



PROJECT COMMITMENT NOTE (« NEP »)

"MAR Fish" - Knowledge, monitoring and protection of Mesoamerican reef's fish spawning aggregations

COUNTRY: Mexico, Belize, Guatemala, Honduras



PROJECT TITLE	"MAR Fish" - Knowledge, monitoring and protection of Mesoamerican reef's fish spawning aggregations
SHORT TITLE OF THE PROJECT	MAR Fish
COUNTRY / REGION	Meso American Reef (Mexico, Belize, Guatemala et Honduras)
FFEM MEMBER INSTITUTION PROVIDING THE PROJECT	Ministère de la Transition écologique et solidaire (MTES)
IDENTIFICATION DATE	June 1st, 2018
FFEM FIELD OF APPLICATION (among six)	Biodiversity
FFEM FOCUS THEMATIC (among five)	Innovative Financing of Biodiversity
PROJECT TOTAL AMOUNT (including all funders)	3,5 M€
CO-FINANCIERS	Healthy Reefs for Healthy People Initiative (HRI), LGL, Rotary Club, COBI, FUNDAECO, TIDE, MAR Fund, Oak Foundation, Summit Foundation, Oceans 5 and others.
FFEM AMOUNT OF CO-FINANCEMENT	1,12 M€
BENEFICIARY (implementing the project)	MAR Fund
FINAL BENEFICIARY	Coastal communities of Mexico, Belize, Guatemala and Honduras; Fishermen from Mexico, Belize, Guatemala and Honduras
START DATE OF THE PROJECT	1 st quarter of 2019

DURATION OF THE PROJECT 3 years



**FONDS FRANÇAIS POUR
L'ENVIRONNEMENT MONDIAL**

Proposition de résolution

RESOLUTION CAAAAXXX

**FONDS FRANÇAIS POUR L'ENVIRONNEMENT
MONDIAL**

COMITE DE PILOTAGE DU FFEM

RESOLUTION N° XXXXX DU JJ MOIS AAAA

MEXICO, BELIZE, GUATEMALA AND HONDURAS

MAR FUND

The FFEM Steering Committee authorizes the Secretary General of the FFEM, acting by delegation, of the Director General of the French Development Agency, to offer MAR Fund a grant on the following conditions:

Beneficiary:	MAR Fund
Project name:	MAR Fish: Knowledge, monitoring and protection of Mesoamerican reef's fish spawning aggregations
Field:	Biodiversity
Countries:	Mexico, Belize, Guatemala and Honduras
Subsidy amount from FFEM (in €)	1,12 M€
Co-financiers	2,38 M€ - MAR Fund, Healthy Reefs for Healthy People Initiative (HRI), LGL Association de Recherche Écologique, Club Rotary, COBI, FUNDAECO, TIDE, Oak Foundation, Summit Foundation, Oceans.
Estimated duration of the project:	3 years
Projected start date of the project:	January 2019
Conditions precedent for disbursements:	<ul style="list-style-type: none">- Regarding the mobilization of funds from the FFEM excluding the capitalization of Cayman Crown Sub-fund (excluding activity 1.3.3.): Opening of an account in the name of the project, in a bank acceptable to AFD (solution recommended as the most adapted: in the USA).- Regarding the capitalization of the Cayman Crown sub-fund by the FFEM (activity 1.3.3.): Opening of a specific "Cayman Crown" sub-fund within MAR Fund.
Main commitments:	<ul style="list-style-type: none">- Inform the FFEM of the creation of the Cayman Crown sub-fund as well as the list of the members of its Steering Committee.

PMA/PFR/PRITI/PRITS

Subvention

Déclarable en APD: OUI

Numéro du Concours: CXX NNNN NN X

Numéro du Bénéficiaire:

EXECUTIVE SUMMARY

1. Context and issues

Fisheries along the Mesoamerican Reef (MAR) support the livelihoods of millions of people across four countries: Mexico, Belize, Guatemala, and Honduras. But along this coastline, unrelenting fishing pressure has contributed to a 23% drop in commercial fish biomass in sites surveyed by the Healthy Reef Initiative, as registered in their 2018 Report Card. Fully-protected “fish replenishment zones” (where no off take is allowed) have proven extremely successful, doubling commercial fish numbers over the past decade in those zones. Unfortunately, while 57% of the territorial sea within the MAR is now within protected areas, only 3% is fully protected from fishing as “fish replenishment zones”. This is particularly problematic in the case of Fish Spawning Aggregations (FSAs) that are scattered along the reef and are essential to maintain fish populations.

FSAs are temporary gatherings of fish that come together for reproduction in densities up to three times higher than those found during non-reproductive periods and are extremely vulnerable to fishing. FSAs generally represent the near total annual reproductive output of the species that spawn there. Periodic information on FSA health, critical for their protection, is missing and there is no cohesive, multinational plan to monitor and manage them, nor widespread understanding of their importance.

The focus area will include the recently discovered “Cayman Crown” (2013, by Ana Giro, of Healthy Reefs Initiative, and local Guatemalan fishermen), an extremely healthy reef straddling the maritime border between Guatemala and Belize, which likely includes Guatemala’s only multi-species FSA. Due to its recent discovery, information vital for its management and protection, is missing. If properly protected under this Project, the Cayman Crown and five of its more established neighbor FSAs, would truly complete a 4-nation protected areas network of sites. This will play a pivotal role in the long-term protection of the fisheries and dependent livelihoods in the MAR.

2. Objectives of the project

The overall objective of the program is to support the rebuilding of the Mesoamerican reef fish stock by strengthening the protection and monitoring of a network of fish spawning aggregations sites as critical areas of the life cycle of these species.

The four-country project will establish and monitor the first regional spawning area protection network in the Mesoamerican Reef region, contributing to the existing network of marine and coastal protected areas and the network of fisheries rebuilding sites. Over a three-year period, from 2019 to 2021, the project has two specific objectives:

- Obtain legal recognition and manage Cayman Crown in Guatemala and Belize, a newly discovered aggregation area;
- Promote participatory monitoring of a network of sentinel spawning areas in the four Mesoamerican reef countries.

This project incorporates the establishment of an endowment fund for the long-term protection and management of “Cayman Crown”.

3. Content of the project

The Project has four components:

- **Component 1: Knowledge and protection of Cayman Crown site.** The site will be subject of scientific explorations, in partnership with fishermen and other members of neighboring communities, to validate the existence of fish spawning aggregations, characterize them, and study the coral reefs of the area, whose first explorations revealed its good health. These elements will serve to advocate for the creation of two new

marine protected areas: one in Belize and the other side of Guatemala. High-level political discussions will be held with key decision-makers to protect and manage Cayman Crown sites in Belize and Guatemala, by bringing together the two countries, whose NGOs are already working together, for coherent management. A financial mechanism - an endowment fund in the form of a specific window hosted within Mar Fund - will be established to ensure the long-term management and protection of the Cayman Crown site.

- **Component 2: Sentinel Site Observation Network.** Several spawning grounds are already protected and monitored in the region, including for the Nassau grouper in danger on the IUCN Red List. The aim of the project is to set up a network of 7 sentinel multi-species spawning sites, so as to ensure a homogeneous monitoring that allows a coherent regional vision of their evolution, including with regard to climate change. A regional workshop will gather all the actors to agree on common protocols, data collection and production of analyzes. Training sessions will allow various actors to be engaged in the follow-up: fishery administrators, NGO members, fishermen and other members of coastal communities, including women. The field collections will be followed by participatory analyzes and the work will allow a regional data banking and the production of a regional inventory for the MAR region, which will be reported at the Caribbean level (in connection with Big Fish) and internationally (Society for the Conservation of Reef Fish Aggregations - SCRFA).
- **Component 3: Promote the social acceptability of protecting spawning grounds.**
 - (1) A detailed communication plan will allow to develop close relationships between scientists, fishermen, environmentalists, policy makers and citizens, in favor of a regional movement to strengthen the understanding of the role of fish spawning aggregations in the management of fisheries, the importance of protecting them and fostering collaborative management. This plan will contribute to building a "citizen science" that promotes a better understanding of environmental issues by local communities.
 - (2) With the support of the regional Rotary network and with the support on 2 NGOs already involved in the field, community development activities will be implemented for the communities most affected by the closure of fishing areas around the Gulf of Honduras (Belize, Guatemala and Honduras), taking into account that the current fishing effort seems to be low.
- **Component 4: Project Management.** A full-time Project Manager will be hired by MAR Fund for the 3 years of the project, a highly renowned scientific advisor will also be recruited, for about 60 days over 3 years, to ensure the consistency of the project from a point of view technical and ensure the scientific quality of the productions.

4. Institutionnel set up

The agency responsible for delivering the Project is **MAR Fund**, a private, regional, environmental fund with a 13-year history. MAR Fund manages numerous regional programs and has successfully mobilized US\$21.8 million of project funding and a US\$26 million endowment. MAR Fund successfully manages another FFEM project.

The challenges of conservation and development require sustainable intersectoral collaboration among the four countries of the Mesoamerican Reef (MAR). MAR Fund will work closely with civil society partners and urge national authorities to recognize and protect the new binational Cayman Crown site. The project will be supervised by a Steering Committee composed of an executive section and a scientific section, so as to facilitate exchanges. The proposed endowment for Cayman Crown will be managed by MAR Fund.

5. Duration and cost

The project is designed on a 3-year basis, from January 2019 to December 2021. MAR Fund is requesting € 1.12 million from the FFEM (plus € 40,000 for the final external evaluation), ie 31.9% of the total amount of the project. Of this sum € 460,000 will go to the endowment fund for the long-term management of Cayman Crown. MAR Fund will invest the equivalent of € 307,000 for the endowment fund, which will bring the fund for the protection, management and monitoring of the Cayman Crown site to € 767,000.

ABBREVIATIONS

AGGRA	Atlantic and Gulf Rapid Reef Assessment
BSP	Beluga Smile Productions, LLC
CCAD	Central American Council on Environment and Development
CFA	Conservation Finance Alliance
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COBI	Community and Biodiversity
CORAL	Coral Reef Alliance
CSO	Civil society organization
CTF	Conservation Trust Fund
CZM	Coastal Zone Management
FCG	Fundación para la Conservación de los Recursos Naturales y Ambiente en Guatemala
FMCN	Mexican Fund for the Conservation of Nature
FSA	Fish Spawning Aggregation
FUNDAECO	Foundation for Eco-development and Conservation
HRI	Healthy Reefs for Healthy People Initiative
ICRI	International Coral Reef Initiative
IMO	International Maritime Organization
IUCN	International Union for the Conservation of Nature
LGL	LGL Ecological Research Associates, Inc.
MAR	Mesoamerican Reef
MAR Fund	Mesoamerican Reef Fund
MAR-L	The Mesoamerican Reef Leadership Program
MCPA	Marine and Coastal Protected Area
MPA	Marine Protected Area
NBSAP	National Biodiversity Strategy and Action Plan
PSSA	Particularly Sensitive Sea Area
SEA	Southern Environmental Association
TIDE	Toledo Institute for Development and Environment

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I CONTEXT AND ISSUES

I.1 Geographic and environmental context

At over 1,000km the Mesoamerican Reef (MAR) is the largest reef system in the northern hemisphere and the second largest in the world. It runs along the Caribbean coasts of four countries; starting in the north of Quintana Roo, Mexico, it borders the coasts of Belize and Guatemala, and ends in the northern coast of Honduras. The Mesoamerican Reef does not include high seas, only territorial waters.

The MAR and its surroundings are renowned for diverse natural wonders as well as its rich cultural and ethnic diversity. Its deep ocean trenches and coral reef systems provide food, shelter, breeding areas, migration routes and nursery grounds for a vast array of species. The MAR hosts over 500 fish species, 65 reef-building coral species, large populations of manatees, turtles and possibly the largest known annual aggregation of whale sharks. The coastal and marine resources include expanses of mangrove forests, sea grass meadows, and extensive reef systems that support the fisheries that in turn provide food security for residents and underpin both the tourism and fisheries industries.

