**SeyCCAT Project Full Proposal**

**PART 1. NARRATIVE**

1. **COVER PAGE**

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| **Title** | *Marine Biodiversity Baseline assessment around Fregate Island, the eastern most Seychelles ‘Inner’ granitic island.*  |
| **SeyCCAT Strategic Objective**  | *Strategic Objective 1* |
| **Name, contact details and status of lead applicant organisation / individual** | *Wilna Accouche**General Manager, Green Islands Foundation, Belair Road Victoria, Mahé Republic of Seychelles**+248 4288829 gm@gif.sc* |
| **Partner organizations (include country if not based in Seychelles)** | *Fregate Island Private, Seychelles**University of Seychelles/James Michel Blue Economy Research Institute, Seychelles**Coralive.org (Zurich, Switzerland)* |
| **Project location** | *Fregate Island Private, Seychelles* |
| **Duration – start and end dates** | *24 months* *Start: 01/01/2019**End: 31/12/2020* |
| **Total budget requested** | *SCR 405,000* |
| **Indicative co-financing** | *Coralive.org have agreed to co-finance up to a third of project costs (SCR138000) based on receiving a grant award from SeyCCAT.**Fregate Island Private will provide services in-kind and cash up to half of the amount of SeyCCAT awarded grant incl. travel expenses, board/lodging, IT support, and salary of contractual experts (SCR 437000)* |

1. **SUMMARY**

Fregate Island has a long conservation history for its terrestrial environment and many Seychelles endemic species are found there, including the Fregate tenebrionid beetle which is only found on this one island. It’s also home to 50% of the Seychelles magpie robin population, Seychelles warbler and Seychelles white-eye. Rats were eradicated from the island and currently the island remains rat-free, following strict biosecurity protocols to maintain that status.

Despite great success on land, the marine environment around Fregate Island is poorly understood especially in terms of the distribution of organisms within the fringe coral reef. To advance understanding of the marine life around Fregate Island, we propose a partnership between Fregate Island Private, Green Islands Foundation (GIF), Blue Economy Research Institute (BERI) and Coralive to establish a coral reef biodiversity baseline and initiate a long-term marine monitoring programme around the island. The partnership aims to create important local and international collaborations that benefit conservation of marine life around Fregate Island and in the Seychelles by identifying a critical habitat to protect and manage (Project 5, SNBSAP)

Long-term, marine ecological research programmes are needed to improve our understanding of the complex mechanisms that govern coral reef ecosystems. Information generated by a long-term marine programme at Fregate Island will help to distinguish anthropogenic change from natural variation, understand the combined effects of various stresses, predict how different parts of the reef community may be affected by environmental change, and identify activities both within and outside coral reef ecosystems that affect the survival of coral reefs.

This project proposes to collect data for an initial assessment of the coral reef assemblage and associated marine species, and assess trends over time by establishing a long-term marine monitoring program on Fregate Island comparable to the Global Coral Reef Monitoring Network (GCRMN) assessments and outcomes of the national program of marine monitoring standardized by BERI. The data will be collected through standardized marine monitoring scientific methodologies currently employed by GIF, thus, can be used to compare findings with other granitic islands. The marine monitoring will be augmented with novel spatial monitoring technologies provided by Coralive.org. The research will produce reports about the state of Fregate Island’s coral reef with more specific questions being answered through University of Seychelles Environmental Science bachelor student’s final year projects. In addition, public awareness of the threats facing coral reefs and marine conservation will be enhanced using state of the art technologies such as 3D virtual reef mosaics. Ultimately, by compiling all the research outlined in this project, we aim to provide recommendations for decisions to be made on the potential for creating an MPA around Fregate Island.

The project employs a multi-faceted approach to tackle the main objective of assessing marine life around Fregate Island. Activities will be conducted over two years from January 2019 to December 2020.

Baseline biodiversity assessment data collection methods will be carried out in year one and repeated in year two from which conclusions of the assessment will be drawn.

