

**FULL PROPOSAL**

**INSTRUCTIONS**

**Read the following before developing your full proposal**

All proposals submitted to the fund must have as their main purpose the conservation and/or management of marine and coastal biodiversity and/or ecosystem based adaptation to climate change in the Seychelles.

Refer to the Call for Proposals to see the priorities for funding in the current round of SeyCCAT grants. Do not submit a proposal that falls outside of these identified priorities.

Do not include activities or costs that are defined as ineligible by SeyCCAT.

Proposals must be compliant with Environmental and Social Safeguards applied by SeyCCAT. Please pay particular attention to the Exclusions List.

Refer to the SeyCCAT website for information on the above: [www.seyccat.org](http://www.seyccat.org)

In the event of specific questions, contact the SeyCCAT Secretariat.

**In preparing your full proposal**

Be clear and concise; stick to the page limit (10 pages maximum).

The budget must be based on real costs (except for subsistence costs and indirect costs). It is, therefore, in the applicant’s interest to provide a realistic and cost-effective budget.

The full proposal should be provided in Font Times New Roman size 11 characters, single spacing.

**SeyCCAT Project Full Proposal**

**PART 1. NARRATIVE (Maximum 10 pages)**

1. **COVER PAGE**

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| **Title** | Assessing the effectiveness of Curieuse Marine National Park in the protection of the critical early life stages of sicklefin lemon sharks (*Negaprion acutidens*) |
| **SeyCCAT Strategic Objective – *as listed in the Request for Proposals*** | **BGF #2 Strategic Objective 1:**Support new and existing marine and coastal protected areas and sustainable use zones |
| **Name, contact details and status of lead applicant organisation / individual** | **Global Vision International (GVI) Seychelles** (est. August 2013)Contact: Christophe Mason-Parker, chris.mason-parker@gviworld.comTel: (+248) 2575770 |
| **Partner organizations (include country if not based in Seychelles)** | **Seychelles National Parks Authority**Contact: Gilberte Gendron, gilberte.gendron@gov.sc **University of Seychelles, *James Michel* Blue Economy Research Institute**Contact: Rowana Walton, [rowana.walton@unisey.ac.sc](rowana.walton%40unisey.ac.sc) |
| **Project location** | Curieuse Marine National Park, Seychelles |
| **Duration – start and end dates** | January 2019 – June 2020, 18 months |
| **Total budget requested** | SCR 550,000 |
| **Indicative co-financing** | Co-financing will be provided by GVI Seychelles in kind, through the provision of a Project Manager and project staff, boat transport and fuel for all activities, diving equipment for the installation, maintenance and retrieval of receivers, and materials for the catching of juvenile sharks. The SNPA will provide access to equipment (diving compressor) and logistical support. Both the SNPA and UniSey will provide project staff to assist with the project activities, and UniSey will also provide scientific and technical advice. Total estimated in kind financing will be to the value of SCR 550,000, with GVI Seychelles providing SCR 310,000, UniSey providing SCR 160,000 and the SNPA providing SCR 80,000. |

1. **SUMMARY (max 1 page)**

The sicklefin lemon shark (*Negaprion acutidens*; Ruppell 1835) is categorized as vulnerable (IUCN 2014), in part due to its coastal preference and consequent proximity to human activity, and it faces many threats to its continued survival. The species is fished throughout its range (Compagno 1990), and its small habitat range and limited movement patterns make it susceptible to local depletion since dispersal is limited (Stevens 1984, Stevens et al. 2000, Shultz et al. 2008). For effective protection of shark species it is important to gain an understanding of spatial movements and habitat preferences of critical life stages. The installation of an acoustic receiver array along the north and east coast of Curieuse Island, together with the acoustic tagging of 20 neonates, will enhance our knowledge of *N.acutidens* spatial ecology. Furthermore, results from this project will enable MPA practitioners to make informed future recommendations with regards to the protection of this particular species. Curieuse Marine National Park (CMNP), designated in 1979, is 2.9km2 and located north of Praslin Island and a key tourism site in the inner islands. The island is surrounded by a shallow fringing reef and seagrass beds and has a healthy stand of mangroves. These habitats serve as key sea turtle feeding and nesting grounds as well as providing nursery habitat for key ecological species such as *N. acutidens*.