Mexico, Belize and the Bay Islands of Honduras all have a strong tourist trade linked to the reef, with beach, scuba and snorkel opportunities via the promotion of vibrant coral reefs, apex predators such as bull sharks and migratory species such as whale sharks and turtles. Marine tourism provides economic opportunities but has not replaced the importance of fishing for many families

In part, due to recognition of the importance of these resources, 57% of the territorial sea within the MAR is now within protected areas (Marine Protect Areas / MPAs), although only 3% is fully protected from fishing¹ and studies show that in fully protected areas there are up to 10 times more snapper and grouper biomass than those with general designations.² Within the MPAs and fish refuges there are concerted efforts to conserve Fish Spawning Aggregations (FSAs).^{3 4 5}

Assessment of the contribution of reefs and mangroves to the Belize economy

A 2008 World Resources Institute study in Belize indicated that “coral reef and mangrove-associated tourism contributed an estimated US\$150 million to \$196 million to the national economy in 2007 (12 - 15% of GDP). Annual economic benefits from reef and mangrove-dependent fisheries in Belize was estimated at between US\$14–16 million. Reefs and mangroves also protect coastal properties from erosion and wave-induced damage, providing an estimated US\$231-347 million in avoided damages per year.”

World Resources Institute, Coastal Capital, Belize. The Economic Contribution of Belize's Coral Reefs and Mangroves. 2008.

I.2 Socio-economic context in the project countries

The region is characterized by uneven economic development at the regional level, particularly with regard to tourism, which together with agriculture is the most important economic sector for employment and income in the MAR region. Fishing and fishing activities are of relatively low importance when considered in terms of regional employment and economic contribution. However, the overall figures do not reflect the value of the sector, as in many coastal communities fishing is the main source of employment and a traditional livelihood⁶.

Tourism is the most important economic sector in terms of employment and income generation in the northern part of the MAR region, particularly in areas where it is already well established, such as the north of Quintana Roo

¹ McField et. al, 2018. p. 2

² HRI, 2015. p. 1

³ Domeier and Colin, 1997

⁴ Shapiro. et. al. 1993.

⁵ Heyman. et al. 2008

⁶ Data at the MAR level are not always easy to find as statistics are often country-specific, but the MAR region, with the exception of Belize, has only the Caribbean portion of the countries in the region.

(Mexico), Central Belize and the islands of the Bay of Honduras. In Belize, for example, 38.1% of GDP was directly or indirectly related to tourism activities in 2017⁷, one of the highest rates in the Caribbean region. This is also the case in the northern region of Quintana Roo, with 16 million tourists per year.

In fisheries, there are very few socio-economic data on small-scale fisheries and the data are old. According to reports by TNC⁸ (2006) and MAR Fund⁹ (2007), the MAR region has more than 6,000 fishermen in island and coastal communities stretching from Holbox in Quintana Roo to La Ceiba, Honduras. Nevertheless, the fishing sector represents a relatively small percentage of employment.

- *Mexico*: The State of Quintana Roo has about 2000 fishermen and 29 fishermen's cooperatives, which bring together the majority of fishermen (about 750 in 2006, 790 in 2010¹⁰) and are grouped in the Quintana Roo Federation of Cooperatives. Most fishermen are located in the northern part of the region in the area from Holbox to Puerto Morelos. The southern part of the state, which includes the area between Cozumel and Chetumal Bay, includes only about 30% of the state fishermen. In 2000, the total value of catches represented less than 1% of the state's GDP.
- *Belize* has about 1800 to 2000 artisanal fishermen, and 650 registered vessels, mainly in the northern region. Fishing and fish processing occupy 2.4% of the working population at the national level.
- In *Guatemala*, there are approximately 1,500 fishermen in the Bay of Amatique region, in the Gulf of Honduras, mainly in a few communities (Livingston, Puerto Barrios). Most fishermen are Garifuna and Métis craftsmen, but about 60 semi-industrial shrimp trawlers based in Livingston also operate in the Amatique Bay area. Many Guatemalan fishermen remain heavily dependent on legal or illegal fishing in Belize waters in areas ranging from Gladden Spit / Glovers Reef to Sapodilla Cayes.
- In *Honduras*, little information is available on the number of fishermen. Heyman and Graham (2000) estimated that there were 647 fishermen in the coastal area from Rio Motagua to Tela. But there are also a significant number of fishermen in the Bay Islands and in the municipality of La Ceiba for which figures are not available.

Country	Average GDP per capita (US PPP) ¹	Labor Force Participation Rate ²	% Reported Employment in the Agricultural Sector ³	% Employment in Tourism activities ⁴	Fishers and fish processing as a % of PEA ⁵	Hotel Rooms per Capita ⁶
Belize	n/a	60	20.1	6.2	3.7	45
Guatemala	n/a	36.7	39.7	17.6	3.8	n/a
Honduras	2520	36.5	n/a	n/a	n/a	n/a
Mexico	10160	58	8.4	18.9	0.6	18.1

Sources : ¹ UNDP Mexico 2003; UNDP Honduras 2003. ² CSO 2005; INE Guatemala 2002; INE Honduras 2001; INEGI 2000. ³ CSO 2000a; INE Guatemala 2002; INEGI 2000. ⁴ CSO 2004; INE Guatemala 2002; INEGI 2000. Tourism figures for Guatemala include commercial sector activities and are not comparable with the Belize and Mexico figures which only include activities related to the hotel and restaurant sectors.

⁵ CSO 2000a; Heyman and Graham 2000c; INEGI 2000. ⁶ BTB 2004; SECTUR 2006

According to the structural study of artisanal fisheries in Central America (OSPESCA, 2010 in Fargier 2012¹¹) and the Statistical Yearbook of the Economic Commission for Latin America and the Caribbean (ECLAC, 2011), the most recent

⁷ World Travel and Tourism Council, 2017. Economic Impact 2017 Belize

⁸ TNC, 2006. Towards Sustainable Fishing Communities in the Mesoamerican Reef Region

⁹ MAR Fund, 2007, Diagnostico organizacional y de necesidades en la comunicades pesueras en el sistema arrecifal para el establecimiento de reservas marinas comunitarias. H. Hidalgo, A. Mendez. Rapport MAR Fund, 100p.

¹⁰ BobadillaT. F.J.2014.Diagnóstico socioeconómico de las comunidades pesqueras artesanales en QuintanaRoo. Comunidad y Biodiversidad, A.C.(COBI), Guaymas (México),50 pp.

¹¹ Luc Fargier, 2012. La participation des pêcheurs artisanaux à la gestion des activités halieutiques artisanales tropicales : étude de cas dans le Golfo Dulce, Costa Rica. Sciences agricoles. Université de La Rochelle, 2012. Français.

sources, the Total fish production (artisanal and industrial) in Central America would be about 350,000 tonnes in 2008, of which 1% for Belize, 6% for Guatemala and 4% for Honduras (Fargier, 2012).

Distribution of artisanal fishing communities	OPESCA, 2008 (in Fargier, 2012) (No data on Mexico)
Guatemala	32
Belize	29
Honduras	ND

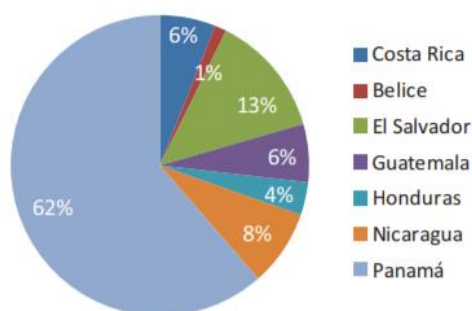


Figure 1. Distribution of total fish production by Central American country in 2008 (in Fargier, 2012)

Declining commercial resources

Commercial fish monitoring at more than 300 stations as part of annual HRI monitoring shows that commercial fish biomass decreased by an average of 23% between 2006 and 2016 on 104 monitored sites (which do not include many protected areas). Guatemala recorded the largest decline, while Mexico recorded an increase, particularly for snappers. The 2018 report also reports that fully protected areas are functioning, and commercial fish biomass has doubled in these areas over the last decade.

1.3 The importance of fish spawning aggregations

Fishing, particularly of snappers and groupers, is essential for the economy and food security of the Caribbean coastal communities of the four countries. Spawning is an essential and vulnerable step in the life cycle of several fish species including those with significant commercial value (snappers, groupers, jacks). By definition, a fish spawning aggregation is a group of conspecific individuals grouped into densities three times higher than those found during non-procreation (Domeier and Colin, 1997). Spawning aggregations ensure the repopulation of specific areas and provide a source of larvae, which in turn replenish and enhance the resilience of populations along the MAR. During these aggregations, fish are more vulnerable and easier to capture. These sites have therefore been massively overexploited for some time without any type of control, resulting in the extinction of some of these fish (Heyman et al., 2004). In particular, the Nassau grouper, which is largely overexploited in the region, is now listed as threatened on the IUCN Red List.

Fish Spawning Aggregations / FSAs

FSAs are temporary gatherings of fishes that have come together for reproduction in densities three times higher than those found in non-reproductive periods.⁴ Undisturbed FSAs ensure the fish populations can continue to fuel local economies, provide food security, and contribute to the overall health of regional coral reefs. The few times and places where FSAs occur represent most, if not all, of the annual reproductive output for the species that spawn there.⁵ During spawning periods, fish group together, making these areas particularly vulnerable to overfishing.⁶

The species is protected in Mexico and Belize; either its fishing is prohibited during the spawning period (December to February), and / or the spawning sites are protected, directly ("replenishment zones" of Belize), or included within larger marine protected area. Protecting breeding sites is therefore essential for fishing, also because that fish reproduces best when reaching large sizes.

1.3.1 Status of FSAs along in the MAR region

Although there are several multi species FSAs sites, it is primarily the Nassau grouper breeding sites that have attracted research because of its threatened status.

More than 100 potential FSA sites have been identified along the Mesoamerican reef (see Appendix) by scientists, including Will Heymann, who has been working on these issues for many years, by fisheries administrations and several NGOs, following many exchanges and in collaboration with the fishermen. About 30 of them have been

investigated and proven, others remain to be validated; others, finally, have already disappeared, in Mexico and Honduras, due to too much fishing pressure.