1. **Organizational Background and Capacity**

The Green Islands Foundation is an environmental NGO established and was legally registered under the Registration of Associations Act on the 11th April 2006 (Certificate no: A430918)

The Mission Statement of the Association is:

**“To Promote The Mainstreaming Of Sustainable Development In Seychelles.”**

The main objectives of GIF pertinent to this project are:

* To integrate biodiversity concerns into land and sea use regimes.
* To further the conservation and sustainable use of biodiversity.

Since its formation GIF has sought to develop partnerships with the private sector to enable the realization of its Mission. GIF has conceived, coordinated and implemented a range of projects with a strong marine management component. Most relevant, in the last few years, GIF has been at the forefront of expanding marine monitoring surveys with private sector establishments on Denis Island and North Island to the advancement of national conservation and sustainable use objectives.

GIF is overseen by a Board of Directors and employs 3 fulltime and 1 part-time staff complemented by volunteers for specific programmes.

Fregate Island Private (FIP) is a private luxury resort island 50km east of Mahe, Seychelles. FIP has a long-standing commitment of over 40 years funding and collaborating on environmental programmes to restore habitat and protect rare species. Currently, the island is a sanctuary for the Seychelles magpie robin, Seychelles warbler and Seychelles white-eye, along with 3500 free-roaming vulnerable Aldabra giant tortoises. Regular monitoring and research is conducted on the aforementioned species. Important collaborations with Turtle Action Group Seychelles projects include monitoring the Critically Endangered Hawksbill turtle and Green Turtles that nest on FIPs beaches. FIP is also an active member of the Seychelles Magpie Robin Recovery Team and the Billfish association. FIP is committed to improving the environment on and around Fregate Island but also Seychelles biodiversity and recently began ambitious projects with local NGOs by translocating species to other islands, for example; tortoise translocation to Aride Island and white-eye translocation to Grand Soeur. FIP regularly hosts University of Seychelles Environment Science students for their internships and BSc thesis projects, supervised on island by the conservation manager. These initiatives have been coordinated and implemented by Richard Baxter, FIPs dedicated conservation manager.

Coralive.org Founder & Director Ahmad Allahgholi has been in marine conservation since 2011, having served as a project manager for a Philippine NGO on coral reef restoration, MPA Management and alternative livelihood. He has a master’s degree in “Sustainable Natural Resource Management” with a thesis in “Coral Reef Restoration” from the United Nation’s mandated University for Peace in Costa Rica. This came right after being the program manager for the environmental NGO Reefdoctor in Madagascar. He has many years of experience developing and implementing marine projects in the Seychelles, Philippines, Caribbean, and Maldives.

The *James Michel* Blue Economy Research Institute (BERI) at the University of Seychelles is also a partner in this proposal with **Dr. Laura Blamey** being a marine ecologist with strong interests in coastal ecology, species interactions, ecosystem change, as well as ecosystem modelling and statistical ecology. She will be responsible for the involvement of the University students in the activities and assist with fieldwork where necessary.

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| Partnership members task allocation for proposed SEYCCAT project implementation |
| Title | Name | Experience (years) | Role in proposed project |
| General manager | Wilna Accouche | 18 | In charge of project administration and management including management of consultant, staff and reporting to SeyCCAT. |
| Project Manager | Mariliana Leotta | 8 | Project management, workshop organisation, data compilation, development of training and educational materials, field manager for marine monitoring team.  |
| Project Manager | Richard Baxter | 11 | Infield management of marine monitoring around Fregate Island, supervising students, assist financial reporting for SeyCCAT, data analysis.  |
| Project Consultant | Ahmad Allahgholi | 17 | Implementing underwater scanning, providing training, and coral project expertise.  |
| University Supervisor | Dr. Laura Blamey | 17 | Supervising UniSey Env Sci BSc Student projects, participation in field data collection |