The overall outcome of this project will be a greater understanding of the movements of neonate *N. acutidens* within CMNP and the efficacy of the park size in their protection. The main objectives are:

* Obtain an improved understanding of spatial behaviour and habitat use of 20 neonate *N. acutidens* within CMNP by monitoring their movements for six months using acoustic transmitters.
* Refine mark-recapture population estimates of neonate *N. acutidens* within CMNP within 18 months
* Develop local capacity by training at least 10 Seychellois stakeholders and MPA practitioners in shark research techniques by December 2019.
* Contribute to national efforts to protect biodiversity by identifying areas of critical habitat within and outside CMNP used by the threatened species, neonate *N. acutidens* within 18 months
* Provide critical habitat data to national park managers and stakeholders within CMNP and other protected areas to better inform management decisions regarding the conservation of *N.acutidens* within 18 months

Outputs will include maps showing the movement and critical habitat areas of neonate *N. acutidens* in CMNP, a training workshop for Seychellois stakeholders and students in shark research techniques, a signboard providing information on the project and a peer-reviewed scientific paper on the findings of the project. These outputs will be enabled by activities to include the installation of an acoustic receiver array and implantation of acoustic receivers in neonate *N. acutidens*, capacity building of staff and students through in-field research experience, and the production of communication materials to disseminate the key findings from the project. The rationale of the project approach is that by collecting data on the movement and habitat use of neonate *N. acutidens*, a species that is vulnerable to over-fishing, the effectiveness of CMNP in protecting the critical life stage can be assessed. There would be a wide range of beneficiaries associated with this project including SNPA, protected area managers, shark biologists, university students and local fishers. The project will operate over 18 months, with the following phases: 1) development and training; 2) implementation; and 3) assessment, monitoring and management. The project is well aligned with the objectives of the National Biodiversity Strategy and Action Plan (2015-2020) including: 1.1. To make the Seychelles population aware of the values of biodiversity and the steps they can take to conserve it; 3.2. To prevent the extinction and improve the conservation status of known threatened species, particularly those most in decline; 5.3. To improve, share, transfer and apply the knowledge, science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss. Finally, the project will contribute to the UN Sustainable Development Goal 14 to “Conserve and sustainably use the oceans, seas and marine resources for sustainable development” under sub-goal 14.2 and 14.a.

1. **Organizational Background and Capacity**

Global Vision International Seychelles (GVI Seychelles) is an NGO and was registered under the provisions of the Registration of Associations Act on 14th August 2013. The NGO is a subsidiary of GVI LTD, which had previously been operating within Seychelles since 2004. GVI Seychelles receives local and international paying volunteers who are then trained to undertake marine and terrestrial monitoring on behalf of and in association with, the Seychelles National Parks Authority (SNPA). GVI Seychelles currently operates at two sites within the Seychelles inner islands group. The Cap Ternay research base located on Mahé, has a focus on coral reef monitoring and is run by a team of seven local and international staff. On Curieuse Island, the GVI Seychelles expedition base houses four staff members, who are responsible for the running of several research projects. Between them, the two GVI Seychelles research hubs receive between 200 – 250 volunteers each year. All of GVI Seychelles’ in-country operations are overseen by GVI’s Regional Director for Africa & Europe, Christophe Mason-Parker.

Since 2004 GVI Seychelles has conducted a number of research projects in collaboration with other local organizations. The majority of GVI Seychelles research is funded by GVI Ltd through the participation of paying volunteers. The following long-term monitoring projects (amongst many others) have all been funded via this model and run in collaboration with the SNPA: Coral reef monitoring along the northwest coast of Mahé island (2004 – present), Baited Remote Underwater Video surveys of predatory fish and megafauna (Curieuse Island) 2017 – present, Neonate Sicklefin lemon shark research: growth rate, population size and composition research (Curieuse Island) 2014 – present (2014 – 2015, funding of SCR 110,000 was provided by the British High Commission Seychelles) (2015 – present, funding has been provided by GVI Ltd)