Mexico (Quintana Roo)	62 potential sites, including 29 characterized sites, 2 characterized and protected sites, 1 extinct site, 4 unprotected verified sites, 3 verified and protected sites
Belize	11 sites proven to be protected, either within an MPA or as a replenishment zone
Guatemala	No spawning aggregation sites identified before Cayman Crown was discovered
Honduras	19 potential grouper aggregation sites have been identified, 4 of which have been validated: Roatan Banks and La Gruperá in Cayos Cochinos, Banco Cordelia and Western Banks, on Roatan

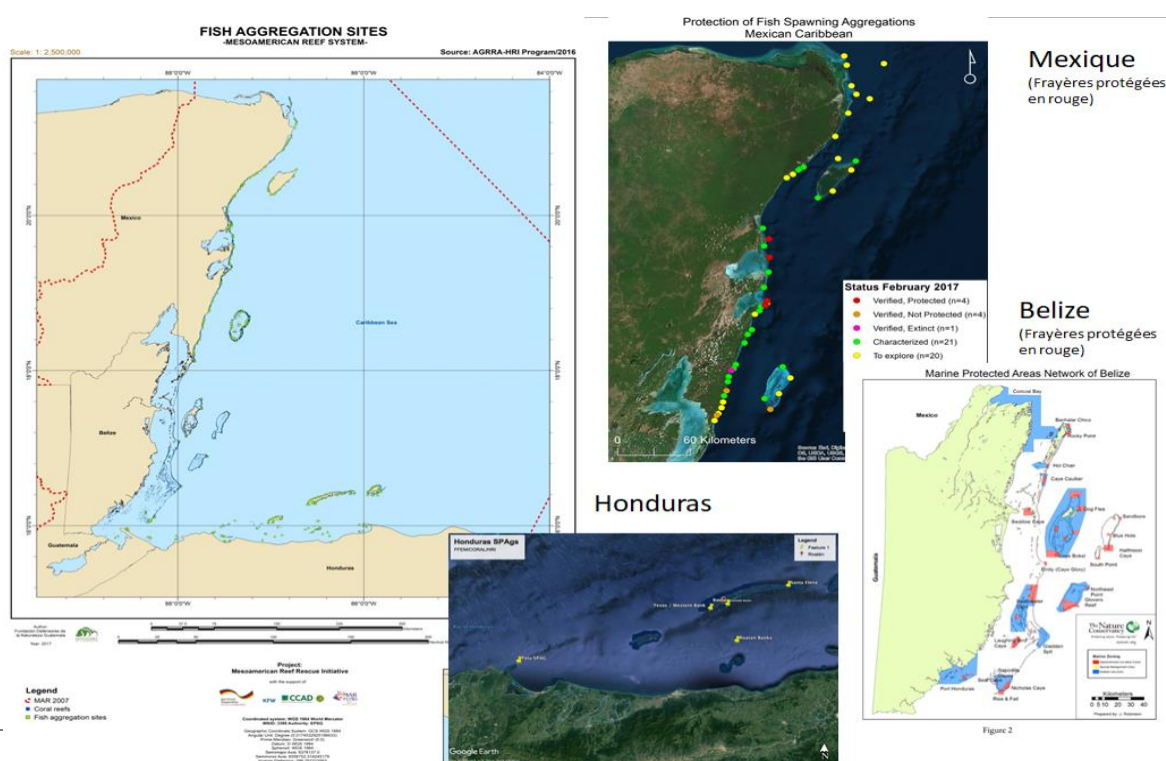
1.3.2 The recent discovery of Cayman Crown

The recent discovery in the southern Cayman Crown reef area, a multi-species spawning aggregation site along the Belize-Guatemala maritime boundary, is a new challenge and provides a unique opportunity to enhance the conservation of the marine ecosystem along the Mesoamerican reef.

The information gathered to date demonstrates the importance of the site and the need to work on its management and conservation. The incorporation of Cayman Crown into the Belize and Guatemalan Protected Area System would:

- Conserve and protect important areas (still to be fully documented) of multi-species FSAs, high levels of coral diversity, healthy populations of megafauna of endangered species.
- Strengthen the system of protected areas of the Guatemalan Caribbean coast. Guatemala represents the smallest portion of the MAR and offers total protection to only 0.6% of its territorial sea, 0% in reef areas. Cayman Crown is an opportunity to engage Guatemala to strengthen its conservation, MPA management and perhaps sustainable tourism efforts along the Caribbean coast of Guatemala, which has so far only weak tourist attractions.
- Increase the diversity of protected marine habitats in Belize and increase the percentage of its territorial seas under total protection, while strengthening its network of fish replenishment zones.
- Increase the resilience of the MAR by protecting a unique area, which is the subject of territorial dispute, and still well-protected. Cayman Crown is relatively far from the coast, at open sea, which has discouraged artisanal fleets fishing.

Figure 2: FSA sites of the MAR region



I.4 Institutional context and public policies

In 1997, the governments of Honduras, Guatemala, Mexico and Belize signed the Tulum Agreement (see box below) to promote the conservation of the MAR through sustainable use of resources, for the welfare of present and future generations, particularly the approximately 2 million people that depend on the region's resources. Since the agreement was ratified, an impressive marine and coastal protected area (MCPA) network spanning approximately 8,192,526 hectares, made up of 73 proposed and declared MCPAs, has been established (see map of MCPAs in Annex 1). Most of these MCPAs are actively managed with allotted annual funds, management plans and basic staff.

Other effective regional solutions have evolved to face regional challenges. Given declining fish stocks, policies have strengthened across the region. In Belize, spawning aggregations are within protected areas that have varying degrees of financial support; reef-associated herbivorous fish are protected in Belize, Guatemala, and the Bay Islands of Honduras; a region-wide ban on shark finning has been implemented; and no-take protected areas that serve as fish refuges are being created thanks to the joint efforts of civil society groups, fishing cooperatives, and government agencies. Belize leads the region in fish spawning aggregation research and management. Belize created a network of MPAs around 11 multi-species FSA sites in 2003 and continues to protect and monitor them. Honduras and Mexico also have declared protections for important FSA sites.

The TULUM Agreement

On June 5, 1997, the World Environment Day, in Tulum, Quintana Roo, Mexico, the Presidents of Mexico, Guatemala, and Honduras, and the Prime Minister of Belize signed an agreement known as the Tulum Declaration. This agreement promoted the conservation of the reef system by promoting its sustainable use and establishing work linkages among authorities, and promoted developing cooperative programs and projects, as main issues.

The Tulum Declaration inspired the four countries' governments, organized civil society, and the international cooperation. Reactions and initial investments in the area were different for each country. Mexico focused on declaring marine protected areas; Belize centred on developing a comprehensive coastal plan; Honduras concentrated on protecting one of its most important areas: The Bay Islands and Banco Cordelia, while Guatemala committed to declaring the Punta de Manabique Wildlife Refuge.

With Support from the Global Environment Facility (GEF), through the World Bank, numerous civil-society organizations, worked on the development of a fifteen-year plan. Eight years later, the Tulum Declaration was ratified.

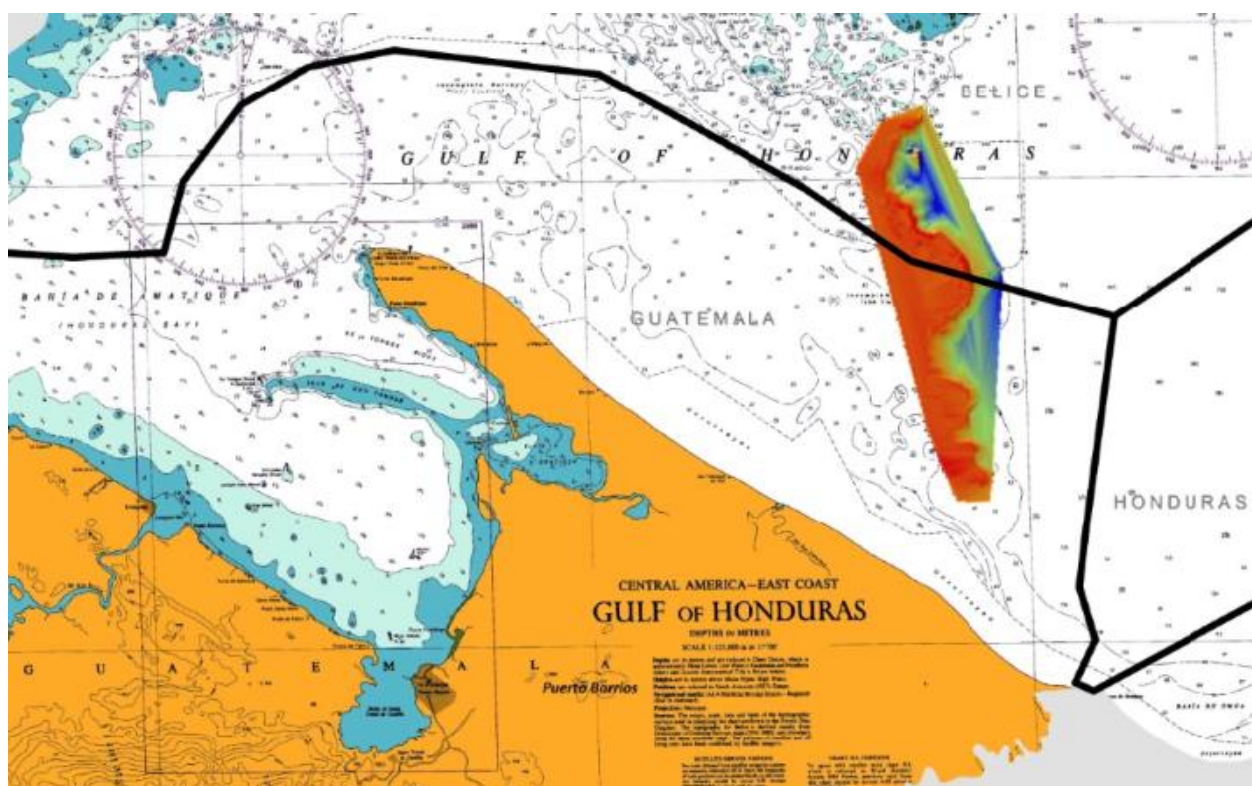
There is no doubt that there are obstacles to developing responsive, integrated, national and trans-boundary solutions to some of the threats in the region (see I.4). On a regional level, there are substantial differences among countries and unresolved boundary disputes. Conversations among governments and ministers of the four countries are not a simple matter and regional agreements can take years. The civil society organizations engaged in the Project will steer clear of transboundary political controversies providing a mechanism for continuing program implementation and collaboration even when governments are not working well together.

The most pressing current border tension is between Guatemala and Belize. On April 15, 2018, Guatemala will hold a referendum asking citizens whether they agree that legal claims on the territorial, insular and maritime dispute against Belize should be submitted to the International Court of Justice for resolution. Even though the border dispute has complicated political relationships, Belize and Guatemala signed a Bilateral Agreement in 2014 and Guatemala officially ratified it in December 2017, publishing the agreement in the official gazette.¹² The agreement states that the two countries have committed to collaborate in the protection of the environment and the sustainable management of natural resources, while maintaining and deepening the bilateral ties of friendship and cooperation between the countries.

In addition to the bilateral agreement and in spite of the current territorial dispute between Belize and Guatemala, the strong relationships and history of joint work and exchanges between national civil society organizations (CSOs) in these countries are a direct opportunity for advances in the conservation and protection of natural resources and ecosystems shared between them. This is the case for the Cayman Crown reef, as detailed below.

¹² Acuerdo entre la República de Guatemala y Belice para la Protección del Ambiente y el Uso Sostenible de Recursos, Diario de Centroamérica #56, 6 de diciembre del 2017.

Figure 3: Limit of Belize, Guatemala and Honduras EEZs in the Cayman Crown Zone (in color)



Long-standing regional cooperation

The MAR Fish project partners have been collaborating for several years. For example, TIDE, FUNDAECO, COBI, SEA, EDF, CORAL, the Belize Fisheries Department, other national authorities and the MAR Fund are all partners of HRI, as well as several members of the Belize Spawning Aggregation Group and BICA in Honduras. Will Heyman, over the years and from different organizations, has played a key role in drawing attention to the importance of fish spawning aggregations and the need to protect them, first in Belize, then in Mexico. He has trained many practitioners in the region to monitor, collect and analyse data, including staff from HRI, COBI, SEA, EDF and others.

Project partners have also established links through other mechanisms. For example, TIDE and FUNDAECO are members of the Trinational Alliance for the Gulf of Honduras (TRIGOH) and have been collaborating in the region since the 1990s.

Through projects supported by MAR Fund, exchanges were encouraged among all stakeholders, including several project partners, at different times and for different specific purposes, which united them for the conservation and management of the Mesoamerican Reef.

The institutional context concerning Fish Spawning Aggregations

Mexico: The National Commission on Aquaculture and Fisheries (Comisión Nacional de Acuacultura y Pesca, CONAPESCA) is responsible for the management, coordination and development of strategies on the sustainable use and exploitation of fisheries and aquatic resources. The National Institute of Fisheries (Instituto Nacional Pesca, INP), conducts scientific and technological research and provides advice on preservation and replenishments.