1. **Project outcome, Objectives and Expected Results**

Through systematic collaborative scientific research, this project aims to improve the knowledge on the state of the marine environment around Fregate Island, with a view to implement a long-term marine monitoring protocol and ultimately create a marine protected area around Fregate Island. This would advance better management of the waters around the island, enhance public awareness, and contributing to the 2020 vision contained in the Seychelles’ Sustainable Development Strategy. Monitoring programmes are an integral part of environmental management and the results can be used as the basis for key management decisions, such as where and when limited management resources are allocated. It is essential that monitoring programmes and data analysis are scientifically robust so that management decisions are based on the most accurate information. In line with this, there are also three main scientific research and management aims in this marine assessment project:

**Objective 1:** To address the lack of knowledge of marine biodiversity around Fregate Island, by undertaking the first biodiversity assessment of coral reef species and coral species diversity around Fregate Island.

**Objective 2:** Identify composition and coral reef health through coral cover analysis of Fregate Island coral reef.

**Objective 3:** Combining data and conclusions of objective one and two to establish long-term marine monitoring program for year-on-year comparison of long-term trends in the structure of reef fish and coral communities

S**pecific outputs:**

1). A detailed first assessment of the marine biodiversity around Fregate Island focusing on fish and coral species (supporting outcomes 1a, 1b, 3, 4, 5, & 6)

2). A first large scale geo-physical and bio-physical assessment of marine around Fregate Island (Supports Outcome 2,3,4,5 & 6).

3) Development and production of long-term marine monitoring protocol for Fregate Island Conservation management. One Environmental Science BSc project thesis and poster presentation.

**Project Outcome(s):**1 a) belt transects focusing on indicator coral and fish species; 1 b) deployment Baited Remote Underwater Video Stations (BRUVs) to quantify fish species diversity, richness and mean trophic levels around Fregate Island.
2) Map and analyze coral cover to enable monitoring change over time, identify areas for coral restoration, and establishing extent of marine protected area
3). Establishment of long-term protocol for marine monitoring around Fregate Island.
4). Submission of University of Seychelles BSc in Environmental Science using data collected during project period
5) National strategic plans and commitments contained in the Seychelles' Sustainable Development Strategy
6) Increase public awareness of threats facing coral reefs

Activities: This project will build a scoping assessments carried out by GIF in April 2018 (see ANNEX 1) Throughout this scoping activity the survey sites were decided based on broad scale differences in habitat type. Sights selected will aid in drawing conclusion that are representative of the diversity of marine life around Fregate Island.

1) Bi-annual intensive marine at selected survey sites around Fregate Island. This will provide the detailed species-specific data required to develop the recommendations and baselines going forwards.

2) Map coral reef using underwater image scanning vehicle along with analysis image mosaics.

3) Combine data from activities 1 and 2 into a dataset for analysis by UniSEy students and partner research to inform on the development and implantation of a long-term marine monitoring protocol for Fregate Island.

**Expected results.**

1) Species based biodiversity indicators showing diversity of marine organisms around Fregate Island. Establish a long-term dataset to monitor conservation efforts and natural fluctuations in reef community structure over time at Frégate Island.

2) Determine benthic coverage and coral health of reef. Detect and assess any severe declines in coral reef health at Frégate Island.

3) Establishment of long-term marine monitoring to assess the resilience of the coral reefs at Frégate Island to environmental change.

**Location**: The project will be primarily undertaken on Fregate Island, the eastern most granitic inner island. No marine diversity assessments using scientific methods have been conducted around the island. Other locations include, a workshop on La Digue and partner meetings on Mahe. This project is highly comparable to other marine monitoring projects in Seychelles (Denis Island and North Island), is cost-effective and supports national marine monitoring protocol initiatives.

