidance for the long-term survival of the species and will allow for more comprehensive decision-making on this matter.

As it follows, this high calibre level of conservation management action is a necessary effort for two of the critically endangered reptile target species on Redonda and the ecosystem that supports them. The Redonda Ecosystem Reserve (RER) currently has a Management Plan that has guided the implementation of work across the 30,000 hectares of both terrestrial and marine areas and sets the framework for continued sustainable management and conservation work.

Through collaborative efforts by the EAG, the Government of Antigua and Barbuda, private sector partners, and with FFI and other international partners, Redonda was successfully eradicated and declared invasive mammalian species free in 2018, thus allowing for endemic endangered species and their habitats to thrive on the remote offshore island. Wildlife monitoring reports from 2018 to 2021 indicate a 4-fold increase in the population of the CR EN Redonda Ground Lizard (Pholidoscelis atratus), a 1-fold increase in the population of the CR EN Redonda Anole (Anolis nubilus), and 2-fold increase in the population of the critically endangered Redonda Pygmy Gecko. This success has garnered national and international interest, and, like the conservation success of the Antiguan Racer, serves as an example for replication on other islands. Incorporated into the Management Plan is a system of collaborative governance between the Government of Antigua and Barbuda and local NGOs and private sector partners. This is expected to also stand as a demonstration for future governance of protected areas in Antigua and Barbuda and showcase the successes of public-private partnerships. Indeed, the lessons learned from Redonda are an essential building block for the development of the OSI Nature Reserve in the NEMMA.

As conservation work has continued, it has been noted that there is a need for a Conservation Action Plan for the CR EN Redonda Anole and the CR EN Redonda Ameiva. Under the CEPF grant with Re:wild and FFI, the EAG's capacity will be built to draft Conservation Action Plans (CAP). Therefore, developing the CAP for the endangered endemic species on Redonda will serve as a validation tool, demonstrating the success of the work to be done for the Antiguan Racer Conservation Action Plan (ARCAP). It will also provide the necessary framework for continued monitoring and recommend areas of focus for further research and management priorities.

The Redonda CAP must include climate change considerations as a critical management tool for the Redonda Ecosystem Reserve. Beyond the general understanding of climate change impacts on the habitats of the target species, there is potential for more comprehensive

additions that will trigger management responses. These considerations must be explored and established in the management plan, which is the guiding block for the Redonda Ecosystem Reserve.

Component 4: Develop a network of committed individuals for environmental conservation within Antigua and Barbuda's KBAs through a strategic conservation capacity-building programme (2023-2026)

Problem the project seeks to address: Co-management and long term management of the NEMMA and Redonda KBAs must be inclusive of communities and resource users of these spaces. Experiential learning through invasive species and wildlife monitoring helps resource users to understand opportunities and threats within KBAs and leads to better overall management. Developing a cadre of monitors who can also later enter the environmental field as trained and skilled professionals also leads to the long term sustainability of the EAG.

The EAG has been engaging with volunteers since its inception in 1989. A key component of the ability to implement strong conservation programmes, is having a skilled, trained and dedicated group of volunteers who view the conservation activities as integral not just to the programmes, but to their personal goals and ambitions.

Since the COVID-19 pandemic, the EAG has been able to amass a total volunteer complement of 130 individuals from Antigua and Barbuda who span the three programmes (OICP, RER, and AMCP), all of whom participate in a range of monitoring activities including, landbird monitoring, shorebird monitoring, waterbird censuses, lizard counts, sea turtle patroling, invasive species monitoring, among others. For each species or type of activity that these volunteers engage in, the EAG offers a combined set of trainings that include in-class skills development, followed by in-field training. Volunteers are then deployed to conduct monitoring, working with team leads who are either EAG staff or more experienced volunteers.

As a result of these trainings and a more consistent means for volunteers to become involved, the following has occurred:
EAG has a consistent set of volunteers who can be called upon to conduct invasive species monitoring on the offshore islands and Redonda;
Some volunteers have led birding tours and been able to provide the EAG with a small sum of money, while receiving a stipend for their efforts, therefore supporting sustainable livelihoods amongst the volunteers;
Volunteers have developed their own birding club, called the Wadadli Warblers. In 2023, the Wadadli Warblers completed their first project which included erecting signs at important sites for shorebirds to educate the wider society about species of shorebirds, and discourage illegal dumping;
Two sea turtle volunteers attended the International Sea Turtle Symposium in Cartagena, Columbia in March 2023, presenting on their monitoring efforts completed in 2022;
Five volunteers who have served as team leaders for bird monitoring, invasive species monitoring, and turtle monitoring, have been elected to serve as members of the Board of Directors; and on the Board they have served in executive positions including President, Vice President, and Treasurer. While serving on the Board, they have used their circle of influence to affect positive change for the organisation.

All of this volunteer work has proven to be both necessary for the sustainability of the organisation, and important for the development of a cadre of individuals who can use their knowledge to improve EAG's accessibility and proximity to areas of influence. Despite that, however, there is no fixed structure for these volunteers. Volunteers have no formal commitment to the organisation, nor is there a clear system for their acknowledgement or retention. EAG, recognising that visits to Redonda by the ordinary man, are beyond the financial capabilities of most, has used the chance to "earn a trip to Redonda '' as a means to encourage volunteers to participate in monitoring efforts on the offshore islands. However, this has no clear guidelines for number of hours completed on the offshore islands, nor competency required to be "graduated" to Redonda, where the stakes for error are far higher than the NEMMA KBA.

This component therefore seeks to formalise the structure of the volunteers, dubbing them as Offshore Islands Guardians who will undergo a set of skills training, complete a certain number of hours of field work, and be able to demonstrate competencies in specific areas. As the volunteers demonstrate skill and capability they will then graduate to clearly identified and transparent means of rewards within the organisation. One of these that will be offered under the scope of this project will be an exchange trip to another Caribbean NGO, who may be conducting Racer surveys or undergoing eradication of an island.

The Offshore Islands Guardian Progamme is expected to ensure the sustainability of the EAG and provide a consistent set of volunteers to assist with monitoring efforts. It should also raise the environmental awareness of these volunteers, providing them with the tools to better advocate on behalf of the natural environment, serving as stewards in Antigua and Barbuda.

This project activity will cover approximately 40% of the costs of invasive species monitoring and some of the wildlife monitoring expected to be completed. It is expected that the funds generated through the Sustainable Financing Unit, developed under Component 1, will support the fees associated with this activity beyond the life of the project.