- The **Spawning Aggregation Working Group of Quintana Roo** was established in 2007 by NGOs and researchers based in the Mexican Caribbean. Meetings took place irregularly until its reactivation and revitalization in 2014. Since then, it meets annually. The group members, who work with local fishing communities, have since characterized more than 30 potential FSA sites, visually verified nine FSA sites and, since 2013, have protected four in no-fishing zones under fisheries legislation (CONAPESCA / SAGARPA): 2 in Punta Allen and 2 in Punta Herrero.

- **The Kanan Kay alliance (Allianza Kanan Kay)** brings together 46 partners (NGO, government and private fishery cooperatives). Its objective is to create an effective network of controlled fishing zones covering 20% of the territorial sea of Quintana Roo, with a view to promoting the restoration of the Mesoamerican reef fisheries. Spawning areas were protected in 2013 and 2015. CONAPESCA does not play an active role in field activities, but it is the authority that approves protection proposals with areas of fisheries refuge.

Belize: The Department of Fisheries is under the Ministry of Agriculture, Fisheries, Forestry, Environment and Sustainable Development; it is responsible for the conservation and sustainable use of fisheries resources, registrations and licenses, fisheries research, education, liaison with fishing cooperatives, marine reserve management, the application of the Fisheries Act, export and research permits.

- The **Belize National Spawning Aggregation Working Group** was established in July 2001 following a national survey of Nassau Grouper spawning aggregations in early 2001, which revealed very low numbers of spawners. In 2002, a coalition of seven NGOs worked successfully to protect 11 Nassau grouper spawning sites and to introduce a four-month closure season. Since the beginning of 2003, the working group has been revitalized and meets regularly every quarter to share data and develop management strategies¹³. The purpose of the working group is to "determine the success of management measures to strengthen Nassau grouper breeding aggregations" (<http://www.spagbelize.org/>). Annual activities include monitoring and research, database maintenance, data analysis, education, public awareness and enforcement¹⁴.

Guatemala: The Directorate of Fisheries (DIPESCA) is under the Ministry of Agriculture, Livestock and Food. The coastline on the Caribbean coast is limited.

Honduras: The General Directorate for Fisheries and Aquaculture (DIGEPESCA) is under the Ministry of Agriculture and Food.

1.5 Ratified international conventions

All four governments are party to the Convention on Biological Diversity (CBD). Belize, Mexico and Guatemala have National Biodiversity Strategy and Action Plans (NBSAP) in support of the Aichi Biodiversity Targets and all four countries are CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) signatories. This February (2018) Honduras ratified the Cartagena Convention, and now the four countries of the Mesoamerican Reef are signatories. Belize, however, is the only one of the four countries that has ratified the specific Convention Protocols: Protocol Concerning Co-operation in Combating Oil Spills in the Wider Caribbean Region, Protocol Concerning Specially Protected Areas and Wildlife (SPA) in the Wider Caribbean Region, and Protocol Concerning Pollution from Land-Based Sources and Activities. Mexico, Guatemala and Honduras have also ratified/accepted the Nagoya Protocol. Additionally, all four countries have national climate change strategies and action plans and have received funding for REDD strategies. The MPAs in each of their countries are fully integrated within their wider national protected areas system. In addition to this alignment, fisheries departments, and in some instances coast guards and or navy ministries, are the lead authorities for securing marine areas. Belize, Honduras and Mexico are members of the International Coral Reef Initiative (ICRI).

¹³ Current members of the working group are: University of Belize - Institute for Environmental Research, Coastal Zone Management Authority and Institute, Southern Environmental Association, Fisheries Department, Toledo Institute for the Environment Development and Environment, Turneffe Atoll Sustainability Association, Sarteneja Fishermen's Association, Belize Audubon Society, Wildlife Conservation Society, Placencia Cooperative, Belize Fishermen's Federation, The Nature Conservancy and Wildlife Conservation Society

¹⁴ The newsletter of the SPAG working group for 2016 and 2015 and the latest 2013-2014 annual report are available at <http://www.spagbelize.org/Public-Awareness.aspx>

United Nations Food and Agriculture Western Central Atlantic Fishery Commission Spawning Aggregations Working Group (FAO WECAFC SAWG)

The task force on spawning aggregations aims to:

- Collect and analyze data on fish aggregations during spawning periods in Member countries and monitor their evolution.
- Seek partnerships with other institutions that can provide assistance in monitoring, evaluating and formulating management recommendations for the protection and conservation of fish that congregate during spawning periods.
- Provide advice on the management and implementation of regional strategies and regulations to protect fish that congregate during spawning periods.
- Report to the appropriate institutions at each session.

The working group met for the first time in 2013 and again in 2018. The first meeting resulted in a work plan ratified by WECAFC, which included the "Miami Declaration", a declaration on the need to preserve spawning sites. The second meeting brought together representatives from 18 countries and territories in the region; it resulted in a detailed set of complementary recommendations that reiterated the Miami Declaration and were added to the detailed work plan underway.

1.6 Main threats inherent to the context

1.6.1 Environmental threats¹⁵

The problem statement for this project is illustrated in Figure 2, below. The final problem of declining fisheries, affected by indirect (in grey) and direct (in orange) threats, has taken us to functionally low levels of fish biomass in many areas throughout the MAR. As is explained in this document, the proposed project will contribute to the restoration and recovery of fisheries in the region, therefore playing an important part in the reduction of the current problem.

The general larger threats affecting the Mesoamerican Reef are outlined below:

➤ Discharge of effluents and contaminants from human activities

Effluents from human activity in agriculture, beachfront resorts and coastal cities, directly impact the MAR's coastal and marine habitats. Sewage reaches the sea through porous limestone in Mexico, down the Motagua River in Guatemala and from coastal cities all along the MAR's coastline. Inadequate water treatment, agro-chemicals, and untreated sewage fuel algal blooms and are harmful to both reef and human health. Some advances have been made to substantially reduce fertilizer, pesticide, and sediment run off into the MAR. Over the past decade WWF has deployed precision cultivation techniques with the agricultural sector in Belize, Guatemala and Honduras—with encouraging results, as the private sector has begun to incorporate them in their farming procedures. On the local level, there are success stories of small communities improving water treatment plants, connecting more households, and addressing leakage from poor septic systems. Nonetheless, additional efforts are needed for new or improved infrastructure to treat and reduce wastewater (including sewage, agricultural and industrial effluents) in order to reduce the nutrients and toxins that reach coral reefs.

➤ Unsustainable coastal development

Unsustainable coastal development takes a toll on marine and coastal habitats, particularly mangroves, which provide shoreline protection, water filtration and nursery habitat for many economically and ecologically important marine species. Effective Coastal Zone Management (CZM) is a critical need within the region, to better balance economic development, sustainable livelihoods and long-term ecological sustainability. Specific efforts to implement and enforce CZM plans, especially to address direct physical damage through mangrove removal, dredging and/or land filling, and indirect damage through increased runoff of sediment, pollution, and sewage, are needed. Major successes to date have been the banning of oil exploitation along the MAR both in Mexico and Belize.

¹⁵ Threats are well documented in the Healthy Reefs Initiative *Report Cards* and *Eco-Audit*.

➤ **Overfishing pressure**

Years of constant overfishing have resulted in reductions or collapses of some fish, lobster and conch stocks. Commercial fish biomass dropped 23% over 10 years in sites repeatedly surveyed by the Healthy Reefs Initiative and reported in the 2018 Report Card, and there is a decline in mature fish with much greater reproduction capacity. Illegal fishing continues to be a problem due to less than optimal enforcement. Economic opportunities for some coastal communities are limited, resulting in greater pressure to fish. There are ever growing fleets of small artisanal fishing boats, and short-term hardships when areas are closed or controlled. FSAs are always a tempting target, even when fishermen know they are reducing future fish stocks, as they provide a short-term economic fix.

➤ **Climate change impacts on the reef**

The preceding threats are exacerbated by the impacts of climate change on the reef, specifically increasing water temperatures, water acidification, and increased storm severity. Climate change takes a toll on coral reefs in multiple ways: ocean acidification (which occurs when oceans absorb CO₂ from the atmosphere) hinders corals from absorbing the calcium carbonate they need to maintain their skeletons; elevated sea temperatures from global warming bleach corals and change oceanographic dynamics along with species behaviour such as larval settlement and juvenile movements, and increased storm intensity and subsequent wave surges directly damage reefs. The Project is a direct response to the threat of overfishing, but also provides numerous benefits for enhancing resilience to climate change. Healthy reefs can resist the impacts of climate change better than reefs that are already degraded. Increased fish biomass and productivity helps the whole ecosystem stay healthier. From a research perspective, the monitoring program that will be put in place in FSA sentinel sites will contribute to understanding the connectivity and ecosystem health of the MAR, as well as provide information on seawater temperatures and climate change impacts on FSAs.

1.6.2 Political threats

➤ **Territorial dispute between Guatemala and Belize**

Guatemala has been claiming 53% of Belize's area for decades. Things have recently accelerated with the Guatemalan referendum of April 15, 2018 concluding that Guatemala wishes to resolve this dispute with the International Court of Justice (ICJ). Belize must also vote by 2019 to comment on whether to use the services of the ICJ. If Guatemala won its appeal, the territorial waters would be modified and the site of Cayman Crown exclusively on the Guatemalan side. If this scenario is not impossible, however, it is highly unlikely. On the one hand, Belizeans may not agree to settle the dispute at the ICJ. The question would then remain unresolved, as in the past, without it having any real influence on the bilateral relations between the two countries. Moreover, even if Belize would agree to resolve the dispute at the ICJ, it is likely that the latter advocates the status quo, especially given the age of the case that dates to the nineteenth century. Finally, the risk of a legal settlement of the dispute exists, following the referendum of 2018, which made the headlines, but its importance must be relativized, and nothing should evolve during the 3 years of the project.

The previous point demonstrates the importance of an approach conducted mainly through civil society, while involving the respective authorities of the countries concerned. As a precaution, politicians should be approached in a measured, tactful and timely manner.

1.7 Main Initiatives and Projects in the MAR Region

Thanks to collaborative, national conservation and community-based organizations, and support from the national governments and donors, the MAR region has a substantial number of on-going regional programmes. Key donors include:

German Cooperation through KfW. They fund the Project "Conservation of Marine Resources in Central America". It consists of two phases of €5 million and 5 years each. Although they were concurrent for a couple of years, Phase I finalized in August of 2017. Phase II will end in December of 2019. This project is administrated by MAR Fund. In addition, KfW provided a €10 million grant to MAR Fund to establish an endowment fund in 2011. The revenue contributes to the Small Grants Program and operation costs. In 2014 KfW granted an additional €7 million, also in endowment funding, for the Reef Rescue Initiative.

FFEM. Has funded the “Establishment of a Fund for the Long-Term Financing of the Coastal and Marine Protected Areas Network of the Mesoamerican Reef”. Through this project, FFEM made an endowment grant of €1 million to MAR Fund. The revenue supports the Small Grants Program.

Global Environment Facility. The GEF has approved the Project “Integrated Ridge to Reef Management of the Mesoamerican Reef Ecoregion” for US\$9.8 million (€8.4 million). The executing organization for the project will be the Central American Commission on Environment and Development (CCAD) and the implementing agency is WWF-US. This project has not started activities yet.

Oak Foundation. Oak, a very important donor for the Mesoamerican Reef, exited the MAR in mid-2016. As a legacy to the region, Oak made a challenge grant to the MAR Fund. They committed a US\$10 million endowment grant to provide long-term financial sustainability for marine resource management and conservation initiatives in Belize if MAR Fund raises US\$15 million in endowment matching funds by 2021, for a total endowment fund of US\$25 million (€21.4 million). Until then, Oak will make US\$500K available for marine conservation annually. In addition, Oak has funded the “Re-granting in the Mesoamerican Reef” through MAR Fund, which is a US\$2 million (€1.7 million), 4-year program to re-grant to seven longstanding Oak Foundation partners working on different strategic aspects of marine resources management in the region.