1. **Description of the Activities and their Effectiveness**

**Objective 1:** Two standardized quantifiable marine survey methods will be used;

1) Belt transects focusing on indicator coral and fish species; underwater visual census methods are effective in monitoring coral reef fishes, particularly in remote locations. Belt transects provide a high degree of precision and are suitable for monitoring multiple objectives and also allow for multiple passes of the transect to count different species and allow surveyors to cover a greater area for a low level of effort. This is the principle recommended fish method under Global Coral Reef Monitoring Network (GCRMN), and used by nearly 95% of monitoring programmes in the South West Indian Ocean (SWIO). Belt transects will be carried out in both years of the project by GIF and FIP between March and May when sea conditions are calm.

2) Deployment Baited Remote Underwater Video Stations (BRUVs) to quantify fish species diversity, richness and mean trophic levels around Fregate Island will be conducted by GIF and FIP. A significant change in the relative abundance and diversity of the fish community may indicate a change in threats or pressures on the ecosystem. Establishing baseline data on larger bodied fish species provides a tool to assess the current and future well-being of the fish and marine ecosystem at Frégate. The BRUV method is extensive and widely used in marine monitoring programs in Seychelles and South Africa. The benefits include, covering large areas, no divers enter the water decreasing disturbance around the BRUV, rapid deployment, large amounts of data collected on fish community assemblage and abundance, along with fish size and sex. Data collected from both these activities will be analyzed and the results will provide the assessment of coral reef fish species around Fregate Island. This data will also be used to achieve Objective 3.

**Objective 2:** To investigate the health, rugosity, and benthic assemblage of the reef around Fregate Island, a specifically designed reef mosaicking underwater vehicle (developed by Bluenomads.org) will be deployed by Coralive and FIP. Although this technology is expensive to operate, when correctly applied has proven to collect precise geo-referenced imagery of the seabed. The method considerably decreases the time taken to collect high-resolution data compared to manual surveys by divers where methods rely on extrapolation from transects rather than a continuous data source, i.e. a single continuous image mosaic of the coral reef around Fregate Island. Qualitative and quantitative survey data collected using this method includes scaled still images of megafauna, as well as biophysical and geophysical properties of the reef. The power of the method allows for repetition of surveys to identify subtle shifts in species distribution or habitat shifts. The torpedo shaped unit contains cameras taking pictures every 6 seconds synchronized to a GPS logger on the surface. The collected images are mosaicked producing a 3D coral atlas allowing for detailed photogrammetric analysis of benthic coverage.

**Objective 3:** Data collected in Objective 1 and 2 will be compiled for one (potentially two) student projects under the supervision of Dr Laura Blamey at the University of Seychelles, Blue Economy Research Institute, Environmental Science BSc. The student projects in conjunction with reporting from Objective 1 and 2 will be used to establish long-term monitoring protocol of the coral reef around Fregate Island. The questions for the projects have yet to be defined but will be once a suitable candidate is selected from the Env Sci BSc 3rd year group. Students will have access to data from both Objective 1 and 2 through a memorandum of understanding between BERI, FIP, and GIF. In addition, partners will be encouraged to initiate their own research based on the database compiled by GIF and FIP. This combination of reports, student projects, and research papers, will contribute to the formalization of a long-term monitoring plan for Fregate Island that can be compared to similar islands in the Seychelles and to protect and manage this critical habitat (Project 5, SNBSAP).

Dissemination of the project outcomes will be publically available online (social media, SeyCCat platform) and interactive through attending workshops. Finally, a workshop will be organized with an organization on La Digue to highlight the importance of coral reefs and raise awareness of the threats to them both nationally and globally.

**Note:** Project monitoring will assess progress by the sequential attainment of the indicators set out in the activity table below. Project reporting will be undertaken by the Project Manager and submitted to SeyCCAT after 6, 12 and 16 months.