Project Approach

We will address the conservation needs identified above in the rationale through the completion of four main objectives:

**Component 1: Develop Sustainable Financing Mechanism for the EAG to facilitate effective co-management of the NEMMA KBA and the Redonda KBA**

Strengthening the financial sustainability of the EAG is the focus of this component, and will investigate innovative solutions to reduce donor dependency, cover recurrent monitoring costs, manage risks, and fill the EAG’s Reserve. Approximately 20% of this grant is allocated for determining appropriate sustainable financing opportunities to strengthen the EAG’s ability to effectively manage Antigua and Barbuda’s KBAs. The outcomes of this component include developing and trialing a suite of ecotourism packages for the 2023 Winter Tourism Season for the NEMMA and Redonda KBAs through the EAG Sustainable Financing Unit (Deliverable 1.1); Strengthening these packages by completing a Revenue Generation Assessment (Deliverable 1.2) and ultimately strengthening the EAG’s co-management of NEMMA and Redonda KBAs through the development of a Financial Sustainability Plan for EAG in

collaboration with FFI (Deliverable 1.3). These deliverables will be achieved through the completion of the following activities:

### *1.1.1: Develop TOR and hire a Sustainable Finance Coordinator to identify suitable sustainable financing mechanisms for the EAG to effectively co-manage the NEMMA and Redonda KBAs by May 2023*

Under this project, the EAG is desirous of creating a Sustainable Financing Unit (SFU) dedicated to reducing dependence on donors and external funding agencies; identifying opportunities to diversify unrestricted funding to cover costs associated with achieving the organization's vision, mission and core conservation programmes, and building the EAG's Financial Reserve.

This unit will be headed by the Sustainable Finance Coordinator (SFC) whose roles and responsibilities will include determining feasible sustainable financing options for the EAG, and developing robust sustainable finance elements to engage with key stakeholders including government, private sector and philanthropists to secure conservation investments for long-term sustainability of the organization. There is an existing gap in dedicated fundraising staff at the EAG, and filling this position is critical to achieving the sustainable financing mechanism. The Terms of Reference (ToR) and hiring process for the SFC will follow a standard of procedures highlighted in the EAG's Procurement Policy, and includes promotion of the open call for applications, submission of curriculum vitae and cover letter, followed by an interview for short-listed candidates. Special effort will be made to encourage applicants locally and regionally, then internationally if not Caribbean candidates are not possible. Support for the SFC's time will also be co-funded by the Linbury Trust.

### *1.1.2: Sustainable Finance Coordinator conducts market analysis of local tourism industry (scoping exercise, site visits, etc) to determine opportunities for sustainably financing the EAG within Antigua and Barbuda's KBAs by July 2023*

Antigua and Barbuda is a tourism-dependent economy, accounting for almost 50% of the country's GDP (Caribbean Development Bank). Understanding the intricacies of the local tourism industry is critical in the conception of sustainable financing opportunities for the EAG. As such, the SFC will, with support from FFI's Sustainable Tourism Advisor, conduct a market analysis of Antigua and Barbuda's tourism industry to obtain a holistic view of the existing tourism products, impacts post COVID-19, tourist interests and preferences and opportunities for the successful integration of EAG's product into the industry. This will include performing a scoping exercise including a review of relevant literature, identification of risks, investigating product registration, conducting site visits to the NEMMA and Redonda KBAs, and meeting with key stakeholders including government, tour operators, coastal communities, civil society. This market analysis will be heavily supported using data and technical expertise from the Sustainable Tourism Unit of the Ministry of Tourism, Civil Aviation, Transportation and Investment (MoT), the Antigua & Barbuda Tourism Authority (ABTA) and the Antigua & Barbuda Hotel & Tourism Association (ABHTA). The results of this market analysis will determine the viability and feasibility of EAG's sustainable financing opportunities, and the potential for ecotourism initiatives (1.1.3).

### *1.1.3: Identify fee structure for tours that includes recurring costs of transportation, human resources and contribution to conservation by September 2023*

Using the findings of the market analysis completed in (1.1.2), the SFC will create a competitively priced fee structure for the EAG's nature-based tourism product, that covers

core operational costs. This will be presented to the EAG's Board of Directors and reviewed by relevant tourism organizations.

***1.1.4: Train and deploy 5 tour guides (including Offshore Islands Guardians) to conduct tours in NEMMA and Redonda KBAs and mainland Antigua by November 2023***

The EAG, with support from the Tourist Guides of Antigua and Barbuda Association will co-facilitate an in person training workshop to 5 tour guides (3 women, 2 men). This will include a combination of classroom and field sessions covering topics including customer service and visitor care, tour guiding ethics, wildlife identification, history and culture, etc. Once training is completed, the tour guides will be positioned to conduct EAG eco-tours (1.1.5). The conservation capacity of some of these guides will also be strengthened through their participation in the Offshore Islands Guardians Programme (4.1.4). Funding for the training, including payment for the Tourist Guides of Antigua and Barbuda Association, will be covered under the Wyss Foundation grant.

***1.1.5: Develop and implement marketing plan in collaboration with the Ministry of Tourism, Antigua & Barbuda Hotel and Tourist Association and the Antigua & Barbuda Tourism Authority by September 2023***

Using targeted marketing campaigns supported by the MoT, ABTA and ABHTA, the EAG will collaboratively promote and launch its ecotourism packages for Antigua and Barbuda's 2023 Winter Tourism Season.

***1.2.1 Conduct at least 10 guided tours within the NEMMA and Redonda KBAs by June 2024***

A minimum of 10 guided tours will be conducted in the country's KBAs and mainland Antigua by the tour guides trained in Activity 1.1.4.

***1.2.1: Conduct Revenue Generation Assessment to determine ways to increase profit and meet financial targets, and prepare concept note for CEPF for refinancing by August 2024***

Once the pilot tours have been executed, a revenue generation assessment will be conducted by the SFC to evaluate performance, identify gaps, and make recommendations of corrective actions to strengthen the suite of ecotourism packages and ultimately maximise revenue results for the EAG.

***1.3.1: EAG Executive Director, Sustainable Finance Coordinator and member of the Board of Directors participate in Financial Sustainability workshop (October 2024) co-funded by FFI CEPF-113415***

***1.3.2: Develop fundraising proposal guided by recommendations made in Financial Sustainability Plan (October 2024) co-funded by FFI grant CEPF-113415***

***1.3.3: Participate in two peer-to-peer mentorship workshops (June 2025) co-funded by FFI grant CEPF-113415***

***1.3.4: Update ecotourism product business plan to include financial models shared under scope of FFI grant CEPF-113415 (Jan 2025)***

***1.3.5: Participate in 7-day field exchange trip to Dominica to observe best practices in ecotourism operations (August 2024)***

***1.3.6: Prepare Financial Sustainability Plan for co-management of Antigua and Barbuda's KBAs, presented to EAG Board (Dec 2024) supported by CEPF-113415***

This component is supported by the FFI grant CEPF-113415 and has time allocated for the EAG's Executive Director, SFC, and a member of the Board of Directors to participate in the trainings, workshops, peer to peer learning, and field exchange. This directly supports efforts identified by the RER Management Plan to explore tourism and sustainable financing options for the reserve, which is being co-funded by Wyss Foundation through technical support. The EAG has allocated specific time for the Executive Director and SFC to participate in the activities as identified by CEPF-113415.