The Summit Foundation. Is a long-time funder with a focus on the conservation and management of the MAR. They fund different conservation objectives, such as fish replenishment sites, MPA management, sustainable tourism, waste management, reef health monitoring and spawning aggregation sites, to name a few. They provide annual grants to a large suite of organizations, both from the MAR region as well as from the United States.

The US Agency for International Development does not have a current program in the region, but its last initiative was MAREA (Regional Program for the Management of Aquatic Resources and Economic Alternatives) with a total cost of US\$13.9 million (€11.8 million). As part of that program, they worked in the Gulf of Honduras (Belize, Guatemala and Honduras) and three other regions within Central America. They focused on several commercially important species (e.g. grouper, lobster, queen conch) and endangered species, such as sharks and sea turtles.

In addition to these donors, global non-profits such as The Nature Conservancy, Wildlife Conservation Society, RARE and World Wide Fund for Nature also work hand in hand with governments, fishermen and local NGOs in programs to promote sustainable fisheries in the region.

One notable aspect about the Mesoamerican Reef is the truly regional, cross border collaboration on many conservation and resource management issues. “Home-grown” regional initiatives have been established in the MAR by local actors:

Healthy Reefs Initiative (HRI) monitors reef health and makes science-based information on the status of the reef publicly available (see section I.6.a). Main donors include The Summit Foundation, Oak Foundation (now channeled through MAR Fund), and Oak Hill Fund.

MAR Leadership Program (MAR-L) accelerates conservation by strengthening the capacities and leadership skills of young conservationists in the four countries. This regional Program is housed within the Mexican Fund for the Conservation of Nature (FMCN) and is led by María Eugenia Arreola, the Program Director. Main donors include FMCN, The Summit Foundation, Oak Foundation and other foundations from the United States. See Section IV.4.

MAR c currently works in eight different countries, including the four MAR countries, to establish baselines and long-term inclusive monitoring programs for large threatened marine wildlife. By standardizing monitoring methods, measures of abundance, diversity, and biomass for cross-comparisons between sites, years, and countries, surveys are directly comparable across areas and years. It is led by Dr. Rachel Graham. Its donors include: The Summit Foundation, Wildlife Conservation Network, New England Biolabs Foundation, The Whitley Fund for Nature, among others.

Some of the previously mentioned organizations are funding and leading complementary initiatives such as the consolidation of protected areas, coral reef restoration, fisheries restoration, traceability and working with fishing communities to support managed access areas. As a result, **this project will build on previously established relationships and capacities among community-based organizations, local fisheries organizations, local NGOs and governments to conduct participatory monitoring of sentinel spawning sites and to characterize and promote the conservation of Cayman Crown in Belize and Guatemala.** The project will study and contribute to the conservation of fisheries in the MAR through its spawning aggregation sites, as one of the key aspects required to achieve a successful

and sustainable conservation of this resource. In addition, it will contribute to the creation and management of a critical area for the connectivity and health of the region's network of coastal and marine protected areas.

The MAR Fish Project can be seen as a sub-component of the larger regional Big Fish Initiative. The Big Fish Initiative (BFI) is a science, conservation and communications program designed to support the characterization, monitoring and protection of a network of multi-species fish spawning aggregations (FSAs) throughout the Wider Gulf of Mexico and the Wider Caribbean.

FSAs are productivity hot spots essential for fish reproduction and for maintaining sustainable fish populations. As such, FSAs fuel local fishing economies and they are essential for maintaining the health and resilience of regional coral reefs. The snappers, groupers and other fishes that spawn at these sites serve as a mainstay for the sustainable economies, food security, and health of local communities throughout the region. BFI is an integrative system for cooperative research, constituency building and marine governance that will contribute to the understanding, maintenance, and resilience of the fisheries and communities that depend on them. The Big Fish implementation team includes scientists, policy makers, fishers, NGOs, fisheries and communications experts with decades of experience working in the region.

The Project's scientists, citizen scientists, fishers and institutions from the MAR region will become part of the bigger BFI network to share knowledge, information and experiences. Connecting people and institutions via shared FSA protection and monitoring will ultimately help change the way fisheries are managed in the region to be more sustainable, adaptive, collaborative, and ecosystem-based.

Bringing BFI to the four countries is an opportunity to support the MAR's shared fisheries through the replenishment of commercial and herbivorous fish biomass needed for a healthy ecosystem, food security and a sustainable income for coastal communities

The added value of the FFEM project

Spawning aggregations have been the focus of attention in the Mesoamerican reef since 2007. Their management and monitoring is a permanent goal. They are now generally regarded as an essential conservation and management tool for the recovery of fish stocks and the overall restoration of the ecosystem, not only at the national level, but at the regional level. Local practitioners actively share their experiences and best practices. Government authorities are increasingly considering marine reserves or fish replenishment zones (FRZs), including spawning areas, particularly in Belize, as effective conservation and management mechanisms for fisheries resources, in which the participation of fishing communities is a win-win situation.

Although significant work has been done systematically for several years at the site level, on the Belize spawning aggregations sites and, more recently, in Quintana Roo, thanks to the efforts of COBI, the FFEM project will concentrate on the extension and the protection of the spawning aggregations network on the regional scale of Mesoamerica, in order to create a regional dynamic in favor of their maintenance. The project will contribute to the understanding of region-wide spawning dynamics and their adequate protection as a fisheries management tool that, along with other conservation strategies such as MPAs and FRZs, will contribute jointly to sustainable fisheries, food security and local economies.

The information generated by this project will complement the information and conservation actions currently supported by other ongoing projects in the region. For example, under the KfW-funded Marine Conservation Project in Central America (Phases I and II), a number of FRZs were created and stakeholder exchanges took place. A sustainable fisheries development network was created in 2017 and will meet again in 2018 to bring together all local, national and regional stakeholders working on different fisheries issues to exchange information, establish collaboration, promote synergies and identify gaps. Phase III of the project will continue to support the FRZ, but also the other spawning grounds and the network, thus promoting collaboration at different levels.

As described above, the activities of the various projects focus on improving the management of MPAs, coral nurseries and the creation of emergency funds. In this sense, the activities undertaken are complementary to those proposed by the FFEM project since the creation of a regional network of FSA sites is not included in the scope of existing projects.

Similarly, the characterization of Cayman Crown and the creation of new MPAs are not included in the activities of ongoing projects. The various initiatives tend towards a common objective and complement each other since the network of MPAs will be strengthened and the resource will benefit from an increased scientific knowledge. It is also

conceivable that the German cooperation will ultimately contribute to the capitalization of the Cayman Crown window so that it reaches a level of capitalization in line with the identified needs.

Lessons learned from the evaluation of the latest FFEM project

MAR Fund has already received funding from the FFEM, initiated in 2013, which enabled it to structure and capitalize its endowment fund, through the project "Establishment of the sustainable financing fund of the network of marine and coastal protected areas of the Mesoamerican Reef", alongside the KfW. This project was the subject of supervision missions which confirmed the quality of management, the good governance of the fund, exemplary to the point that MAR Fund is today invited to share its experience with other younger funds, and to sponsor them, as with its support of the environmental fund for Mediterranean MPAs, M2PA, also supported by the FFEM, or the CAFE network (also supported by the FFEM); the spin-offs on the ground are already significant, thanks to a portion of the income from capital, allocated to projects led by CSOs, through a Small Grants Program. In 2017, KfW completed a final technical evaluation of the endowment fund, with good results. In its final evaluation letter, KfW wrote that "the results of the project were very positive" and expressed "its recognition of the moderate spending policy that has been applied throughout the project period".

The evaluation found the implementation of the Small Grants Program to be particularly effective, and in particular highlighted the relevance of the MAR Fund's monitoring of the selected CSOs.

The Small Grants Program has become a reliable funding opportunity for MAR conservation organizations. The revenue from the FFEM contribution of 1 million euros to the endowment of MAR Fund co-finances since 2015 the annual call for tender of this Program. Since its launch, 10 calls for proposals have been launched. The program has funded 71 projects developed by more than 63 organizations in the region, including local communities, government organizations, NGOs and academic institutions. More than € 1,732 million have been approved and 1.4 times this amount has been mobilized. Leverage is important as other funders are now providing financial support for this program, including the Paul M. Angell Foundation, Oak Foundation, Overbrook Foundation, Summit Foundation, NOAA, National Fish and Wildlife Foundation and the Orangery Foundation.

From a conservation perspective, the Small Grants Program is an appropriate mechanism to support innovation and specific initiatives that address strategic conservation needs and threats, leading to significant conservation and management outcomes, and possibly additional funding for specific programs. Through this Small Grants Program, several fisheries research, management, conservation and policy projects have been supported along the MAR, including funding for spawning aggregations protection in Mexico.

I.8 Description of MAR Fund

MAR Fund will be the responsible agency for delivering the Project. It is a private, regional, environmental fund with a Board of Directors comprised of international collaborators, experts, the Central American Commission on Environment and Development (CCAD), and the founding environmental funds from each of the Mesoamerican Reef countries: Protected Areas Conservation Trust (Belize); Fundación para la Conservación de los Recursos Naturales y Ambiente en Guatemala (FCG); Fundación Biósfera (Honduras); and Fondo Mexicano para la Conservación de la Naturaleza (Mexico).

It is registered in the United States as a tax-exempt charitable organization. Although it is legally established outside the Mesoamerican Reef region, its purpose is to provide sustainable funding for conservation in the ecoregion. A MAR Fund entity was registered in Guatemala City, where the coordinating office is established, in August of 2014.

MAR Fund (www.marfund.org) supports a functional network of priority coastal and marine protected areas, the establishment and management of fish replenishment sites, and an innovative reef restoration initiative, among other programs that, jointly, promote adaptation to climate change, conservation of natural resources and ecological processes, permanence of connectivity functions and ecosystem services.

Now in its 13th year of operation, MAR Fund has successfully mobilized US\$21.8 million of project funding and a US\$26 million endowment. Its endowment—funded by FFEM and German cooperation through the KfW— provides

funding for small grants throughout the region for strategic conservation objectives, innovation in conservation and support for the grantees' operations.

As a transparent financial mechanism with a solid administration and annual audit, MAR Fund enables innovative, transnational solutions to critical Mesoamerican Reef issues. This effective institutional framework provides fiscal and management oversight and non-profit (501c3) status and a proven track record of soliciting, receiving and managing tax-deductible and government donations. MAR Fund provides meaningful, long-term financial support through grant making across the region and securing trustworthy reef management advice for its partners.

I.9 A description of the main issues that justify the setting up of the project

Declining fisheries, with declining commercial fish biomasses, affected by indirect threats (in gray) and direct threats (in orange), have resulted in lower levels of fish biomass in many areas along the MAR. Spawning aggregation sites fuel local fishing activities and are essential to maintaining the health and resilience of regional coral reefs. Snappers, groupers and other fish that spawn at these sites serve as a pillar for sustainable economies, food security and the health of local communities throughout the region. The challenge of the project is simply a food security issue in the region by promoting the maintenance or even the restoration of commercial fish stocks via a network of spawning aggregation sites. By helping to protect Cayman Crown, the project strengthens this network with a new link. International co-ordination between Cayman Crown's two coastal countries (Guatemala and Belize) is also one of the important issues of the project, particularly in the context of the territorial dispute between them.