The Seychelles National Parks Authority (SNPA) was created on the 2nd of March 2009, under SI. 30 of 2009, as a parastatal- government budget dependent- organization with the following mandates of particular relevance to the proposed project; (i) monitor and control all activities concerned with the management and protection of a National Park and (ii) commission research or sponsor studies concerned with management and protection of a National Park. The organization is governed by a board of directors and fall under the Ministry of Environment, Energy and Climate Change. It has a workforce of over 80 employees and is the responsible authority for managing Curieuse Marine National Park, the project location. Over the years SNPA has implemented diverse research projects along with various partners and a key one being GVI Seychelles. Gilberte Gendron (see attached CV), a Research Officer at SNPA who hold a PADI rescue diver certification is well versed in various marine monitoring techniques and has experience in implementation of projects aiming at characterizing population estimates and distribution of various species, including EDGE coral project, PIT tagging of land tortoise, Turtle tagging. Additionally, other staffs from the Research and monitoring section were involved in the previous sicklefin lemon shark research and have experience in shark tagging.

The *James Michel* Blue Economy Research Institute (BERI) at the University of Seychelles is also a partner in this proposal with **Rowana** **Walton** being a marine ecologist, with a focus on coral reef systems and associated species and habitats. She has extensive experience researching Seychelles’ coral reef ecosystems both inside and outside the marine national parks. Rowana is a qualified scientific research diver with significant experience in a variety of marine monitoring techniques. She has previously led animal spatial-behaviour studies and is familiar with several scientific approaches to evaluate these movements. Rowana was a collaborative partner on a previous project using a passive acoustic monitoring approach for neonate lemon sharks and other large-bodied marine species in Baie Ternay Marine National Park. Rowana has also previously worked at Curieuse Marine National Park, undertaking coral reef surveys and several other research projects at the island. **Dr. Laura Blamey** also from the BERI, is 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.

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

**Problem statement:** In unprotected areas,*N.acutidens* is highly sensitive to overfishing with evidence of local extinctions in India, Thailand and parts of Indonesia where the species has been assessed as Endangered (IUCN Red List, 2018).

**Context:** There is a lack of information regarding *N. acutidens* life history, with only approximately 35 publications available from a limited number of populations and geographical locations. In order to effectively conserve, manage, maintain or increase populations of sharks both inside and outside of protected areas, it is essential to possess knowledge regarding the status of a population, which involves an assessment of life history patterns and population trends over time, in particular critical early life stages Therefore, any new information resulting from the scientific study of sharks can aid in their management and conservation.

**Rationale:** In 2007, the government of Seychelles produced a National Plan of Action for the Conservation and Management of Sharks (NPOA; Seychelles Fishing Authority 2007). The plan was updated in 2016 and recognises the nation’s commitment to, and sets out national strategies for, the conservation of all shark species in Seychelles waters. The assessment of the NPOA confirmed that shark stocks in Seychelles have followed a pattern of decline over the past few decades as seen in the majority of shark populations worldwide. This, coupled with the paucity of information regarding *N. acutidens*, highlights the need for long-term studies of this species’ populations. Identifying and understanding the use of critical habitats specific to the early life stages of a species is fundamental to their effective conservation and management. Protection of nursery grounds represents an important component of shark management in a broad context, but the utilisation of these coastal areas by *N. acutidens* during early life stages puts them at high risk from anthropogenic threats such as fishing. In addition *N. acutidens* is known to occur within mangrove habitats, which due to coastal development, have significantly reduced in size within Seychelles inner islands. Curieuse Marine National Park (CMNP), is home to one of the largest remaining mangrove areas found within the inner islands of Seychelles and supports a valuable nursery ground for *N. acutidens*. Since this species is listed as Vulnerable on the IUCN Red List of Threatened Species, there is a great need to gain further understanding of the effectiveness and role of marine protected areas in the protection of the early life stages of the species within CMNP.

The project will be carried out in collaboration with the University of Seychelles (BERI) and the Seychelles National Parks Authority (SNPA) and will seek to engage local fishers in the process. Through the involvement of these local partners in the activities proposed, the training workshops for local stakeholders and the public seminar, it will build on the sense of stewardship felt for the marine protected areas of Seychelles and promote the protection of their valuable biodiversity.