**Component 2: Through the completion of a Financial Feasibility Study, determine the fiscal viability of the Offshore Islands Nature Reserve for co-management of priority areas within the NEMMA KBA**

Building on the strengthened financial sustainability of the EAG covered in Component 1, this component focuses on determining the economic viability of EAG managing priority areas within the NEMMA KBA. In 2022, the Offshore Islands Nature Reserve was found to be technically feasible based on desk research, site visits and stakeholder consultations but the financial feasibility of managing the area has not yet been determined. Thus, approximately 10% of this grant is allocated for determining whether the EAG's co-management approach for the Offshore Islands Nature Reserve is financially feasible. The outcomes of this component include the hiring of a Financial Consultant to conduct a Needs Assessment and Financial Feasibility Study (Deliverable 2.1); identifying target strategies and prioritize resources for sustainably financing the area (Deliverable 2.2) and determining the fiscal viability of co-managing the Offshore Islands Nature Reserve within the NEMMA KBA (Deliverable 2.3) These deliverables will be achieved through the completion of the following activities:

***2.1.1: Develop TOR and hire a Financial Consultant to complete Needs Assessment and Financial Feasibility Study for the OSI Nature Reserve (February 2024)***

Under this project, the EAG will hire a Financial Consultant with a background in economics and finance, ideally previous experience working with funding protected areas. The consultant's major outputs will be the Needs Assessment (2.2.1) and Financial Feasibility Study for the Offshore Island Nature Reserve (2.3.1). The Terms of Reference (ToR) and hiring process for the Financial Consultant will follow a standard of procedures highlighted in the EAG's Procurement Policy, and includes promotion of the open call for applications, submission of curriculum vitae and cover letter, followed by an interview for short-listed candidates. Special effort will be made to encourage applicants locally and regionally, then internationally if not Caribbean candidates are not possible.

***2.1.2: Consultant conducts site visit and stakeholder consultations in NEMMA KBA to develop cost structure for OSI Nature Reserve and identify statutory requirements for co-management (Mar - Apr 2024)***

To experience a holistic view of the financial landscape within the NEMMA KBA and gain firsthand experience of the proposed areas for the Offshore Islands Nature Reserve, the Financial Consultant will conduct a site visits, and stakeholder consultations with key

stakeholders inclusive of government departments (Ministry of Finance, Corporate Governance and Public Private Partnerships; Fisheries Division; Department of Environment; Ministry of Tourism, Civil Aviation, Transportation and Investment, etc) tour operators, island owners, NGOs, target communities (Parham, Seatons, Willikes, Freetown). The combination of these two complementary activities will give the consultant invaluable insight into the statutory requirements for co-management and the dynamics of key stakeholders in the area.

***2.2.1: Consultant conducts needs assessment to determine financial requirements for OSI Nature Reserve including identification of legal or regulatory framework, and core cost needs (Apr - May 2024)***

Using the information gained during the site visit and stakeholder consultations completed in 2.1.2, the Financial Consultant will conduct a needs assessment to identify gaps, prioritize resources and determine the legal framework needed for the successful establishment of the Offshore Islands Nature Reserve. The findings of this assessment will also feed into the development of the Financial Feasibility Study (2.3.1).

***2.3.1: Consultant facilitates validation workshop with key stakeholders (50% female 50% male) to present findings and incorporate stakeholder feedback into final version of the study (June 2024)***

The final activity under this component will take the form of a half-day validation workshop with representatives of key stakeholder groups (~50% women), facilitated by the Financial Consultant. Following a presentation on the findings of the study, stakeholders will be invited to provide feedback on the financial feasibility of the Offshore Islands Nature Reserve, which will be incorporated into the final version of this document. Once completed, this study will be presented to the EAG's Board of Directors and key government departments (Department of Environment and Fisheries Division) to make the necessary strides for the establishment of the priority area within the NEMMA KBA.

**Component 3: Strengthen conservation management of the CR Antiguan Racer, CR Redonda Ground Lizard, and CR Redonda Anole in the NEMMA and Redonda KBAs through the development and implementation of species-specific Conservation Action Plans**

Through this project, the EAG seeks to strengthen its conservation management of critically endangered reptiles in Antigua and Barbuda's KBAs. Approximately 30% of this grant is specifically allotted to achieve this goal through the completion of species action planning workshops, field surveys, technical reports and strategic communication. The outcomes of this component firstly focus on the NEMMA KBA, and include: collaboratively developing a climate change-inclusive Conservation Action Plan for the CR Antiguan Racer (Deliverable 3.1); producing a technical report on the findings of the CR Antiguan Racer population surveys across 4 offshore islands (Deliverable 3.2); developing and implementing a communication strategy to raise awareness about the CR Antiguan Racer and the NEMMA KBA to target audiences using strategic communication tactics and key messengers (Deliverable 3.3); and implementing the Conservation Action Plan for the CR Antiguan Racer on priority islands within the NEMMA KBA (Deliverable 3.4). Within the Redonda KBA, the outcomes include: developing and implementing climate change-inclusive Conservation Action Plans for the CR Redonda Ground Lizard and the CR Redonda Anole under the Redonda Ecosystem Reserve Management Plan (Deliverable 3.5); producing a technical report on the findings of CR Redonda Lizards population surveys (Deliverable 3.6); and developing and implementing a communication

strategy to raise awareness about the CR Redonda Ground Lizard, CR Redonda Anole and the Redonda KBA to target audiences using strategic communication tactics and key messengers (Deliverable 3.7).These deliverables will be achieved through the completion of the following activities:

### *3.1.1: Co-facilitate CR Antiguan Racer Action Planning Workshop with Re:Wild and FFI (supported by Grant #112943) with 10-20 key stakeholders (approx. 50% female, 50% male) by June 2023*

The EAG will invite key stakeholders (~50% women) to participate in a 2-day action planning workshop for the CR Antiguan Racer (*Alsophis antiguae*) including members of the OICP Partnership, tour operators, landowners, volunteers, herpetological experts and other stakeholders with a vested interest in the conservation of the species and the NEMMA KBA (ReWild, FFI, Durrell). This workshop will be co-facilitated by Re:Wild and FFI who are developing a network of species-specific conservation action plans (CAPs) within the wider Caribbean region under their respective CEPF Grant. Special consideration will be made to include climate change considerations and emerging threats to snakes and other reptiles in the development of the CAP. They will be using a species action planning process similar to that used by the IUCN SSC Conservation Planning Specialist Group that have been successful in other countries including regionally in St. Lucia. This workshop will result in a draft conservation action plan for the CR Antiguan Racer which will be finalized in 3.1.2.

### *3.1.2: Finalize technical drafting of the CR Antiguan Racer CAP by core EAG staff and prioritization of recommended actions by August 2023 (CEPF 112943)*

Following the collaborative drafting of the CR Antiguan Racer Conservation Action Plan (ARCAP) in 3.1.1, the EAG's OICP Coordinator and Wildlife Officer will finalize the technical drafting of the document which outlines the recommended actions for the survival of the species in perpetuity. The findings of this year's population surveys (3.2.2) will provide up-to-date figures for the CAP, which will then be circulated for peer review by regional technical experts and international conservation organizations, before being finalized. The brief plan will cover a five - ten year timeframe, and the action points will be ranked on a scale from high to low priority as a means to implement at least one of the top priority actions for increasing the Antiguan Racer conservation status. The finalized version of this document will be shared with key stakeholders and presented to the government's Technical Advisory Committee, chaired by the Department of the Environment.

