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

Invitation to submit a BID for the contracting of consulting services to conduct a Commercial and Ecosystem-Based Fish Stock Assessment of Sapodilla Cayes Marine Reserve.

March 2026

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 the Elbow and Cayman Crown reef. 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. (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).*

Marine Protected Areas provide numerous benefits, if well designed and managed. They maintain healthy habitats, natural ecosystems and reproductive populations of key marine species to support long term sustainable fishing, protection from coastal hazards such as storm surge and flooding, biodiversity conservation, tourism opportunities and quality of life for locals. By helping to maintain healthy ecosystems, MPAs are key to buffering the unpredictable impacts of global climate change. With the significant expansion of the Sapodilla Cayes Marine reserve from 38,595 acres to 321,623.5 acres in 2020, which includes a main portion of the Cayman Crown, a resilient coral reef ecosystem, it is critical for TIDE to continually seek funding for its effective management.

SCMR, a biodiversity hotspot within the Mesoamerican Reef, is near to neighbouring countries with huge populations and is traditionally known for key commercial species that support the livelihoods of commercial fisher-folk in the region. A commercial and ecosystem-based fish stock assessment provides baseline and trend data to evaluate species diversity, predator-prey dynamics, whether species are harvested sustainably or at risk of over-fishing, whether the fisheries management tools are achieving recovery or protection goals and whether spillover effects are benefitting nearby fisheries. This evidence-based approach can improve the resilience and effectiveness of MPA management under changing environmental and socioeconomic conditions. Clear science-based findings can support transparent decision making and buy in from resource users. Belize has national and international commitments, and a commercial and ecosystem-based fish stock assessment contributes directly to achieving and reporting progress on these commitments.
Conducting a commercial and ecosystem-based fish stock assessment of SCMR is critical for safeguarding marine biodiversity**,** ensuring sustainable livelihoods**,** and enhancing science-based management of one of Belize's most ecologically significant marine protected areas.

2. OBJECTIVE:

Within 8 months, conduct a comprehensive commercial and ecosystem-based fish stock assessment within the Sapodilla Cayes Marine Reserve to estimate biomass, abundance, diversity and size structure of commercial and reef fish species, determine stock status using standardized assessment methods, and develop evidence based management recommendations to improve fisheries sustainability and evaluate the effectiveness of the marine reserve regulations.

3. CONSULTING ACTIVITIES:

3.1 Project Initiation and Planning

- Meet with TIDE management, technical partners and co-management entity to clarify scope of work (objectives, key activities, deliverables, timelines and responsibilities)
- Review existing data and information – compile existing scientific reports, maps, biodiversity records, GIS data sets, monitoring records, and legal documents, for conch, lobster, and finfish species in SCMR
- Identify data gaps and refine field work priorities
- Develop a detailed work plan, defining timeline, methodology, data needs, budget and team responsibilities
- Plan logistics and access of research permits

3.2 Methodology Development

- Review previously established Belize Fisheries Department (BFiD) permanent monitoring site locations (for conch, lobster, sea cucumber and AGRRA for finfish) and reports with the intention of including these sites in the new site selection
- With TIDE science team, aided by habitat maps and the SCMR Management Plan, determine the number of sites to be included in the new long-term monitoring programs for conch, lobster and sea cucumber. Sites should be representative of habitat type and management zones. A total of 25 – 30 sites will be identified for conch, lobster and sea cucumber by the end of this consultancy. Note that there will be 14 - 16 finfish sites that will align with established AGRRA sites.
- Consult with relevant stakeholders (e.g. rangers, fishers, tourism operators) during the site identification process to capture historical knowledge and pertinent site information.
- Select sites to conduct initial site assessments for conch, lobster and sea cucumber.
- Design field survey protocols and finalise sampling strategy for conch, lobster, sea cucumber and finfish, using national standardized methods and AGRRA for finfish, in conjunction with the TIDE science team.
- Where possible, align conch and lobster field surveys with existing monitoring schedules (pre/post closed season) to provide robust baseline data that can be used for comparisons in future years.
- Review pre-established protocol for collecting habitat type and description and incorporate into assessment methodology at each site visited
- Coordinate the inclusion of TIDE's marine biologist and Community Researchers in fieldwork as appropriate.

**Note: Lobster and finfish assessments could be conducted at the same sites, and similarly site selection for conch and sea cucumber can align, as appropriate in each case.*

3.3 Fieldwork and Stakeholder Consultations

3.3.1 Participatory Mapping

- Work with stakeholders (e.g. rangers, fishers, tourism operators) to identify and map areas of use (fishing, tourism), concern, or significance e.g. overfishing, climate change).

3.3.2 Initial Biological and Physical Field Surveys

- Conduct underwater surveys (e.g., SCUBA/snorkel transects, photo quadrats) to ground truth initial sites selected for review using habitat assessment criteria (excluding finfish which is conducted at pre-determined AGRRA sites)

- Collect biological data at all sites for conch, lobster and sea cucumber if deemed a suitable site for long-term monitoring
- Conduct baseline finfish monitoring at all pre-determined sites (14 – 16 sites)[1]
- Use GPS and GIS tools for mapping initial sites surveyed

3.3.3 Review of initial surveys

- Present initial findings to TIDE and review the suitability of the initial survey sites for each of the species (conch, lobster, sea cucumber).
- Based on findings from the first fieldwork surveys, review findings with TIDE Science Team and plan the second phase of field surveys to continue to ground truth new or alternative sites

3.3.4 Conduct final Biological and Physical Field Surveys

- Conduct underwater surveys (e.g., SCUBA/snorkel transects, photo quadrats) to ground truth secondary sites selected for review using habitat assessment criteria
- Collect biological data at all sites for conch, lobster and sea cucumber if deemed a suitable site for long-term monitoring
- Use GPS and GIS tools for mapping sites surveyed

3.3.5 Review of second survey phase

- Present findings to TIDE from both fieldwork phases and review the suitability of all survey sites for inclusion in TIDE's long term monitoring programs
- Finalise site selection for TIDE's long-term conch, lobster, and sea cucumber monitoring programs, ensuring representation of different habitat, reef and management zones, and to include existing BFiD sites if appropriate.