**Outcome**: The main outcome will be a greater understanding of the movements of neonate *N. acutidens* within Curieuse Marine National Park and the efficacy of the park size in their protection.

**Objectives**: This outcome will be achieved by addressing the following objectives:

* *Objective 1*: Obtain an improved understanding of spatial behaviour and habitat use of 20 neonate *N. acutidens* within CMNP by monitoring their movements for six months using acoustic transmitters.
* *Objective 2*: Refine mark-recapture population estimates of neonate *N. acutidens* within CMNP using mark-recapture methods within 18 months.
* *Objective 3*: Develop local capacity by training at least 10 Seychellois stakeholders and MPA practitioners in shark research techniques by December 2019.
* *Objective 4*: Contribute to national efforts to protect biodiversity by identifying areas of critical habitat within and outside CMNP used by the threatened species, neonate *N. acutidens,* as compiled in a report and seminar within 18 months*.*
* *Objective 5:* Provide critical habitat data to national park managers and stakeholders within CMNP and other protected areas to better inform management decisions regarding the conservation of *N.acutidens* and its nurseries within 18 months.

**Specific outputs:** The following outputs will be delivered by the project:

* A refined up-to-date population estimate of neonate *N. acutidens* in CMNP;
* Map showing critical habitat areas for neonate *N. acutidens* in CMNP;
* Map of the movement of neonate *N. acutidens* inCMNP;
* 1 training workshop held for a minimum of 10 Seychellois staff, students and fishers in shark research techniques;
* At least 1 peer-reviewed scientific paper submitted for publication documenting the finding of these studies;
* 5 communication articles published on project activities/results;
* A signboard providing information on the project, for visitors to the CMNP;
* Educational and awareness raising materials to be used during related environmental theme days e.g. biodiversity day, world ocean day etc.

**Specific activities:** The objectives of the project will be achieved by the successful completion of the following integrated activities:

1.1 Installation, maintenance and subsequent collection of 12 acoustic receivers at CMNP;

1.2 Capture of at least 20 neonate *N. acutidens*, and implantation of acoustic transmitters and PIT tags (where necessary) in captured individuals;

2.1 Weekly capture of neonate *N. acutidens* and implantation of PIT tags (where necessary) in captured individuals for population estimate;

3.1 Capacity building and training of Seychellois staff and students in shark research techniques through a workshop and in-field experience;

4.1 Analysis of data collected using a geo-spatial approach to identify critical habitat areas for *N. acutidens*;

5.1 Public seminar held to present results and transfer knowledge to CMNP park managers and other stakeholders;

5.2 Production of communication materials (e.g. signboard, poster) and articles to disseminate findings to CMNP park managers and other stakeholders.

**Expected results:**

* Increased knowledge of the spatial behaviour and habitat use of neonate *N. acutidens* within CMNP, as assessed by habitat area report and maps;
* Increase in local capacity in shark research techniques with at least 10 stakeholders (MPA practitioners, students, fishers) trained, as assessed from project activity logs;
* An up-to-date population estimate of neonate *N.acutidens* within CMNP produced, as assessed from a peer reviewed scientific article;
* An improved understanding of the efficacy of the CMNP as a nursery for *N.acutidens*

**Location**: Curieuse Marine National Park (CMNP) is 2.9km2 and located north of Praslin Island. It was designated a national park in 1979 and is a key tourism site in the inner islands. The island is surrounded by a shallow fringing reef and seagrass beds and has a healthy stand of mangroves. These habitats serve as a key sea turtle feeding and nesting ground as well as providing nursery habitat for key ecological species such as *N. acutidens*.

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

**Project Activities:**

**Activity 1.1** *Installation, maintenance and subsequent collection of fixed acoustic receiver array at CMNP*

Movement patterns of neonate *N.acutidens* will be monitored through a fixed remote acoustic receiver array, consisting of 12 VR2W receivers located on the east and the north coast of the CMNP. This activity is crucial in order to facilitate all other activities and also to directly achieve Objective 1 as well as realize Objective 4, and the desired overall Outcome of the project. This activity will be undertaken by three of the project partners (GVI, SNPA, UniSey) as advanced scuba diving experience will be needed. The acoustic receivers will be installed at specified locations underwater, as agreed by all partners, using SCUBA equipment. The design of the acoustic array will be as such to ensure the maximum yield of data, especially in expected high transition areas. The receivers will be checked every three months to ensure they have not moved or been lost. The receivers have a limited battery life, therefore they will be collected at the end of the project.