### *3.1.3: Field gear and equipment purchased for fieldwork including calipers, PIT Tags, tents, notebooks by June 2023*

Under this grant, the EAG seeks to gain an up-to-date population estimate of the Antiguan Racers across the four islands they inhabit (Great Bird, Green, Rabbit, York) as described in 3.2.2. This will require the purchase of the field equipment and supplies necessary to conduct surveys; collect, analyze and store data. General camping equipment such as tents, sleeping mats, headlamps, and solar chargers will be needed for activities conducted over the 60 day period. Additionally, survey-specific equipment including PIT Tags, scanners, injecting guns, pillowcases, notebooks, calipers, spring balances and measuring tapes are essential tools for processing CR Antiguan Racers in the field subsequent to capture. This equipment will play a vital part in training Offshore Island Guardians on collecting accurate and sound data as identified in activity 3.2.1.

### *3.2.1: Hire field biologist to deliver training workshop promoted by EAG to build capacity in 15-20 volunteers (approx. 50% female, 50% male) to conduct surveys and fill critical gaps on the CR Antiguan Racer by June 2023*

The EAG's Offshore Islands Conservation Program (OICP) has been monitoring populations of the CR Antiguan Racer for decades, since 1995. With the last population trend estimated as 1200 in 2003, an updated count is an immediate need and critical activity for determining the species' current population status, conservation needs and informing management decisions in face of current and emerging threats (climate change, development, habitat loss etc) to their population and habitat. A field biologist who has been collecting data on the CR Antiguan Racer under the programme for over 15 years (Andrea Otto) will be hired based on her wealth of her technical expertise to lead these surveys and train 15-20 volunteers (~50% female) in established monitoring protocols to conduct the census of the species across its entire range.

### *3.2.2: Conduct 60 days of field surveys of the CR Antiguan Racer on Great Bird, Green, Rabbit, York islands using trained volunteers and established monitoring protocols by September 2023*

As outlined in the CR Antiguan Racer Guidelines, surveys of the four islands that the racer inhabits (Great Bird, Green, Rabbit, York) will be conducted over a span of 60 days. The methodology focuses 40 days of survey effort on one specific focus island, with 3-14 days on the other islands. These surveys will ideally be conducted in succession, and whilst the field biologist is the overall lead, EAG staff (OICP Coordinator, Wildlife Officer) will serve as island leads while she supports surveys on the other islands. Racers will be surveyed using the mark-recapture methodology used since 1995 to gain estimates of population size, composition and distribution and make comparisons to previous survey efforts. Morphological data such as head width, head length, snout-vent length, weight etc will be collected on the racers using the equipment purchased in 3.1.3 and recorded electronically using the freely available application KoBo Toolbox. This work, slated for Summer 2023, will be led by a field biologist from activity 3.2.1 and undertaken by EAG staff, volunteers from activity 3.2.2 with support from regional organizations working with Caribbean racers.

### *3.2.3: Field biologist performs technical analysis of monitoring data collected during field surveys by November 2023*

Monitoring data collected from all four islands (Great Bird, Green, Rabbit, York) will be collated, cleaned and analyzed by the field biologist to determine population size, trends and assess the current status of the racer population through determining their distribution, density and sex ratio. This data will then be added to the 1995-2023 CR Antiguan Racer Database and stored on the OICP's hard drive and EAG's Google Drive Cloud for safety.

### *3.2.4: Field biologist prepares technical report, submits for peer review by EAG team and key experts by January 2024 for submission to Department of Environment*

The field biologist will prepare a technical report of the 60-day survey period, presenting key findings, assessing the population size and trend of the CR Antiguan Racer in comparison between the previous population counts. The report will be submitted for peer review by key EAG staff (OICP Coordinator, Wildlife Officer) and by technical experts (Durrell, Re:Wild, FFI) for feedback and strengthening. The findings from the technical report will feed into the finalization of the Antiguan Racer Conservation Action Plan (3.1.2), thus strengthening management efforts. The final report will be submitted to the Department of Environment's Data Management Unit where this data will be shared with the Department of Environment's National Resource Inventory (NRI) and National Environmental Information Systems (NEIS)

and will be submitted as part of the country's obligations to multilateral environmental agreements (MEAs).

***3.3.1: EAG's Science Communications Officer develops Communication Strategy to raise awareness of the CR Antiguan Racer, the need for conservation action and the wider NEMMA KBA presented to OICP Partnership by November 2023***

As a means to effectively disseminate information, and raise awareness on conservation action, EAG's Science Communication Officer will develop a communication strategy to continue sensitizing the public about the CR Antiguan Racer and the need for enhanced management of the NEMMA KBA through the delivery of strategic messaging to engage with key stakeholders to inspire them to take action to protect racers and their habitats.

***3.3.2: Implement Communication Strategy by hiring videographer to capture visual media focused on highlighting the CR Antiguan Racer, the need for conservation action and the wider NEMMA KBA by January 2024***

A videographer will be hired to capture still photos and video content of the CR Antiguan Racer in its natural habitat and of key messengers comfortably and happily interacting with the snake. The use of digital visual media to capture the human-nature relationship will help to frame key messages around the snake, highlighting the importance of continuing to promote locally led conservation action and their long-term survival.

***3.3.3: Implement Communication Strategy by hiring graphic designer to prepare and disseminate communication products of survey findings and CAP to various stakeholder audiences for awareness raising about the CR Antiguan Racer, the need for conservation action and the wider NEMMA KBA by February 2024***

A graphic designer will be hired to create specific communication products to share key points and findings from the CAP and surveys. The graphic designer will organize information and utilize raw shots from the videographer from activity 3.3.3 in the most impactful way. This information will be shared on traditional (television, newspaper, handouts) and social media platforms including EAG's Facebook, Instagram, Twitter and LinkedIn accounts.

***3.4.1: Implement at least one recommended action identified in the CR Antiguan Racer Conservation Action Plan on priority islands within the NEMMA KBA by January 2026***

Guided by the CR Antiguan Racer Action Plan in activity 3.1.2, EAG will select at minimum one priority recommended action to be implemented in the NEMMA KBA for the benefit of the CR Antiguan Racer using technical assistance provided by Re:wild and FFI (supported by Grant #112943).

***3.5.1: Facilitate workshop for Conservation Action Plan for CR Redonda Lizards with 10-20 stakeholders (approx. 50% female, 50% male) using skills gained from Antiguan Racer CAP (Feb 2024)***

Guided by skills built and lessons learnt during the Antiguan Racer Action planning workshop in activity 3.1.1, the EAG will identify and invite key stakeholders (~ 50% women) to participate in the CR Redonda Lizards (including Redonda Ground Lizard *Pholidoscelis atratus* and the Redonda Anole *Anolis nubilus)* Conservation Action Planning workshop including relevant technical experts, members of the Redonda Ecosystem Reserve Technical Advisory

Committee (RER TAC) and relevant government agencies. Special consideration will be made to include climate considerations and emerging threats of the Redonda Ground Lizard and the Redonda Tree Anole to the CAP. This workshop will result in a draft conservation action plan for the CR Redonda Lizards which will be finalized in 3.5.2.