3.4 Data Processing & Analysis

3.4.1 Data Entry and Management

- Organise and digitise field data, photographs, GPS tracks, and consultation notes.

3.4.2 Physical Analysis and Mapping

- Use GIS to produce habitat maps, usage zones, and permanent site selection.

3.4.3 Biological Baseline Analysis

- Conduct baseline assessment of selected permanent monitoring sites using standardized methodology – including AGGRA analysis for finfish
- Identify trends, hotspots, and potential management concerns.

[1] Finfish monitoring can be conducted during either the first or second fieldwork phase at the discretion of the consulting team and based on alignment with optimal season for conducting this monitoring, to be agreed upon during planning phase

3.5 Reporting & Dissemination

3.5.1 Draft Habitat Characterisation Report

- Prepare a summary report including baseline data, maps, and recommendations.
- Share draft report with TIDE Management and Science team and technical team for feedback
- Add data to existing habitat characterization database

3.5.2 Draft Commercial and Ecosystem-based fish stock assessment report

- Prepare a detailed report on conch, lobster, sea cucumber and finfish at newly established monitoring sites, using nationally standardized and AGRRA reporting methods where appropriate
- Share draft report with TIDE Management and Science team and technical team for feedback

3.5.3 Final Report Submission

- Incorporate feedback and submit the final report.
- Submit all raw data in databases

Note that cross-cutting activities include coordination and communication, maintaining regular updates with project partners and stakeholders and ensuring data accuracy, adherence to methods, accuracy and consistency in analysis. Further, complimentary to this baseline site characterisation assessment, a team will be conducting baseline fish stock assessment for SCMR. Information from this report will be shared with that team as it becomes available to support their planning.

4. Estimated Work Schedule (8 months)

Activities as described	1	2	3	4	5	6	7	8
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Project initiation and planning	X							
Methodology development		X						
Fieldwork and stakeholder consultations								
Participatory mapping			X					
Initial biological and physical field surveys			X	X				
Review of initial surveys					X			
Final biological and physical field surveys						X		
Review of second survey phase						X		
Data processing and analysis								
Data entry and management							X	
Physical analysis and mapping							X	
Biological baseline analysis							X	
Reporting and dissemination								
Draft habitat characterization report							X	
Draft commercial and ecosystem-based fish stock assessment report							X	
Final report submission								X

5. EXPECTED PRODUCTS

The consultant will deliver the following products:

Deliverable No	Deliverables	Submission date
1st deliverable	Inception report with detailed methodology and work plan.	15 May 2026
2nd deliverable	Lists of 25 – 30 long-term monitoring sites for conch, lobster and sea cucumber	5 October 2026
3rd deliverable	Draft habitat characterization and commercial and ecosystem-based fish stock assessment reports	30 October 2026
4th deliverable	Final habitat characterization and commercial and ecosystem-based fish stock assessment reports	30 November 2026

6. CONSULTANT'S PROFILE

The consultant or consulting team must possess the following experience and qualifications:

- Minimum of a Master's degree(s) in marine biology, ecology, fisheries science, or related field
- Demonstrated experience (minimum 5 years) in conducting fieldwork in marine environments, including data collection, sampling techniques, species identification and stakeholder engagement.
- Supporting researchers/surveyors must have a minimum of 3 years' experience using the survey methodologies required.
- Understanding of ecological connectivity, spawning aggregations, habitat associations
- Proficiency in using habitat characterisation, conch, lobster, sea cucumber and AGRRA finfish data collection methods and analysing ecological data using statistical methods, standardized national and regional reporting formats, and software.
- Experience conducting similar studies in Belize is preferred.
- Experience using GIS and spatial data analysis
- Ability to operate and maintain scientific equipment used in marine research, such as underwater cameras, and other monitoring devices.
- Strong ability to write clear and concise reports summarizing research findings, as well as the ability to effectively communicate results.
- Ability to analyse complex ecological data, identify patterns, draw meaningful conclusions and provide management advice tailored to MPA contexts.
- Ability to identify and address challenges related to MPA characterization, such as data gaps, logistical constraints, or stakeholder concerns.
- Ability to adapt to changing field conditions and adjust research plans as needed.
- Familiarity with MPA designs, zoning, management and evaluation strategies in Belize
- Must hold relevant permits and certificates (e.g. dive certifications, AGRRA certifications) and research permits or be willing to obtain them.

7. ASSOCIATED COSTS:

All travel and transportation costs – including all costs relating to fieldwork and field surveyors - must be included in the BID (Guidance can be provided upon request)

8. PAYMENTS

Payment for the consultancy shall be made upon approval of the deliverables by the Contracting Party and submission of corresponding legal invoices in *4* payments in accordance with the payment schedule below.

Payment No	**Product**	**Payment %**
1	Inception report with detailed methodology and work plan.	50%
2	Lists of 25 – 30 long-term monitoring sites for conch, lobster and sea cucumber	10%
3	Draft habitat characterization and commercial and ecosystem-based fish stock assessment reports	20%
4	Final habitat characterization and commercial and ecosystem-based fish stock assessment reports	20%
	Total	**100%**

9. CONSULTANCY SUPERVISION:

The consultant will be supervised by the MAR Fund/TIDE Project Manager and TIDE Science 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 based on payment plan in contract.

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 Fund or KfW.