**Activity 1.2** *Capture of at least 20 neonate N. acutidens, and implantation of acoustic transmitters and PIT tags (where necessary) in captured individuals*

Deployment of transmitters will commence in October 2019, with the goal of tagging 20 neonate *N.acutidens* within/adjacent to the ‘turtle pond’ at the CMNP. Following capture, each neonate will be transported to a specially designed trough and submerged in water, in preparation for implanting with an internal Vemco V13 acoustic transmitter. A 2 – 3 cm medial incision will then be made on the anterior side of the shark, distal to the pectoral girdle, creating an opening of the body cavity into which the activated transmitter will be inserted. The incision will be closed with three sutures and the entire process should take no more than five minutes. This is a fundamental activity to provide the necessary knowledge to achieve Objective 1 and also the overall Outcome of the project, and the completion of this activity will also help realise Objective 3. It will be carried out by the main project lead (GVI) with assistance from other partners (SNPA, UniSey, Fishers). GVI will lead as they have significant experience in this methodology and are on-site to access the area.

**Activity 2.1** *Weekly capture of neonate N. acutidens and implantation of PIT tags (where necessary) in captured individuals for population estimate*

This is an essential activity to provide the necessary knowledge to achieve Objective 2 and also the overall Outcome of the project. The completion of this activity will also help realise Objective 3. It will be carried out by the main project lead (GVI) with assistance from other partners (SNPA, UniSey, Fishers). GVI will lead as they have significant experience in this methodology and are on-site to access the area. The capture process for the sharks will be the same as in Activity 1.2, but only a small PIT tag will be inserted and no specialized incision will be made.

**Activity 3.1** *Capacity building and training of Seychellois staff and students in shark research techniques through a workshop and in-field experience*

This is the fundamental enabling activity to provide the skills and knowledge necessary to achieve Objective 3 to enable desired Outcome of the project. The training will be facilitated by the main project partners and local experts (where necessary), with the participation of local community stakeholders. Hands-on training will be conducted utilising the facilities of all partners as appropriate, both in the field and in a classroom setting.

**Activity 4.1***Analysis of data collected using a geo-spatial approach to identify critical habitat areas for N. acutidens*

Once data has been collected using the acoustic transmitters and receivers, it will be cleaned to remove false detections (Pincock 2008). The remaining data will then be used to map neonate *N. acutidens* movement patterns using centers of activity analysis (COA; Winton et al. 2018), including diel and nocturnal movements, and to identify critical habitat areas. This activity will be carried out by the main project lead GVI, with assistance and technical input from other project partners (SNPA and UniSey). This activity will directly achieve Objective 4, as well as facilitating the realisation of Objective 5 and the overall Outcome of the project.

**Activity 5.1** *Public seminar held to present results and transfer knowledge to CMNP park managers and other stakeholders*

To foster local engagement and increase the impact of the project, a public consultation will be held on Praslin with the Praslin Fishers Association (PFA) prior to commencing the project. The activity will be an opportunity to engage local fishers in the research and provide them with an introduction to the project aims. Information will be provided on a tag return process, including reward system. The consultation will be led by SNPA and GVI, and fishers will be invited to take part in a shark research training workshop. Following the conclusion of the project, a seminar will be held on both Praslin and Mahe to disseminate results and knowledge gained through the project research. All stakeholders will be encouraged to attend and details of the event will be communicated widely through social media etc. The seminars will be organised through collaboration of all main project partners, utilising their facilities as appropriate (e.g. theatre at UniSey). This activity will lead to the direct achievement of Objectives 4 and 5, as well as the overall Outcome of the project.