***3.5.2: Finalize technical drafting of the Conservation Action Plan for the CR Redonda Lizards by core EAG staff and prioritization of recommended actions (June 2024)***

Through outcomes identified in the CR Redonda Lizards action planning workshop and following the collaborative drafting of the CR Redonda Lizard Conservation Action Plan in 3.5.1, the EAG's RER Coordinator, OICP Coordinator and Wildlife Officer will finalize the technical drafting of the document and outline the recommended actions for the survival of the species in perpetuity. The brief plan will cover a five - ten year timeframe, and the action points will be ranked on a scale from high to low priority as a means to implement at least one of the top priority actions from activity 3.5.3, for increasing the Redonda Lizards conservation status. The CAP will then be circulated for peer review by the RER TAC, regional technical experts and international conservation organizations, before being finalized. This document will then be shared with key stakeholders and presented to the government's Technical Advisory Committee, chaired by the Department of the Environment.

***3.5.3: Implement at least one recommended conservation action identified from the CR Redonda Lizards Conservation Action Plan in the Redonda KBA (January 2026)***

Guided by the conservation action plan in activity 3.5.2, EAG will select at minimum one priority recommended action to be implemented in the Redonda KBA through technical assistance and guidance provided by the RER TAC members.

***3.6.1: Hire field biologist to deliver training workshop promoted by EAG to build capacity in 5-10 volunteers (approx. 40% female, 60% male) to conduct field surveys and fill gaps on the CR Redonda Lizards (Mar 2024)***

In previous wildlife monitoring trips in the Redonda KBA, there have been identified gaps in the congruence of the data collected with recent studies. To rectify this, the EAG will hire a field biologist to oversee the surveys completed in 3.6.2 and to train 5-10 volunteers (~40 % female) to build their conservation capacity in wildlife monitoring protocols and ensure there is clear understanding of the data collection methodologies. Unlike the OICP, there is no veteran biologist dedicated to the Redonda KBA and thus the Terms of Reference (ToR) and hiring process for the Field Biologist will follow a standard of procedures highlighted in the EAG's Procurement Policy, and includes promotion of the open call for applications, submission of curriculum vitae and cover letter, followed by an interview for short-listed candidates. Special effort will be made to encourage applicants locally and regionally, then internationally if not Caribbean candidates are not possible. As Redonda continues to recover and vegetation cover increases, survey methods used pre-removal of the invasive species will need to be updated to reflect changes in the environment, and this will be a key deliverable of the field biologist. This ensures that good and sound data are being collected. The training workshop will also serve as a great opportunity to update EAG staff and volunteers on the appropriate data collection techniques.

***3.6.2: Conduct survey of the CR Redonda Lizards in the Redonda KBA using trained volunteers and established monitoring protocols (Apr 2024) (Fully funded by WYSS Foundation project)***

Wildlife monitoring data on Redonda are collected on an annual basis over a 5-day period, one of the monitoring activities include point counts of the Redonda Ground Lizard and Redonda Tree Anole.The survey of the CR Redonda Lizards on Redonda will be led by the field biologist with support from EAG staff and volunteers. The field biologist will ensure that data is being collected efficiently and effectively each day during the Redonda wildlife monitoring trip and rectify any issues that may arise with incorrect data collection. This will ensure that during the technical analysis of the monitoring data in activity 3.6.3 that their is comparability to data collected in previous years (2012-2023).This survey is scheduled for early April 2024 and will be fully funded by the WYSS Foundation Project.

***3.6.3: Technical analysis of monitoring data collected during field surveys by field biologist by June 2024***

Monitoring data collected over the 5-day monitoring period will be collated, cleaned and analyzed by the field biologist to plot trends and assess the current status of the CR Redonda Lizard population through determining their distribution and density on the island. As well as to identify any climate stressors threatening the viability of the population.This data will then be added to the 2012-2023 CR Redonda Lizard Database and stored on the EAG's hard drive and Google Drive Cloud for safety.

***3.6.4: Field biologist prepares technical report, submits for peer review by EAG team and key experts by September 2024 for submission to Department of Environment***

The field biologist will prepare a technical report of the 5- day survey, presenting key findings assessing the population size and trend of the CR Redonda Lizards in comparison to previous point counts.The report will be submitted for peer review by key EAG staff (RER Coordinator and Wildlife Officer) and by technical experts (RER TAC) for feedback and strengthening. The findings from the technical report will feed into the finalization of the Redonda Lizards Conservation Action Plan (3.5.2), thus strengthening management and conservation efforts of the Redonda Ecosystem Reserve and its management plan. The final report will be submitted to the Department of Environment's Data Management Unit where this data will be shared with the Department of Environment's National Resource Inventory (NRI) and National Environmental Information Systems (NEIS) and will be submitted as part of the country's obligations to multilateral environmental agreements (MEAs).

***3.7.1: EAG's Science Communications Officer develops Communication Strategy to raise awareness of the CR Redonda Lizards, the need for conservation action and the wider Redonda KBA presented to RERTAC by October 2024***

As a means to effectively disseminate information, and raise awareness on conservation action, EAG will develop a communication plan to continue sensitizing the public on the conservation value of the CR Redonda Tree Lizards and heightened management of the Redonda KBA. This plan will focus on delivering strategic messaging to engage with key stakeholders to inspire them to take action to ensure that Redonda remains invasive alien species free, preserving the habitat of the CR Redonda Lizards.

***3.7.2: Implement Communication Strategy by hiring graphic designer to prepare communication products of survey findings and CAP to various stakeholder audiences for awareness raising about the CR Redonda Lizards, the need for conservation action and the Redonda KBA by December 2024***

A graphic designer will be hired to create target specific communication products to share key points and findings from the CR Redonda Lizards CAP and surveys in activity 3.7.3. The graphic designer will organize information and utilize raw images captured from previous trips in the most impactful way.

***3.7.3: EAG implements Communication Strategy through dissemination of communication products using key messengers to engage target stakeholder audiences for awareness raising about the CR Redonda Lizards, the need for conservation action and the Redonda KBA until project end***

Communication products created by the graphic designer in activity 3.7.3 will be shared on traditional (television and newspaper) and social media platforms including EAG's Facebook, Instagram, Twitter and LinkedIn accounts. The use of digital visual media to capture the human-nature relationship will help to frame key messages around the CR Redonda Lizards, highlighting the importance of promoting locally led conservation action and the long term survival of these critically endangered endemic lizard species living on island nearly one mile long.

