

***Toledo Institute for Development and
Environment [TIDE]
Grant agreement No. BZ – KfW FIII - 006 - 2024***

**Invitation to submit a proposal for a consultant to
install a Radio Repeater at Hunting Caye Ranger
Station to improve communication for rangers and
stakeholders.**

September 2025

TERMS OF REFERENCE

1. Background

The Mesoamerican Reef Fund, Inc. (MAR Fund) and Toledo Institute for Development and Environment (TIDE) have entered into a Grant Agreement under the project: *Enhancing Protection and Conservation of Commercial Species, Coral Reefs, and Fish Spawning Aggregation Sites in Sapodilla Cayes Marine Reserve, Belize* with the objective of increasing protection and biodiversity conservation of commercial species, coral reefs, and legally established FSAs within Sapodilla Caye Marine Reserve (SCMR) including Elbow and Cayman Crown. KfW has been involved in the conservation of the Mesoamerican Reef on behalf of the German Federal Government since 2010 as part of its cooperation with the Mesoamerican Reef Fund (MAR Fund) to protect the natural resources of the world's largest transboundary coral reef and promote sustainable use. (MAR Fund 2016).

The Sapodilla Cayes Marine Reserve (SCMR) is the most southern of the marine protected areas in Belize and encapsulates the southernmost tip of the Belize Barrier Reef. It lies in the general area of N16 6 32.9, W88 16 10.4 and is an integral part of the Belize Barrier Reef Reserve System (BBRRS), inscribed as a UNESCO World Heritage Site in 1996.10. (SCMR management plan 2023)

The expanded marine reserve covers an area of 321,623.5 acres (approximately 130,156 ha) and contains fourteen palm-fringed sand or mangrove cayes, fringe reefs, natural lagoons, and key spawning aggregation sites (SPAGs). It is one of the 17 barrier reef regions that compose the Mesoamerican Reef System that is home to more than 65 species of stony coral, 350 species of molluscs and more than 500 species of fish. (SCMR management plan 2023).

With the significant expansion of the Sapodilla Cayes Marine reserve from 38,595 acres to 321,623.5 acres which includes a large portion of the Cayman Crown, a resilient coral reef ecosystem, there is an urgent need for the Toledo Institute for Development and Environment [TIDE], a new co-manager of SCMR to seek significant funding for investment in infrastructural, urgent resource protection, sustainable management and socio-economic opportunities for primary users to increase management effectiveness of this world heritage site.

Recreational and commercial fisher-folks from southern Belize rely on the use the Sapodilla Cayes Marine Reserve to generate an income either from fishing for commercial species during season or from sport fishing and tourism. With changing climate, and increased local and transboundary fishing pressure, there is an urgent need for 24 hour ranger presence on Hunting Caye for regular day and night surveillance and patrols to enforce existing regulations and ensure compliance. Currently, there is internet service at the ranger base which does not necessarily extend within the marine reserve. Therefore, there is an urgent need to expand the communication capacity to have reliable communication with the field staff especially when on patrols within the marine environment. A VHF system can be explored as they are used in remote marine areas to extend the range of radio communications and overcome geographical obstacles. Research indicates that NEMO and Belize Communications Security Ltd. Offer VHF communications. Other marine protected areas in Belize are using Internet based Communication Systems; however, towers are installed at the ranger base and at resorts within the marine reserve that help provide internet in most areas within the reserve.

This project entails installation of an upgraded communication system [Radio Repeater System] at Hunting Caye Ranger Station to improve communication for rangers, and stakeholders, especially while out in the marine reserve. Its successful implementation will increase communication from the main office to the Hunting Caye base and from Hunting Caye base during patrols within the Sapodilla Cayes Marine Reserve.

Objective: Within 3 months, complete an assessment of the existing communication system at Hunting Caye Ranger Station and implement necessary upgrades to ensure reliable communication between the ranger team and the station while patrols are conducted within the marine reserve. OR

Within 3 months, implement upgrades to the existing communication system at the Hunting Caye Ranger Station, based on the assessment conducted and approved recommendations based on budget allocation.

2. Consulting activities

The following activities will be carried out as part of the consultancy:

1. Conduct Assessment of Existing Communication System:

- Perform on-site inspection of current internet system.
- Review ranger patrol routes and coverage needed in various zones.
- Interview ranger team members about current communication challenges.

2. Identify Communication Gaps and Equipment Needs:

- Map out areas with poor or no signal.
- Determine technical specifications required (e.g., radio range, waterproof devices, backup power sources).
- Consult with technical experts or vendors for recommendations.
- Discuss recommendations with TIDE to agree on a system that would be installed.

3. Procure and Install Communication Upgrades:

- Source quotations from qualified suppliers for recommended equipment.
- Purchase radios, repeater system, satellite communication devices (phone, Garmin In reach or necessary infrastructure upgrades agreed on).
- Install and configure all new equipment at the station and with ranger patrol units.

4. Test and Validate Upgraded Communication System:

- Conduct field tests across the marine reserve patrol areas.
- Simulate emergency communication scenarios to ensure system reliability.
- Adjust configurations or reposition equipment based on test results.