**Activity 5.2** *Production of communication materials (e.g. signboard, poster) and articles to disseminate findings to CMNP park managers and other stakeholders*

To build on Activity 5.1, this activity will further disseminate the findings and knowledge gained from this project to a wide range of stakeholders (visitors to CMNP, fishers, CMNP staff, tourism representatives). Both a signboard and posters will be displayed at the SNPA research station on CMNP and in the mangrove area near the location of the project. The completion of this activity will contribute to Objective 5, as well as the overall Outcome of the project. This activity will be led by SNPA with expert input from other project partners as necessary.

The project work will build upon existing activities being conducted by GVI Seychelles within the CMNP. In 2014 a mark-recapture study of the CMNP neonate *N.acutidens* population was initiated and is now entering its fifth year of research. Data collected through the project has already provided significant results relating to the duration of the pupping season, neonate population size and habitat use within the CMNP, and led to the publication of a research paper along with the presentation of a poster at the WIOMSA conference in 2015, and subsequently the publication of a peer reviewed research paper in 2017. The project will also enable replication through the development of monitoring methodologies that will enable similar activities to be undertaken in other coastal systems by other organizations. Through the auspices of GVI and the SNPA, technical support for such activities in terms of copies of protocols, and monitoring methodologies will be readily accessible. Data generated will be maintained by SNPA and will inform the Seychelles Marine Spatial Planning process.

The implementation of these activities with local stakeholders and partners will help enable the goals of the Seychelles Sustainable Development Strategy, in Biodiversity and Forestry, in particular Goal 2 ‘Improve our understanding of biological diversity and ecosystem functioning in a changing environment’, for Strategic Objective 1; Activity 1 ‘To identify critical habitats and ranges of endangered or endemic species’, and Activity 3 ‘To strengthen biological and ecological research on local biodiversity with emphasis on research and monitoring of keystone species’**.**

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| **Project title:**Assessing the effectiveness of Curieuse Marine National Park in the protection of the critical early life stages of sicklefin lemon sharks (*Negaprion acutidens*) | **Project start and end dates:**January 2019 – June 2020, 18 months |
| **Project Outcome:**  A greater understanding of the movements of neonate *N. acutidens* within Curieuse Marine National Park and the efficacy of the park size in their protection. |
| **Specific Objective No. 1 -** Obtain an improved understanding of spatial behaviour and habitat use of 20 neonate *N. acutidens* within CMNP by monitoring their movements for six months using acoustic transmitters. |
| **Activity** | **Responsibility for implementation** | **Timeline of activity** |
| **Year 1** | **Year 2** | **Notes** |
| **Q1** | **Q2** | **Q3** | **Q4** |
| 1.1 Installation/maintenance of acoustic receivers  |  P.team & partners |   |   |   |   |   |   |
| 1.2 Implantation of acoustic transmitters  |  Project team |   |   |   |   |   |   |
| **List indicators for each activity:** |
| 1.1 Receiver installation report |  |  |  |  |  |  |  |
| 1.2 Capture and implantation report |  |  |  |  |  |  |  |
| **Specific Objective No 2 -** Refine mark-recapture population estimates of neonate *N. acutidens* within CMNP using mark-recapture methods within 18 months. |
| 2.1 Weekly capture of sharks (PIT) |  Project team |   |   |   |   |   |   |
| **List indicators for each activity:** |
| 2.1 Capture (PIT Tag) report |  | 1st in M3 | Month 6 | Month 9 | Month 12 |  |  |
| **Specific Objective No 3 -** Develop local capacity by training at least 10 Seychellois stakeholders and MPA practitioners in shark research techniques by December 2019. |
| 3.1 Shark research techniques workshop  | P.team & partners |  |  |  |  |  |  |
| **List indicators for each activity:** |
| 3.1 Number of participants trained |  |  |  | Month 9 | Month 12 |  |  |
| **Specific Objective No 4 -** Contribute to national efforts to protect biodiversity by identifying areas of critical habitat within and outside CMNP used by the threatened species, neonate *N. acutidens,* as compiled in a report and seminar within 18 months*.* |
| 4.1 Data analysis - critical habitat areas  | P.team & partners |  |  |  |  |  |  |
| **List indicators for each activity:** |
| 4.1 Habitat area report |  |  |  |  |  |  |  |
| **Specific Objective No 5 -** Provide critical habitat data to national park managers and stakeholders within CMNP and other protected areas to better inform management decisions regarding the conservation of *N.acutidens* and its nurseries within 18 months |
| 5.1 Public seminar  | P.team & partners |  |  |  |  |  |  |
| 5.2 Communication materials  | P.team & partners |  |  |  |  |  |  |
| **List indicators for each activity:** |
| 5.1 Public seminar held |  |  |  |  |  |  |  |
| 5.2Development of comms materials |  |  |  |  |  |  |  |