**Component 4: Develop a network of committed individuals for environmental conservation within Antigua and Barbuda's KBAs through a strategic conservation capacity-building programme.**

The fourth and final core component of this project seeks to complement the work completed under the previous components by creating a cadre of trained conservation practitioners equipped with technical and field expertise to participate in the decision-making process for EAG's co-management of the NEMMA and Redonda KBAs. Approximately 30% of this grant is allocated for conservation capacity-building of Antiguans and Barbudans through the development of the Offshore Islands Guardians Programme which will use a specially curated curriculum to equip participants (~50% female) with the required skills for the execution of core wildlife and invasive species monitoring activities within the NEMMA and Redonda KBAs. The outcomes of this component include collaboratively developing and implementing a programme for the EAG's network of committed environmental conservationists focused on established monitoring protocols (Deliverable 4.1); increasing capacity for Antiguans and Barbudans to implement conservation actions in KBAs (Deliverable 4.2) and creating a cadre of high calibre individuals incentivised and empowered to effectively participate in the decision-making process for co-management of the NEMMA and Redonda KBAs (Deliverable 4.3). These deliverables will be achieved through the completion of the following activities:

***4.1.1 Hire consultant to develop curriculum for Offshore Islands Guardian Programme inclusive of theory and practical assessments to track volunteer knowledge, commitment and skill-level during the life of the programme (Apr 2024)***

The EAG is supported by a strong volunteer base, with raising awareness being a core part of the conservation work we do. Our volunteers are heavily engaged in citizen science, attending numerous training sessions to build their capacity to conduct monitoring on the offshore islands and on the mainland. As a means to empower them and advance their skills in conservation, a consultant will be hired to curate a curriculum for structured volunteer monitoring called the Offshore Islands Guardian Programme. This programme will consist of theory (in-classroom sessions) and field sessions (NEMMA and Redonda KBAs) covering various topics such as invasive species monitoring, bird and reptile counts, etc. To assess their level of comprehension, there will be practical assessments and skill level testing.

***4.1.2 Consultant creates point-based rewards system for Offshore Islands Guardians based on completion of specific targets within the curriculum to celebrate achievements and maximise participant retention (Apr 2024 - March 2026)***

To monitor the progress of the Offshore Islands Guardians, the consultant will create a point-based reward system to track the completion of specific targets such as the number of hours spent completing invasive species monitoring on the offshore islands with the NEMMA KBA. An Offshore Island Guardian may need to complete a specific number of hours (e.g. 45) of IAS monitoring in the NEMMA KBA and pass the required theory component before being afforded the opportunity to conduct IAS monitoring on Redonda. The point-based reward system will also feed into Offshore Islands Guardians being publicly recognized for their achievement, receiving badges for completing core components and certificates as a means of positive reinforcement to continue on in the programme. This will also support the coalition of the Offshore Island Guardians as a means of tracking their effort and time in activity 4.2.2.

***4.1.3 Consultant facilitate conceptualisation workshop with EAG staff and Board, OICP Partnership, RER TAC, and existing volunteers to determine key outputs and framework for the Offshore Islands Guardian Programme (May 2024)***

The consultant will facilitate a participatory workshop with EAG core staff, the Board of Directors, existing volunteers and EAG core programme partners such as the OICP Partnership and the RER TAC to present the framework of the Offshore Islands Guardian Programme. They will present on the draft curriculum from activity 4.1.1 and the point-based rewards system from 4.1.2 to receive feedback, strengthen the objective of the programme, determine the outputs and use the opportunity to fill any gaps with the input from the technical experts.

***4.1.4 Promote and deliver Offshore Islands Guardian training workshops to build conservation capacity in 30 participants (~50% male; 50% female) using curriculum developed (June 2025)***

Following the conceptualisation workshop completed in 4.1.3, the Curriculum Consultant will co-facilitate training workshops for the Offshore Islands Guardians, supported by EAG staff. Using the curated curriculum developed in 4.1.1, these 8 workshops (5 covered under this grant) will cover specific topics to build conservation capacity of the Guardians over the 1 year period, and will include themes outlined in the EAG's Wildlife Monitoring Protocols and Biosecurity Training Toolkit.

***4.2.1 Deploy 30 Offshore Islands Guardians in the NEMMA and Redonda KBAs to conduct invasive species and wildlife monitoring over 12 month period by June 2025***

This activity will focus on the Offshore Islands Guardians using the skills gained during the training workshops (4.1.4) to conduct invasive species and wildlife monitoring on 11 offshore islands within the NEMMA KBA (Codrington, Galley Major, Galley Minor, Great Bird, Green, Guardhouse, Rabbit, Redhead, Lobster, Lobster Extension, York) and the Redonda KBA. Based on their performance and completion of specific activities over the 1 year period, the Offshore Islands Guardians will be incentivized through the rewards programme established in 4.1.2.

***4.2.2 Collate monthly records of Offshore Islands Guardian monitoring activities to confirm validity of collected data, and track participant effort and skill over the 12 month period by June 2025***

The EAG's Invasive Species Officer and Wildlife Officer currently verify collected wildlife and invasive species monitoring data using an online application called KoBo Toolbox. To validate the data being collected by the Offshore Islands Guardians (4.2.1), the EAG Officers will compile and collate monthly records (Excel Sheets) of participants' contribution over the 1 year period using the app. This data will be annually shared with the Department of Environment's National Resource Inventory (NRI) and National Environmental Information Systems (NEIS) and will be submitted as part of the country's obligations to multilateral environmental agreements (MEAs).

***4.3.1 Based on results of the rewards system, execute at least one island-exchange for an Offshore Islands Guardian within the NGO network developed under the Species Conservation Action Planning (Component 3) by March 2026***

As part of the complementary regional grant proposals submitted to CEPF by Re:Wild (113415), FFI (112943) and Durrell Wildlife Conservation Trust (112857), there is an identified synergistic need to build a regional network of conservation professionals within the Caribbean. Through this activity, the EAG seeks to meaningfully contribute to this network by selecting the highest performing Offshore Island Guardian to participate in a week-long skills exchange with one of the participating NGOs. During this trip, the selected Offshore Islands Guardian will share their skills and knowledge with the staff/volunteers of the participating NGO and strengthen their capacity based on that NGO's expertise. Once the exchange is completed, the Offshore Islands Guardian will present to the EAG Staff and Board of Directors about the outcomes of the trip.

**8. Date of preparation of this document.**

31 March 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.**

Rats and other invasive species continue to pose a threat to our offshore islands. Green Island was reinvaded by black rats in 2016, and a full-scale eradication was needed to eliminate this threat. Codrington Island experienced incursions of mongooses in 2020 and rats in 2023, both of which were eliminated before the invasives could gain a foothold on the island.

Alien invasive black rats are the biggest pest problem encountered on the offshore islands. These invasive rats were first brought to Antigua and Barbuda in the 17th century by European settlers. Rats have since gained access to the offshore islands via several means (1) Rats are good swimmers (black rats are known to swim as far as 750m and brown rats as much as 1km), and if the island is close enough to the mainland, the rats may cross to get to it. (2) Rats can float across on debris found in the water after storms. (3) Perhaps the easiest and most common way to reach the offshore islands is by coming across as stowaways in boats and in camping gear and equipment.