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| **Project title:** *Marine Biodiversity Baseline assessment around Fregate Island, the eastern most Seychelles ‘Inner’ granitic island.*  | **Project start and end dates:** |
| *Start: 01/01/2019* |
| *End: 31/12/2020* |  |
| **Project Outcome(s):** 1 a) belt transects focusing on indicator coral and fish species; 1 b) deployment Baited Remote Underwater Video Stations (BRUVs) to quantify fish species diversity, richness and mean trophic levels around Fregate Island. 2) Map and analyze coral cover to enable monitoring change over time, identify areas for coral restoration, and establishing extent of marine protected area3) Establishment of long-term protocol for marine monitoring around Fregate Island. 4) Submission of University of Seychelles BSc in Environmental Science using data collected during project period5) National strategic plans and commitments contained in the Seychelles' Sustainable Development Strategy6) Increase public awareness of threats facing coral reefs |
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| **Specific Objective No 1**  | **Conduct initial biodiversity assessment of coral reef species around Fregate Island.** |
| **Activity** | **Responsibility for implementation** | **Timeline of activity** |
| **Year 1** | **Year 2** | **Notes** |
| **Q1** | **Q2** | **Q3** | **Q4** |
| 1.1 Organisation of project logistics / purchase equipment | GIF & FIP  | Jan-19 |   |   |   |   | Repeated in Year 2 |
| 1.2 Belt transects focusing on indicator coral and fish species | GIF & FIP  |   | Mar-19 |   |   | Mar-20 | Repeated in Year 2 |
| 1.3 Belt transect data compiled and analysis | GIF with FIP input |   |   | Sep-19 |   |   |   |
| 1.4 BRUV Deployment | FIP with GIF input | Feb-19 | Apr-19 | Jul-19 | Nov-19 |   | Single deployment per quarter |
| 1.5 BRUV Data analysis | FIP  | Mar-19 | Apr-19 | Jul-19 | Nov-19 |   |   |
| 1.6 Annual presentation and report of data analysis to partners and stakeholders  | GIF & FIP  |   |   |   | Dec-19 | Dec-20 |   |
| **List indicators for each activity:** *1.1 Project equipment sourced and acquired. 1.2 In-field data collection of coral and fish presence and abundance 1.3 Belt transect data report in year one and two. 1.4 In-field data collection with BRUV 1.5 BRUV data analysis report in year one and two 1.6 12-month data report and conclusions derived from analysis.*  |
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| **Specific Objective No 2**  | **Identify composition and coral reef health through coral cover analysis of Fregate Island coral reef.** |
| 2.1 Organising consultant and logistics for scanning equipment | FIP & Coralive | Jan-19 |   |   |   |   |   |
| 2.2 Scanning of coral cover | FIP & Coralive |   | Mar-19 |   |   |   |   |
| 2.3 Mapping of coral cover | FIP & Coralive |   | Mar-19 |   |   |   |   |
| 2.4 Report on coral cover analysis | FIP & Coralive |   |   | Analysis Sep-19 | Report Dec-19 |   |   |
| **List indicators for each activity:** *2.1 Arrangement of work permits and travel logistics for technical consultants 2.2 2D scanning of coral reef 2.3 Production of 2D geophysical and biophysical maps 2.4 Analysis report of coral cover and conclusions* |
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| **Specific Objective No 3**  | **Establish long-term marine monitoring program for year-on-year comparison of long-term trends in the structure of reef fish and coral communities**  |
| 3.1 Data compilation from Objective No. 1 & No. 2 | FIP & GIF & Coralive  |   |   |   | Dec-19 | Nov-20 |   |
| 3.2 Project proposals from BERI BSc Students | BERI with support from FIP & GIF |   |   |   | Sep-19 |   |   |
| 3.3 BSc Field Work | BERI & FIP |   |   |   | Dec-19 | Jan-20 | start and end dates |
| 3.4 BSc write up | BERI & FIP |   |   |   |   | Mar to May -20 |   |
| 3.5 Incorporate research into long-term monitoring protocol for Fregate Island - incl. Zonation of marine activities based on MSP criteria | GIF & BERI & FIP  |   |   |   |   | Nov to Dec- 20 |   |
| 3.6 Training of staff to implement long-term monitoring protocol on Fregate Island | CORALIVE, FIP & GIF |   |   |   |   | Nov to Dec- 20 |   |
| 3.7 National outreach and knowledge sharing workshop |  GIF & FIP |   |   |   |   | Oct-20 | Workshop presented on La Digue |
| **List indicators for each activity:** *3.1 All data from obj. 1 & 2 compiled into database 3.2**BSc project proposal submitted to BERI and FIP supervisors 3.3 Field work to collect further data for BSc project 3.4 BSc project thesis submitted to BERI and poster presentation 3.5 Protocol finalized including zonation of marine activities around Fregate Island 3.6 In-field training of Fregate Island conservation staff and students of marine monitoring protocol 3.7 Workshop/outreach campaign organized on La Digue - to increase awareness of marine life and meeting local fishers.* |