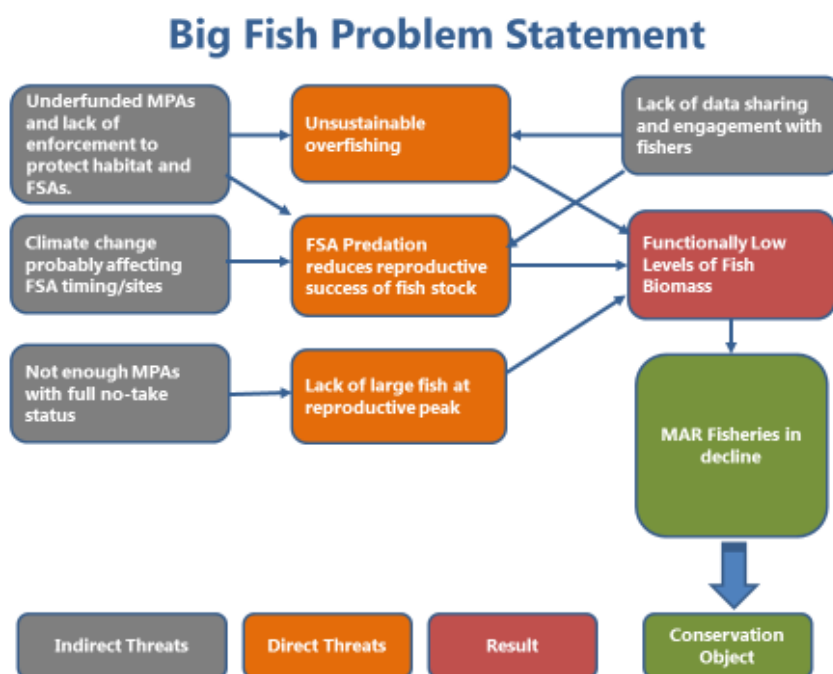


Figure 4: Problem statement for the Big Fish Mesoamerican Reef Project.

II OBJECTIVES OF THE PROGRAM

II.1 Overall goals of the program

The overall objective of the project is to promote the recovery of fisheries in the Mesoamerican Reef region, by strengthening the network of protected spawning aggregation sites of commercial fish, as critical areas in the life cycle of these species.

II.2 Specific objectives

Over a three-year period, from 2019 to 2021, the project will achieve two specific objectives:

1. Obtain legal recognition and adequately manage Cayman Crown in Guatemala and Belize, a recently discovered fish spawning aggregation site;
2. Promote participatory monitoring of a network of sentinel spawning aggregation sites in the four Mesoamerican Reef countries.

Located partly in Guatemala and partly in Belize, the Cayman Crown site should be considered as a single functional unit. However, given the border dispute between the two countries, the strategy is first to ensure protected area declarations and their control, separately on both sides. Strong relationships between national NGOs, which often collaborate with each other, will promote these declarations and strengthen citizen diplomacy to ensure regular exchanges between the two countries.

Monitoring a network of seven sentinel sites will contribute to the understanding of the health of the MAR ecosystem, the potential for fish stock restoration, connectivity and provide information on the impact of climate change on the spawning aggregation sites, to the benefit of fisheries and the communities that depend on them. The theory of change is such that by providing information on spawning aggregation sites and engaging local actors for their protection:

- Policies will be put in place, in countries where this is necessary, for the full protection of spawning aggregation sites or temporary protection during spawning seasons;
- the law will be applied during spawning periods in spawning sites, not only in already protected areas but also in new areas proposed at Cayman Crown;
- local fishermen will adhere to no-fishing guidelines according to the rules set out in the spawning aggregation sites; and
- the number of fish registered in these areas during the spawning period will be stable or increase significantly for all species.

This project also includes funding for the establishment of MPAs, management and short-term monitoring of Cayman Crown Protected Areas, with the collaboration of NGOs and communities. An endowment fund, as a long-term mechanism, will be created to support the management of Cayman Crown Protected Areas in a sustainable manner. The endowment fund will be established as a window within the MAR Fund Endowment, in a separate account that provides clear and transparent accountability.

III CONTENT OF THE PROGRAM

III.1 Component 1: Knowledge and protection of the area of Cayman Crown

Context

The site of Cayman Crown was discovered in 2013 by the HRI coordinator for Guatemala, Ana Giro, while working with local fishermen from the Quetzalito community. They, who fish mainly in deep areas, reported the presence of 'rocks' (local reference to coral reefs) nearby.

The first exploratory site dives and the evidence provided by bathymetric analysis revealed the existence of the most well-developed reefs of Guatemala, with a wide variety of habitats, and home to many marine organisms. With 60% of live coral, live coral cover is amazing, compared to the average of the Mesoamerican Reef that is only 20%. Sponge density and diversity, as well as the size of individuals, are particularly high. Top predators, charismatic marine mega fauna and several endangered species, such as Goliath grouper, in critical danger of extinction, are present in abundance.

The reef system is at least 15 km long and about 6 km wide. In addition, the configuration of the site, the complex physical features of the reef system, with reef peaks, platforms, pinnacles, spurs, furrows and channels, which provide an ideal habitat for spawning aggregations, suggest that the site could represent a multi-species spawning area, the only one on the Caribbean coast of Guatemala; preliminary observations of multi-species spawning aggregation, including the common snapper (*Lutjanus analis*), the balistidae and the common jackfish (*Caranx hippos*), were made there.

Since its discovery, several expeditions to Cayman Crown have been completed. The first, in 2014, consisted of assessing the health of the reef (coral and macro algae cover, commercial fish biomass and herbivores). Later that year, with the support of the Summit Foundation, the first expedition to map Cayman Crown and continue its exploration took place. In 2015 and 2016, other sites were explored with a team of scientists and videographers to document the site. The HRI team continued to monitor reef health at the site in 2015, 2016 and 2017 and to document the effects of coral bleaching. The last mission took place in February 2018 to continue the mapping of the site. If protected, this area would complement the MAR region's network of protected areas for spawning aggregations.

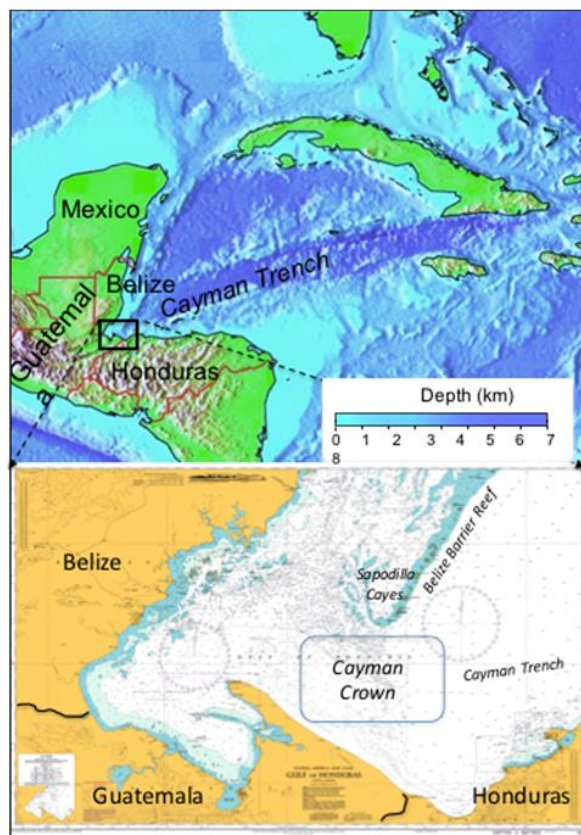
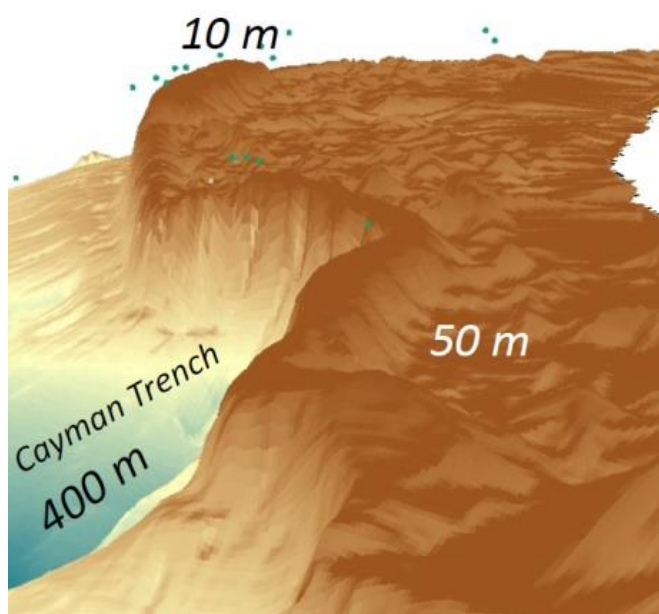


Figure 4: Maps of Cayman Crown



The boundary of the Belize and Guatemala EEZs is almost in the middle of the large Cayman Crown area. Given the dispute between the two countries, the joint protection of this area is a important issue. Today, while the approach to politicians is already advanced, several solutions are envisaged:

- In Belize: either extend the Sapodilla Keys Protected Area to Cayman Crown or make Cayman Crown a no-take zone. The government, aware of the importance of this area, supports its protection and supports the project;
- In Guatemala: the proposed solution is to extend the marine protected area of Punta de Manabique.

The objective of the component is, therefore, to lead towards the protection of this area, which is undoubtedly very important for the region, and to put in place the means for effective management on both sides of the maritime boundary between Guatemala and Belize; developing knowledge on this area, including reefs and aggregation sites, to provide advocacy arguments for protection. Strong relationships between national civil society organizations (CSOs) will ensure regular collaboration and exchange for harmonization of approaches between the two countries. To ensure continued diplomatic support, this proposal includes working on the declaration of new protected areas and their management.

Expected outcome: The Cayman Crown spawning aggregation site is legally recognized and managed in Belize and Guatemala

Expected results and activities:

Result 1.1: Acquired knowledge on Cayman Crown allows to fully document the request for protected area creation

- Activity 1.1.1 Preliminary mapping of the Cayman Crown, based on existing data
- Activity 1.1.2 Detailed mapping of the Cayman Crown area, based on new field data
- Activity 1.1.3 Ecological characterization of coral reefs and megafauna
- Activity 1.1.4 Characterization of the fish spawning aggregations
- Activity 1.1.5 Compilation and analysis of site characterization data to guide management
- Activity 1.1.6 Management and zoning recommendations

Result 1. 2: Cayman Crown Protected Areas Declaration in Belize and Guatemala is on track (or done)

- Activity 1.2.1 Drafting of documents for legal declarations (technical document depending on the status of MPA)
- Activity 1.2.2 Follow up on high-level policy discussions with policy makers to advance the declaration and management of the Cayman Crown site.
- Activity 1.2.3 Protection is gazetted and management plans are developed (Regional meeting for coordination and harmonization of regional policies)

Result 1. 3: Funding mechanisms are established

- Activity 1.3.1 Provide initial funding for Cayman Crown protected area management activities in Belize and Guatemala.
- Activity 1.3.2 Tentative Business planning for Cayman Crown MPAs
- Activity 1.3.3 Establish and manage an endowment fund for both Cayman Crown Protected Areas.

Result 1.1: Acquired knowledge on Cayman Crown allows to fully document the request for protected area creation.

Activities 1.1.1: Preliminary mapping of Cayman Crown

Creating a detailed bathymetric map for Cayman Crown is a priority. Knowledge shows that aggregations occur in specific geomorphological conditions and mapping the bathymetry of the area provides information on the likely existing fish spawning aggregations. The spawning aggregations are indeed in areas where the coral reef forms an "elbow" and in areas of relatively steep external slope (immediately surrounded by deep waters), areas in which currents favor both a productive medium and good propagation of larvae.