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk/Factors** | **Risk category** | **Potential level of impact** | **Risk mitigation measures** |
| Few sharks caught | Environmental  | High | Increase frequency of capture sessions |
| Mortality of sharks after acoustic transmitter implanted | Environmental | High | Training on implantation from local expertProtocol adhered to properly minimising stress to sharks.Selection of appropriate individuals for implantation. |
| Failure or loss of acoustic transmitter or receiver | Technological | High | Ensure all batteries fully charged and equipment watertight before deployment. Make sure receiver moorings are robust and fixed firmly to the substrate. |
| Unfavourable weather conditions | Environmental | Low | Change capture schedule  |
| Delays in securing equipment | Technological | Low | Equipment will be ordered several months prior to deployment. |
| Negative perception of project and lack of engagement from local fishers | Social | Low | Look to engage fishers by providing clear information on project aims and encouraging active participation in project. |

**G. EVALUATION AND INDICATORS**

Project monitoring will be undertaken by a Steering Committee each quarter during the project lifetime using a Red-Amber-Green tracking tool comparing progress of each activity to its time-bound indicator. At the initial Steering Committee meeting the tracking tool with the pertinent indicators for each activity will be confirmed so that targets are clear. A communication strategy will also be agreed at this meeting to ensure learning and sharing of project results. Project impact evaluation assesses whether the intervention had the planned effect on individuals and communities and whether this effect can be attributed to the project’s activities. This will be done by the use of appropriate counterfactuals for the intended objectives and outcomes; that is, the assessment will compare the impact indicators in the project area with the same indicators in a designated non-project intervention area. These will be reviewed on a quarterly basis by the steering committee.

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| **Outcome**  | **Impact Indicator**  |
| Greater understanding of the movements of neonate *N. acutidens* within CMNP and efficacy of the park size in their protection. | Number of data sets / records compiledNumber of technical articles published & seminars/workshops held |
| **Objectives** | **Impact Indicator**  |
| Improved understanding of spatial behaviour and habitat use of neonate *N. acutidens* within CMNP  | Number of data sets / records compiled |
| Refine mark-recapture population estimates of neonate *N. acutidens* within CMNP  | Number of data sets / records compiled |
| Develop local capacity in shark research techniques  | Number of people trained in shark research techniques |
| Identifying areas of critical habitat within/outside CMNP for neonate *N. acutidens* | Number of data sets / records compiledNumber of technical / scientific articles published |
| Provide data to national park managers and stakeholders within CMNP to better inform management decisions regarding the conservation of *N.acutidens*  | Number of data sets / records compiledNumber of technical articles published & seminars/workshops held |

**H. SUSTAINABILITY AND REPLICATION**

Once the fixed acoustic receiver array has been installed, there will be an opportunity to replicate and continue this project in future years if new sharks are implanted with acoustic transmitters. GVI Seychelles is permanently based on Curieuse Island and has the ability to incorporate this study as part of its ongoing volunteer research programme. This presence of a permanent acoustic receiver array offers possibilities for the tagging of other key species, including rays, turtles and other large marine species that use the CMNP. There is also potential in future for the scaling up of the project, and widening the study area, through the installation of additional acoustic receivers.

The knowledge developed during this project will be disseminated during and after the project implementation through social media outlets of each of the partners, articles in local media and through peer reviewed scientific publications. In addition, signboards communicating the project activities to visitors will be installed in the CMNP. The project will also train key MPA stakeholders in critical shark research techniques, helping to shape broader shark conservation management measures within Seychelles.

Study Area