**F. RISKS TO SUCCESSFUL IMPLEMENTATION AND MITIGATION MEASURES**

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| **Risk/Factors** | **Risk category****(e.g. political, social, economic, technological, environmental, legal)** | **Potential level of impact****(e.g. low, medium, high)** | **Risk mitigation measures** |
| Lack of students interested/capable of undertaking BSc thesis from data | Social/technological | Medium  | Ensure that students are engaged from beginning of project. Provide necessary support in order to undertake project. Field trip to Fregate Island for UniSey students |
| Failure of coral mapping equipment | Technological  | Low  | The mapping equipment designed and engineer will be on the island to ensure smooth operation |
| Bad weather preventing data collection | Environmental | Medium - unpredictable | Select times of year known for calm seas (March and April)  |
| Diving incidents | Environmental | Low  | Experienced divers only on the project – Fregate Island has a clinic equipped to deal with dive related emergencies |

**G. EVALUATION AND INDICATORS**

Project performance will be monitored and review on a quarterly basis utilizing the indicators set out in the project activities table (table 2). Reporting to SeyCCAT utilizing the prescribed format will be submitted after 6, 12 and 18, 24 months respectively.

Project impact will be measured by the completion and conclusions drawn of objectives and SMART criteria listed in “Section D; Objectives” of this document. Assessment of the project’s impact will require production of information to guide decision-making after the funding period but initial impact in year one and year two will be measured on external stakeholder feedback, effectiveness of Fregate Island Private management decisions using the project objective activities, and implementation of a long-term marine monitoring protocol.

**H. SUSTAINABILITY AND REPLICATION**

Aligning our stated objectives with the national program of marine monitoring ensures the project can be repeated after the two year budgeted project period. The establishment of a long-term marine monitoring protocol into the overall conservation management plan of Fregate Island will ensure consecutive annual marine monitoring takes place in the future, supported by Fregate Island Private revenue. Through this long-term monitoring, we will be able to monitor and analyze trends in the data, indicating where and when changes occur, significantly improving our marine knowledge of the Seychelles.

We will use multiple indicators to reveal system state changes including fish abundance, coral bleaching/recovery, and environmental variables (sea temperature and pH). As the methods are standardized through Green Islands Foundation that operate on other islands, there is great potential to compare the coral reefs between granitic islands of the Seychelles. Fregate Island has no chemical or oil run-off, sewage discharge, or over coastal development, therefore project results have potential for acting as a control for areas that suffer from known land-based threats to coral reefs in the Seychelles.

Replication of marine monitoring and coral cover mapping will be achieved with consistent and thorough reporting of methods and results during the project. We endeavor to have a paper in preparation to be submitted towards the end of the project, possibly based on the UniSey research thesis, allowing for transparency on methods used and conclusions drawn, allowing for other marine conservation practitioners to implement comparable projects. Post-project objectives include organizations responsible for data collection returning annually or bi-annually. Regular training of Fregate Island marine staff, conservation volunteers and UniSey students will take place throughout and after the project by consultants and project leaders.