Multibeam and single-beam sonar mapping data has been obtained recently for the site. Its analysis will develop a basic preliminary map that will be used to guide the first field expedition to complement these essential bathymetric elements for further research. To do this, the existing corrected and cleaned data will produce a coherent 3D digital model. Additional existing data will also be sought from organizations in the region to supplement the analysis where appropriate. A first bathymetric map will be produced, with a sampling plan for the additional bathymetric data required.

Implementation: LGL or tender

Probable date: January-February 2019

Activity 1.1.2: Detailed mapping of the Cayman Crown area

An expedition to Cayman Crown will finalize the mapping of the area. The organization in charge of this activity will be chosen by tender. This field expedition, which should last approximately 10 days, could bring together various teams and organizations in the region with compatible bathymetric analysis equipment (acoustic sounders single beam or even multibeam). Whenever possible, information will be processed in the field. Final data processing and cleaning will take place immediately after shipment to rapidly develop the final bathymetric map from all collected data. This map will be used as a basis for determining the sampling plan for coral reef and FSA characterization. This expedition will include about 10 people and 2 boats.

Implementation on tender

Probable date: March or April 2019

Activity. 1.1.3: Ecological characterization of coral reefs and megafauna

The site has already been prospected a few times and 2 reef “stations” have already been monitored by HRI since 2014, as per the AGGRA method deployed throughout the Caribbean region. But given the extension of the site, these data are far too punctual to give a representative picture of the entire Cayman Crown region.

Following the previously adopted sampling plan, a certain number of representative zones of the different reef structures (ridge, shallow flats, spurs / furrows, reef rear, ...) will be explored. Detailed ecological studies will be conducted at some stations to describe the area and assess its condition. The inventories will make it possible to specify the specific composition and diversity of corals, macro-algae, sponges and other key benthic components (soft corals, sea fans, etc.), key fish species (herbivores, top predators and commercial species) and macroinvertebrates; Coral recruitment, the size structure of the coral population, the status of corals and the roughness of the reefs will be evaluated, on which biodiversity depends in part. Phanerogam meadows, if any, will be described. Finally, the megafauna will also be considered (whales, sharks, rays, dolphins and turtles in particular).

HRI will seek permits to collect specimens of algae, gorgonians or sponges that may be required for species verification by Smithsonian taxonomists. HRI is also striving to obtain an Autonomous Reef Monitoring Structures (ARMS) biodiversity sampling station in this region, which will provide additional taxonomic and genetic data on micro-fauna, flora and even bacteria. (HRI co-financing via the Smithsonian).

Responsible for implementation: HRI. For the characterization of taxa at the specific level (corals, sponges, and other invertebrates), HRI will partner with taxonomic experts from various institutions (eg, Smithsonian, University of Texas, ECOSUR, etc.).

Probable date: May 16 to 26, 2019, date of highest probability of aggregation of snappers in the area.

Activity. 1.1.4: Characterization of the fish spawning aggregations

The objective is to begin to characterize aggregations during the snapper spawning periods (April-May) and grouper (January-March). Bathymetric mapping will identify potential spawning sites and the expedition will occur during the assumed spawning periods (during the May full moon). Several potential sites will be explored and, in the case of proven aggregations, will be characterized. The basic characterization of aggregations includes mapping and determining the evolution and importance of aggregations over time and space, as well as quantifying the number of species, their size, their location, their time and the phase of the moon. The data are collected by subsea and video visual counts (species present, size, density, breeding behavior (color change), gonad status), specifying moon phase, time, depth, and the weather conditions. Physical data are collected as much as possible: point-specific data,

temperature profiles. An acoustic recorder (Loggerhead DSG-ST) will be installed on the main site. These studies will also provide the information needed to establish the baseline for the management of the reserve.

Probable date: May 16 to 26, 2019, date of highest probability of aggregation of snappers in the area

Means: These two characterization studies (1.1.3 and 1.1.4) will be the subject of a 10-day joint expedition, whose base camp will be on Lime Caye. The teams will be made up of about 12 people in total, both the usual partners in the reef studies and the aggregation studies, but also members of the local FUNDAECO and TIDE communities, as well as volunteers interested in participating, who will be trained in the field. The teams will have at least 4 boats. MAR Fund / FFEM will provide financial support for travel by voluntary participants via partners, HRI, TIDE, FUNDAECO, with the support of the scientific advisor.

Security: Given that the area is very isolated, with sometimes difficult conditions, the safety of the divers is imperative. All participating divers will receive specialized insurance (DAN for Dive Accident Insurance). Most will be familiar with follow-ups. The lead diver will be certified (American Academy of Underwater Sciences - AAUS / Smithsonian or other recognized scientific diving organization); he/she will have experience in conducting underwater research. A dive plan containing all the information and all safety equipment for the dive will be produced. If trainees are included in the diving teams, they will be supervised by a local dive master.

Activity 1.1.5. Compilation and analysis of site characterization data to guide management

- Reef characterization data will be analyzed using the AGGRA method, which allows for the calculation of a reef health status index based on coral cover, macro algae, commercial fish biomass and herbivorous fish recovery data.
- Aggregation characterization data will be analyzed to account for their importance, location, duration, species present and size, and size of clutches (if observed).

Implementation: HRI, FUNDAECO and TIDE with the support of the scientific advisor.

Activity 1.1.6. Management and zoning recommendations

The results will enable FUNDAECO and TIDE to make the first management proposals, in partnership with local communities: eventual zoning of the Cayman Crown sector, recommendations concerning uses (fishing, maritime transport, tourism), monitoring the area according to spawning periods etc.

Implementation: FUNDAECO and TIDE with the support of HRI and the Scientific Advisor.

Result 1.2: Cayman Crown Protected Areas Declaration in Belize and Guatemala is on track (or done)

Activity 1.2.1. Drafting of documents for legal declarations

FUNDAECO and TIDE, based on previous studies, will develop advocacy and technical documents and proposals for legal documents for the official declaration of MPAs (Marine protected areas, non-fishing zone or others).

Implementation: FUNDAECO and TIDE.

Activity 1.2.2. Follow up on high-level policy discussions with policy makers to advance the declaration and management of the Cayman Crown site

High level political discussions have already begun. They will be continued to present the results and recommended actions in support of the declaration of the reserve in each country. As Cayman Crown is still in good condition, it is expected that protected areas will be declared as "no-take zone" (no extraction allowed). This proposal is in line with IUCN resolution WCC-2016-Res-50-SP, which calls for at least 30% of national waters to be decreed as an MPA or any other category of effective management, not subject to extractive activities. As stakeholders in the Convention on Biological Diversity (CBD), this declaration would support the two governments' commitments to the Aichi targets, mainly Goal 11: "Preserve 10% of marine and coastal areas, including areas that are particularly important for biodiversity and ecosystem services."

TIDE and FUNDAECO, each for their country, will lead the political process and present the technical studies documenting the decrees creating marine protected areas. They will also negotiate co-management arrangements for

reserves in each country once MPAs are formally established. Even before this declaration, TIDE and FUNDAECO will strengthen their presence in the communities to dialogue, inform them, discuss the management system; on Cayman Crown, they will conduct regular patrols to monitor activities taking place in the area.

HRI and EDF will support TIDE and FUNDAECO in their policy efforts, community meetings, and sensitization of fishers, as needed, to support the MPA declaration.

Responsible for implementation: TIDE and FUNDAECO have significant experience in co-management of coastal and marine protected areas through partnerships with their respective national governments.

Result 1.3: Financing mechanisms are established for Cayman Crown

Activity 1.3.1 Provide Initial management funding for Cayman Crown Protected Area in Belize and Guatemala

Specific funding is required for initial management and protection activities in both Cayman Crown Protected Areas. Although the governments of Belize and Guatemala have not formally declared these areas, TIDE and FUNDAECO, respectively for Belize and Guatemala, will begin to implement core management activities early in the project to reduce pressure on resources and generate community support for the future declaration of areas. Basic management activities include monitoring, as well as environmental education for the benefit of local communities. These activities will begin to be implemented in parallel with the lobbying and advocacy process for the legal declaration of zones in both countries.

The budget allocated for these management activities is \$ 75,000 in the first year, \$ 90,000 in the second year and \$ 120,000 in the third year, by country. The project partners, TIDE and FUNDAECO, will provide matching funds and ensure that protection and management activities are properly implemented.

Management expenditures will increase each year as needs increase, and include the following:

- Establishment of a field base in each country. Basic equipment will include 1 boat / engine, 1 computer and printer, communications, among others.
- Field team. A first team will be set up, ideally consisting of a field coordinator, a captain, an environmental educator and two park guards. This team will be responsible for the implementation of the initial communication and management activities. In the second year of the project, a community promoter can be added to the team; and in the third year of the project, 2 additional park guards may be added to provide adequate protection activities.
- Patrol activities. The team will conduct periodic patrols in both countries. Associated expenses include fuel / oil and per diems.
- Communications and information for communities. The environmental educator will be responsible for working with communities to inform them about the region and its importance. Information materials will be produced and used during the implementation of the activities. Associated costs include the production of materials, transportation (fuel) and food for the activities.
- Community participation and benefits of protection activities: During the second year of the project, the community promoter can facilitate the participation of community members in the protection and conservation of areas through conservation agreements that will be signed with key communities

Activity 1.3.2. Preliminary Business Plan for Cayman Crown MPA

Based on the management plans to be drafted during the project, the two Cayman Crown MPAs will have to develop business plans, to determine the financial needs for good management of the MPAs in the long term. These financial needs will have to be compared to existing sources of financing, to reduce a possible funding gap.

Based on the identified funding gap, business plans will detail a resource mobilization strategy, serving as an exit strategy for the project.

It is understood that the capitalization of the Cayman Crown endowment, managed by MAR Fund, will be one of the main pillars of this resource mobilization strategy (see below). Capitalization objectives for the said window will be defined precisely.

Implementation: Mar Fund

Activity 1.3.3 Establish and manage an endowment fund for the two protected areas of Cayman Crown

MAR Fund is an internationally recognized Environmental Fund and manages an endowment fund of over \$ 26 million. This capital is spread over several accounts, each with specific objectives. As part of this project, it is planned to create a new window within MAR Fund, which will provide sustainable funding for the two Cayman Crown MPAs being created. Such an arrangement is an innovative exit strategy for the project.

The objective of the MAR Fund investment policy, which will be applied to the Cayman Crown account, is twofold:

- 1) Maintain the real value of long-term assets (10-year horizon),
- 2) Maximize annual cashflows to contribute to operating costs and channel funding to field projects.

The Cayman Crown window will have its own supervisory body, a steering committee whose composition will include Belizeans and Guatemalans. Decisions made by the Cayman Crown Steering Committee will need to be approved by the MAR Fund Board of Directors. The Steering Committee will decide conservation and management investments for the Cayman Crown Protected Areas in both countries. The project will thus ensure:

- Coherent, reliable and long-term funding for marine conservation providing significant additional financing to Cayman Crown long term financing;
- Improving Marine Resource Management in Cayman Crown Protected Areas in Belize and Guatemala;
- The conservation of marine and coastal resources, and environmental goods and services, which are the basis for the sustainable economic development of the region; an important basis for fishing and tourism.

The Cayman Crown window will initially benefit from 2 capitalization: FFEM support amounting to 525,000 dollars, as well as a capitalization by MAR Fund of 350,000 dollars, coming from a "challenge grant" from the Oak Foundation. It is expected that by the end of the first year of the project, the Cayman Crown account has a capital of \$ 875,000, likely to generate annual financial income of about \$ 44,000 (at 5%). The Cayman Crown account will apply the same investment policy as the other windows of the MAR Fund and will be invested by the same asset manager. Cayman Crown endowment will be managed in a separate account within the MAR Fund Endowment Fund. It will be set up with the corresponding FFEM funds and the co-financing of MAR Fund via the Oak Foundation. As a result, specific investment reports may be reviewed regularly by the Investment Committee, the Belize Marine Fund Steering Committee, the Cayman Crown Fund Steering Committee and the MAR Fund Board of Directors. Financial costs related to the management of this endowment include asset management services (0.175% of annual capital plus 16% of value-added tax), custodian fees and external audits. The cost of administering the allocation is approximately 0.50% of the capital.