5. Train Ranger Team on Upgraded System:

- Develop a basic operational manual.
- Conduct hands-on training sessions with all patrol members.

- Establish communication protocols and emergency procedures using the new system.

3. Estimated Work Schedule (3 months)

| Activities | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Conduct Assessment of Existing Communication System: <ul style="list-style-type: none"> a. Perform on-site inspection of current internet system. b. Review ranger patrol routes and coverage needed in various zones. c. Interview ranger team members about current communication challenges | | | | | | | | | | | | |
| 2. Identify Communication Gaps and Equipment Needs: <ul style="list-style-type: none"> ○ Map out areas with poor or no signal. ○ Determine technical specifications required (e.g., radio range, waterproof devices, backup power sources). ○ Consult with technical experts or vendors for recommendations. ○ Discuss recommendations with TIDE to agree on a system that would be installed. | | | | | | | | | | | | |
| 3. Procure and Install Communication Upgrades: <ul style="list-style-type: none"> ○ Source quotations from qualified suppliers for recommended equipment. | | | | | | | | | | | | |

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|---|--|--|--|--|--|--|--|--|--|--|--|--|
| <ul style="list-style-type: none"> ○ Purchase radios, repeater system, satellite communication devices (phone, Garmin inReach or necessary communication upgrades agreed on by TIDE based on budget ○ Install and configure the new equipment at the station and with ranger patrol units, if necessary. | | | | | | | | | | | | |
| <p>4. Test and Validate Upgraded Communication System:</p> <ul style="list-style-type: none"> ○ Conduct field tests across the marine reserve patrol areas. ○ Simulate emergency communication scenarios to ensure system reliability. ○ Adjust configurations or reposition equipment based on test results. | | | | | | | | | | | | |
| <p>5. Train Ranger Team on Upgraded System:</p> <ul style="list-style-type: none"> ○ Develop a basic operational manual. ○ Conduct hands-on training sessions with all patrol members. ○ Establish communication protocols and emergency procedures using the new system. ○ Prepare and submit a project report. | | | | | | | | | | | | |

4. Expected products

The consultant will deliver the following product(s):

| No | Deliverables | Time Frame |
|-----------------|--|---------------------------------|
| 1st deliverable | Assessment of existing system? Report with communication gaps and equipment needs | 3 weeks after signing contract |
| 2nd deliverable | Procurement and installation of communication upgrade | 9 weeks after signing contract |
| 3rd deliverable | Testing and validation of communication upgrade and report on training of rangers on use of communication tools installed. | 12 weeks after signing contract |

5. Consultant's Profile

The consultant or consulting team must possess the following qualities and qualifications.

1. A Bachelor's Degree in Telecommunications, Electronics Engineering, Marine Technology, or a related field.
2. Minimum 5 years of experience in designing, installing, and maintaining communication systems in remote or marine environments.
3. Proven knowledge of:
 - a. **VHF/UHF radio systems** and repeater setups
 - b. **Satellite communication devices** (e.g., Iridium, Garmin inReach)
 - c. **Power and solar solutions** for off-grid communication infrastructure
 - d. **Emergency communication protocols** in marine protected areas or enforcement contexts
4. Demonstrated experience working in:
 - Remote field locations (preferably in coastal or island settings)
 - Protected areas or with marine law enforcement/patrol teams
 - Experience with communication coverage assessments, blackspot mapping, and field testing
5. Strong project management skills — able to deliver within a 3-month timeline.
6. Ability to coordinate procurement and logistics for equipment in remote areas.
7. Clear, effective communication and training abilities for park ranger team.
8. Ability to produce:
 - a. Assessment reports
 - b. Communication protocols and user guides

- c. Technical documentation and post-installation evaluations

6. Travel and Transportation: All travel and transportation costs must be included in the BID.

Payment for the consultancy shall be made upon approval of the deliverables by the Contracting Party and submission of corresponding legal invoices in 3 payments in accordance with the payment schedule below.

| Payment No. | | Payment % |
|--------------|--|-------------|
| 1 | Assessment of existing system? Report with communication gaps and equipment needs | 30% |
| 2 | Report on equipment procurement list and specifications and installation of communication upgrade | 40% |
| 3 | Report on testing and validation of communication upgrade and training of rangers on the use of communication tools installed. | 30% |
| Total | | 100% |

7. Consultancy supervision

The consultant will be supervised by the MAR Fund/TIDE Project Coordinator and TIDE Executive Director.

The consultant shall attend virtual and/or face-to-face meetings to which he/she is summoned for the execution of this consultancy.

The consultancy deliverables will be submitted to the consultancy supervisor for review and approval. If improvements are required, the consultant will proceed to make the requested adjustments.

Payment for each product will be made once it has been approved by the Executing Party's reviewers.

In all discussions and comments made *on site*, the consultant shall expressly state that these reflect his/her opinion and not necessarily the position or opinion of the Contracting or Executing Party, MAR Fu