After eradicating rats from 13 offshore islands, a marked difference could be noticed, almost immediately, in wildlife found on rat-free islands compared to rat-infested islands. For example, having eradicated rats from Great Bird Island, the Antiguan Racer Snake population doubled in one year, from ~50 individuals to more than 100 individuals, and has steadily

increased ever since (Daltry et al., 2001, Oryx 35(2), 119–127). There are other examples as well: 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). 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 island. An even more recent example of the positive effects of removing invasive species is the dramatic recovery of Redonda after the removal of rats and goats from the island. Redonda has seen a remarkable recovery in the populations of its three endemic lizard species, the Redonda Ground Lizard, Redonda Tree Lizard, and Redonda Pygmy Gecko. It has also seen the return of avian life such as Magnificent Frigate Birds, Red-billed Tropic Birds, Red-footed Boobies, Brown Boobies and Masked Boobies. This is in addition to the dramatic recovery of the island's vegetation.

## 10.Current and proposed pest management practices.

*Current practices*

Biosecurity

Rats and other mammalian invasive species have been eradicated from seventeen islands in Antigua since 1995, and the focus of current practices on these islands is on basic biosecurity only i.e. preventing rats and other mammalian predators from reinvading these islands. Presently, there is a network of 209 bait boxes (on 11 offshore islands) affixed a few inches (2-3) off the ground on cemented PVC stands. Each bait box is supplied with 4-6 poison bait blocks (Klerat 20g sourced from Syngenta) and 1 flavoured wax or 1 chocolate resin bait. The latter two are heavily scented to lure rodents to the bait stations, are less likely to be disturbed by non-target species, and the component materials yield much clearer teeth markings thus allowing easier identification. Both the baits and the boxes are checked for any signs of rats (teeth marks, faecal matter, etc.) on a 5-weekly basis (approximately every 3 months in the case of Redonda). Bait is changed once it has degraded. If there is any indication of the presence of rats, samples (poison, flavoured wax or chocolate resin bait with tooth marks, faecal matter) are collected for confirmation, and poison bait is manually distributed in areas surrounding the bait station that yielded the incursion signs. The entire island is also checked to determine whether the incursion was an isolated incident. This exercise is done every other day until there is no longer any evidence of the presence of rats.

The EAG has continued to engage with stakeholders to educate them about the harm that invasive species can cause to our offshore islands. Under the "Preventing the COSTS of IAS in Barbados and the OECS Countries" project, the EAG developed a biosecurity training toolkit in 2022 that was utilized to carry out capacity building workshops with Mill Reef Yacht Cub staff, Mill Reef restaurant staff, and additional IAS monitoring volunteers.

*Proposed practices*

Biosecurity

Biosecurity measures on the offshore islands will continue to be implemented as outlined above.

The EAG will also partake in joint capacity building activities with Durrell Wildlife Conservation Trust 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. Other organizations that will be involved in capacity building are the St. Lucia National Trust, FFI, 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 previously mentioned 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.

In addition, the EAG plans to install signs at marinas and along public roads and other locations educating the public about the value of the offshore islands, the danger that invasive species pose to their ecosystems and livelihoods, and how they can help to prevent the spread of invasive species to the offshore islands.

The EAG also has developed a Reinvasion Prevention Plan to decrease the likelihood of invasive species being reintroduced to the offshore islands, much less being given the opportunity to establish footholds that would require full-scale eradications. Among the contingencies that will be put in place are the installation of permanent bait stations at locations on the mainland that are likely pathways for the incursion of rats on to the offshore islands, in addition to signage and educational outreach.

<u>Eradication</u>

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

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

The EAG has worked with Fauna & Flora International (FFI) and other project partners to eradicate rats on 15 offshore islands between 1995 and 2014. Since then, the EAG has carried out further eradications and now maintains regular invasive species monitoring on 11 offshore islands (~270 hectares):

-Great Bird Island
-Galley Major
-Redhead Island
-Rabbit Island
-Lobster Island

-Green Island
-York Island
-Codrington Island
-Guardhouse Island
-Redonda
-Smith Island

During the 2021 eradication of black rats on Green Island, the core eradication team of 6 consisted of 3 Antiguans and 1 regional volunteer from Grenada, denoting a shift away from the use of international personnel dominated teams for eradication work. The regional volunteer later joined the EAG as a full-time staff member and continues to be involved in IAS monitoring. The Green Island eradication was also used as an opportunity to give IAS monitoring training to other Antiguans who joined the effort at different stages during the operation. They have continued to be instrumental in executing invasive species monitoring on the offshore islands, as well as training newer volunteers.

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

The current pest management approach has been quite effective in preventing reinvasions of the offshore islands. As mentioned previously, only two incursions have been detected in the last three years, and these incursions were dealt with swiftly. However, EAG has historically had an issue with volunteer retention. 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.

EAG's capacity building with Durrell and other partners in St Lucia will help to identify gaps in and to update current biosecurity protocols. It is expected that the cross-pollination of ideas will 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 is 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 permanent bait stations on Antigua and Barbuda's offshore islands. These bait boxes are in turn secured to PVC pipes affixed 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.

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.

The use of these methods is in line with best management practices for the following reasons:

- Rodenticide remains the only effective means of completely eradicating rats from an area, and the methods used by this project have passed previous close inspections by, among others, the IUCN/SSC Invasive Species Specialist Group, Island Eradication Advisory Group and Royal Society for the Protection of Birds.
- Any planned eradications will first entail (a) a Feasibility Study, including detailed risk assessment and analysis of the options in consultation with local stakeholders, following international guidelines; and (b) A written Operational Plan, which details the methods, equipment, transport, personnel, training, logistics, timetable, etc., and discussed with local stakeholders and peer-reviewed by independent experts. All eradications also require (c) Biosecurity Program and (d) Monitoring and Evaluation Program, which will continue after the eradication is completed. Careful planning and close monitoring of the pesticide's use and effects both during and after the eradication will ensure risks to non-target species are minimized, if not removed entirely
- A low dosage is needed to kill an average sized black rat compared to the use of other forms of rodenticide. Additionally, a rat that has consumed the bait dies in a matter of a few days.

## 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.

EAG has secured an agreement through FFI by which it will source a regular supply of donated rodenticide, Brodifacoum, directly from the supplier, Syngenta. Thus, CEPF funds will not be used to acquire the rodenticide.

**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).**

The pesticide will be used in the form of Klerat™ 20g blocks.

**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 Great Bird Island (17.145, -61.724167; 8.4 ha), Galley Major (13.728293, -60.929973; 0.59 ha), Redhead Island (17.137887, -61.728349; 0.91 ha), Rabbit Island (17.136062, -61.731085; 2.14 ha), Lobster Island (17.133817, -61.729776; -0.46 ha), Codrington Island (17.102492, -61.705743; 4.48 ha), Guardhouse Island (17.101744, -61.707857; 0.68 ha), Green Island (17.070804, -61.667474; 45.19 ha), York Island (17.053336, -61.669110; 6.99 ha), Smith Island (17.041012, -61.680112; 1.22 ha), Redonda (16.935774, -62.345729; 200 ha). Great Bird, Galley Major, Rabbit, Green, York, and Smith Island are privately owned, while Redhead, Lobster, Codrington, Guardhouse, and Redonda are owned by the Government of Antigua and Barbuda.

**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 have been no non-target poisoning cases on Antigua's offshore islands since biosecurity baiting was begun in 1995.

The bait is transported in waterproof containers with tight-fitting lids (this is particularly important when moving the bait to the islands by boat).

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 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 PVC pipes filled with cement. 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. In addition, field officers are prompted by a question in the data collection form in the KoBoCollect app to remove any poison bait if it has been determined that the bait station is damaged in such a way that humans or animals can gain access to the interior without having to use a bait station key.

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 despite 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.

**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 have been 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 are 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.

Permanent bait stations are locked after each access by IAS monitors and bait station keys are returned to Invasive Species Officer, Nathan Wilson. Bait supplies are stored in their original containers in the EAG's Seatons Storage Unit which is only accessible by EAG staff and 2 field officers. Bait is carried to the bait stations in waterproof, plastic containers solely used for storing the bait. Empty bait packaging containers are kept locked in the shed until proper disposal supplied by the health department collects them. Non-target wildlife is closely monitored to determine (1) if they consume the bait (2) if the bait has any adverse effects on them.

**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).

Brodifacoum remains the rodenticide of choice because:

- Brodifacoum in the form of Klerat or Talon has been approved for use in Antigua and Barbuda by the Pesticides and Toxic Chemicals Control Board. It can be freely accessed and purchased from most pest control operators on the mainland, but the EAG has the direct support of the manufacturer, Syngenta, cutting out the need to purchase the Brodifacoum locally.
- It is 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].**

The pesticide is sourced directly from the manufacturer, Syngenta.

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

Environmental Awareness Group Seatons Storage Unit, Antigua, the storage in Seatons is rented indefinitely by the Environmental Awareness Group (EAG) and houses the Brodifacoum bait as well as much of the EAG's equipment. Both the equipment and the bait will be housed in this storage facility for as long as it is rented by the EAG.

**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.**

The importation of pesticides in Antigua and Barbuda must be approved by the Pesticides and Toxic Chemicals Control Board. The project's use of the particular pesticide has been approved and supported by this Board. Brodifacoum in the form of Klerat or Talon has been approved for use in Antigua and Barbuda by the Pesticides and Toxic Chemicals Control Board. It can be freely accessed and purchased from most pest control operators on the mainland. The use of Brodifacoum was carefully thought out and found to be an extremely efficient means of detecting and controlling rats. Only target species have been affected by the use of this pesticide (monitoring of non-target species occurs throughout the life of the project). The pesticide used and the mode of application was deemed most efficient, and indeed is the most humane method available to control invasive predators. This method of predator control has been adopted by several countries throughout the world, with stricter regulations for invasive predator control than what can be found in Antigua and Barbuda.

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

EAG staff (6 in particular) have been trained in invasive species control using pesticides. In addition, the EAG has been accumulating a pool of trained volunteers that can be called upon to assist in the IAS monitoring and these volunteers have indeed been doing so since 2020.

The Environmental Awareness Group will participate in a review of the biosecurity protocols established under the last CEPF project in collaboration with Durrell and other partners in Saint Lucia to fill possible gaps.

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

The Pesticides and Toxic Chemicals Control Board regulates the importation of pesticides in Antigua and Barbuda. According to the Pesticides and Toxic Chemicals Act (2008) the rodenticide used by this project (brodifacoum) is neither a "Controlled Product" (listed in Schedule 2) nor a "Prohibited Product" (Schedule 3).

The National Solid Waste Management Authority Act (2005) requires all waste, including toxins, to be disposed of responsibly. It lists a number of agencies with responsibility for this, including our local project partners: the Environmental Awareness Group, and the Ministry of Agriculture, Lands, Housing and Environment.
The Public Health Act (1955) makes it an offence to dispose of animal carcasses in a toilet or cesspit. (Any rat carcasses found during this project will be incinerated).
Although there are regulations limiting what pesticides are imported (Brodifacoum is not on the restricted list), presently, there is no regulation in place to monitor their distribution. However, the government has recognized the importance of regularizing pesticide use and

distribution. Although no formal regulation exists on a national level to monitor distribution of pesticides, the government has signed international agreements such as the St. George's Declaration of Principles for Environmental Sustainability in the OECS1. Signatories to this declaration are cognizant of the commitment and obligation to uphold past and future regional and international agreements related to environmental protection and sustainable development.
It is important to note that the government, being a project partner is aware of the need for pest control in the offshore islands and has given EAG the mandate to carry out monitoring and control actions necessary in the offshore island KBA. Governing the actions of different project partners is a signed Memorandum of Agreement, most recently signed in 2010.

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

Training and refresher sessions will be held at least once a year to ensure that new and current volunteers are onboarded with new techniques that are instituted as the biosecurity protocol evolves. With the institution of the Offshore Islands Guardians Programme, we expect the onboarding of at least 30 volunteers during this project to carry out regular IAS monitoring in the NEMMA KBA and Redonda KBA.

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

All landowners (Fuller Family, Mill Reef Club, and the Government) have been approached and provide support. The Fuller Family has always supported the EAG's conservation efforts and has even provided support in the form of transportation for invasive species and wildlife monitoring trips to the islands they own. Mill Reef Yacht Club provided transportation for personnel and supplies during the 2021 Green Island and Smith Island eradication and has continued to provide transportation during our 5-weekly biosecurity checks, as well as for the installation of additional bait stations to shore up Green Island's defences. It was through the "Preventing the COSTS of IAS in Barbados and the OECS Countries" project that EAG, through the Department of Environment received funding to complete these two eradications. The signing of the contract was an agreement that the EAG had a mandate to carry out IAS monitoring on the offshore islands.

**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 include 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.**

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 Antigua (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.**

Pesticide handling and application:
The pesticides are handled and applied to bait stations every 5 weeks by field officers. Checks will be made by the Invasive Species Officer or Project Coordinator at least once a month to ensure that proper storage, and handling procedures are being carried out.
Bait station monitoring:
Pesticide handling and application must take place every 5 weeks during routine bait station monitoring. Bait station monitoring is a quick way to determine the presence of rats on offshore islands. During bait station checks, field officers are trained to check for indications of the presence of rats, check for the presence and condition of any non-target animals.
Wildlife monitoring:
It is extremely important to monitor both fauna and flora on islands where active conservation work is being carried out. The plants and animals are environmental indicators that greatly assist in determining the impact that invasive predator control has had. Using standardized survey methods, data collected over years of wildlife monitoring are useful to understanding the importance of maintaining rat-free islands. Wildlife monitoring most frequently done on islands where OICP actively carries out conservation activities include Landbird surveys, Seabird surveys, Vegetation surveys, Racer Snake surveys, and Lizard surveys. These are done on an almost annual basis.

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

The monitoring and supervision plan is organized by the project coordinators and the Invasive Species Officer with the consultation of project partners. Although the field officers are quite familiar with storing and handling Brodifacoum, monitoring and supervision responsibilities are covered by the project coordinator and Invasive Species Officer. Project partners also review handling and storage practices when on island. The project coordinator is equipped with sufficient knowledge to carry out the inspections, but also draws upon the knowledge of the project partners who specialize in the application of pesticides in invasive species control.

The costs of these monitoring activities will be very low as these activities will be twinned with other project activities, including but not limited to bait station monitoring and wildlife surveys.

32. **Disclosure: 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.