Endowment fund revenues - after financial and administrative costs - will be used to support Cayman Crown's protected area management costs in Guatemala and Belize. The asset manager will provide an annual revenue projection for this account, which will be available to support various activities in Cayman Crown such as personnel, equipment and infrastructure, control and monitoring, environmental education. These funds will be provided through grants. The MAR Fund Small Grants Program Project Manual presents the complete methodology and requirements for a grant program that will be monitored and evaluated, available to MAR's Board of Directors and the FFEM.

It is expected that the Cayman Crown window will achieve an even higher level of capitalization, either in the course of the project, or thereafter, so that a substantial portion of the financial needs of the two MPAs will be covered by MAR Fund. Public funding will still be expected and negotiated, with the understanding that the contributions from the environmental funds must complement public efforts to improve conservation funding.

III.2 Component 2: Sentinel Site Observation Network

Context

An initial selection of seven sentinel spawning aggregation sites was made based on existing information: importance of the site for the region, appropriate institutional partner with monitoring and management capabilities, and at least some of the characterization, mapping and monitoring completed.

In order to use these sites as demonstration sites, they have been selected at different stages of characterization and protection, from those that are fully protected and regularly monitored (eg, Punta Allen and Gladden Spit) to those that are barely characterized and mapped (Cayman Crown). The selection of sites will be re-evaluated during the first year of the project, especially for sites in Honduras, which are still uncertain.

The figure beside shows the sentinel sites along the MAR, including the Guatemala and Belizean portions of Cayman Crown. The sentinel sites and the partners in charge of their follow-up are as follows:



Figure 5 : Sentinel sites proposed in the Mesoamerican Reef

Country	Partners	Site	Characteristics of the site
Mexico	COBI	Punta Allen	2 aggregations sites classified as fish refuges: Punta San Juan and Niche Habin
	COBI	Punta Herrero	El Faro site, fish refuge area, co-managed with the fishing cooperative of Punta Allen
Belize	Southern Environmental Association (SEA)	Gladden Spit	One of the most important multi-species sites in the region. Protected area; regulated opening to fishing during the spawning period
	HRI et TIDE	Cayman Crown	Still unknown
Guatemala	HRI et FUNDAECO	Cayman Crown	Still unknown
Honduras ¹⁶	HRI, CORAL, AMATELA, Tela Marine Research Center	Punta Sal, Tela	Tela Bay Marine Wildlife Refuge, 5 likely aggregation sites including 4 of groupers (to be validated). This site is subject to fishing pressure from Utila fishermen and residents of Tela. The site is monitored remotely due to low visibility and rough water.
	CORAL, HRI, Roatan Marine Park (RMP), Bay Islands Conservation Association (BICA)	Roatan Banks, Cayos Cochinos	Strong fishing pressure by fishermen from Utila, Roatan and Guanaja (large vessels due to strong currents and the high seas)

¹⁶ Other potential sites: Santa Elena, Cordelia Banks, Texas/Western Bank, Roatan

Expected outcome of component 2: a monitoring network of 7 sentinel spawning sites is operational and supports the protection of a regional network of multi-species spawning aggregations

Expected results and activities:

Result 2.1. Observation network and protocols are validated

Activity 2.1.1 Status report of FSA research in the MAR region with revision of historical data

Activity 2.1.2 Validate a common monitoring strategy through a regional workshop: prioritization and validation of sites, protocol and partners, data sharing agreements

Result 2.2. The people in charge of monitoring are trained

Activity 2.2.1 Provide regional training on standard techniques and protocols for monitoring aggregations

Activity 2.2.2 Training for coral reef monitoring

Result 2.3. Data collected and analyzed provides information on the status of FSA and their responses to Climate Change

Activity 2.3.1 Equipment of monitoring stations

Activity 2.3.2 Support and maintain a coordinated surveillance program for FSA sentinel sites in the MAR

Activity 2.3.3. Upgrade the database and improve data entry

Activity 2.3.4. Analysis of data at the regional level

RESULT 2.1. OBSERVATION NETWORK AND PROTOCOLS ARE VALIDATED

Activity 2.1.1. Status report of FSA research in the MAR region with revision of historical data

Aggregations, particularly of the Nassau grouper, have already been the subject of much work but it has never been compiled, synthesized and integrated at the regional level. In agreement and in collaboration with key partners who wish to participate, a regional assessment of the current state of surveillance and protection of all FSA sites in the region will be produced. The report will compile metadata illustrating the state of knowledge, management, monitoring and specifying the organizations in charge of this monitoring. In addition, existing data on the 7 sites (at least Gladden Spit and the sites in Mexico that have the longest monitoring records), or even beyond if the partners agree, will be analyzed to determine historical trends. All available studies (gray literature, reports and publications) on FSAs in the MAR will be compiled and indexed. This synthesis will be published in a report in 2019, either with the synthesis of the reef monitoring or in a separate report, according to the will of the participants.

The results of this study will be shared on the HRI website. The results will be replicated and disseminated as part of the communication component. This inventory will constitute the zero state of the observation network and the basis of discussion of the regional workshop to set up the regional network for observing aggregation sites.

Implementation on tender.

Activity 2.1.2. Validate a common monitoring strategy through a regional workshop: prioritization and validation of sites, protocol and partners, data sharing agreements

The main objective of this regional workshop is to bring together all of the region's partners working on aggregation sites in order to reinforce the idea of developing a regional monitoring network and to validate a common monitoring strategy: prioritization and validation of monitoring sites within the project (sentinel sites planned for the project or beyond), protocols and partners, data sharing agreements. Database management will also be discussed.

Implementation by MAR Fund.

The status of aggregation data

- **In Mexico**, COBI recently completed an excellent FSA status report for the Mexican Caribbean, which can serve as a model
- **In Belize**, the status of all sites is available from local partners and the Spawning Aggregation Working Group. The aggregation sites data set (approximately 13 sites in total) is integrated into the national Belize database, which requires analytical work. The most comprehensive FSA dataset for the MAR region was collected at Gladden Spit. Based on an existing agreement between SEA, the Belize Fisheries Department, LGL Ecological Research Associates and Environmental Defense Fund (EDF), Gladden Spit historical data will be compiled, analyzed and synthesized as information suitable for use by SEA, the Belize Fisheries Department and local management partners at the Gladden Spit Marine Reserve. SEA's Chief Scientist has already started an inventory of the many existing data in the Belize database that require extraction and reformatting.
- **In Honduras**, the situation of FSAs is less well known; several FSA sites are included in reserves (managed for example, by Fundación Cayos Cochinos, BICA, CEM, Prolansate and others).
- **In Guatemala**, no FSA monitoring exists to date. Cayman Crown would be the first known site in the country.

RESULT 2.2 PEOPLE IN CHARGE OF MONITORING ARE TRAINED

Activity 2.2.1. Provide regional training on standard techniques and protocols for monitoring aggregations

Organized by SEA and the Belize Fisheries Department, with support from COBI, the spawning monitoring training course will be held in May 2019 for 8 days (split into 2 4-day sessions, depending on the phase of the moon). Around 30 participants from the four MAR countries will be trained. The training will include:

- on the collection of aggregation data, installation and maintenance of equipment in situ, fish tagging. For staff of governmental and non-governmental organizations, university students and fishermen, these trainings will be provided by members of organizations already carrying out monitoring, mainly in Belize (SEA, WCS, ...) and Mexico (COBI), university professors, site managers (governments and NGOs).
- on the management of boats to accompany divers¹⁷, for fishermen from communities near aggregation sites. The trainers will be fishermen, boat captains already trained in monitoring aggregations.

The course will be divided into two parts, a theoretical part on the ecology of FSAs, the management of the FSA / MPA, on diving safety, and a practical part in the field in small groups for a learning about underwater visual census (UVC), planning and safety of dives, recording and managing aggregation data and collecting fishing data (landings, CPUE, age and growth). Each of these modules will be led by subject matter experts.

Fishermen and other members of local voluntary communities, including women, will also be trained to continue this already well-established citizen science approach that promotes understanding by local communities on the importance of aggregations for fisheries. The project will build on the success of past experiences, such as the 1998-2003 monitoring carried out at Gladden Spit or in Mexico. Fishermen and other participants, initially trained in diving, will then be trained to actively participate in biological data collection, video observation, mapping and physical oceanographic studies.

A coaching of the trained people will be regularly ensured during the follow-up periods.

Implementation: MAR Fund with Southern Environmental Association (SEA), Belize Fisheries Department, and COBI (Mexico).

¹⁷ Monitoring diving teams at nightfall, sometimes in difficult sea conditions, requires specific training; the safety of divers is at stake. Some very committed fishermen have been doing this for a number of years, but the succession needs to be ensured.

Activity 2.2.2. Rraining for coral reef monitoring

Since 2003, HRI has been monitoring coral reefs by developing ongoing training for its partner teams (many NGOs and institutions in the region) and members of local communities to participate in reef monitoring. HRI will continue its activities to ensure, within the framework of the project, the monitoring of the sites close to the aggregation sites.

Implementation: HRI

RESULT 2.3. DATA COLLECTED AND ANALYZED PROVIDES INFORMATION ON THE STATUS OF FSA AND THEIR RESPONSES TO CLIMATE CHANGE

Activity 2.3.1. Equipment of monitoring stations

Sentinel sites will be equipped with surveillance instruments according to available means (see box).

BIOPHYSICAL MONITORING STATIONS

Initial biophysical monitoring at the sentinel sites will be conducted using a combination of underwater visual census (UVC) surveys conducted by divers using a standard protocol. These dives will coincide with the spawning periods of the key species (full moon periods between January and June for groupers and the period from June to August for snappers). The UVC readings will be supplemented by measurements made using a set of instruments that will be installed by the divers at approximately 30 m depth on the spawning site. Initial biophysical monitoring stations will include a minimal set of equipment, which will require maintenance every six months (mooring maintenance, cleaning, downloading, battery replacement): an Onset Tidbit V2 water temperature data logger, an LS1 passive acoustic recorder from Loggerhead Instruments. In addition, approximately 20 breeding fish will be tagged at each sentinel site using Vemco 69 kHz acoustic pinger tags. To record the presence of these tagged fish, each site will be equipped with an active VR2W-69 kHz acoustic receiver docked from Vemco as part of the instrument cluster.

If time, funding, and logistics permit, all sentinel sites will have a more sophisticated surveillance package that will include all of the above equipment (or similar) and PTZ digital video surface and surface video cameras, an acoustic Doppler current meter (to measure the speed and direction of the current), and a multiparameter water quality probe (depth, salinity, temperature, turbidity and dissolved oxygen). These systems will have the ability to transfer data in real time. The project will start with an almost optimal system in Cayman Crown (minus underwater video camera), and basic systems on other sentinel sites.

Implementation by organization in charge of sentinel sites.

Activity 2.3.2: Support and maintain a coordinated surveillance program for FSA sentinel sites in the MAR

The monitoring efforts of local partner organizations throughout the region form the basis of this program. This component of the project will support the surveillance activities of the selected sentinel sites, in accordance with the standard protocols used in the region (see 1.1.4):

- In Belize, SEA will continue to collect FSA monitoring data from Gladden Spit. If the partners so wish and at no additional cost, other sites in Belize with long-term monitoring data may be added (Glover's Reef (WCS), Sandbore in Lighthouse (BAS) or Turneffe Atoll sites (TASA)).
- In Mexico, COBI will continue monitoring the two sentinel sites, Punta Herero and Punta Allen.
- In Honduras, the sites of Punta Sal, Tela and Roatan Banks, Cayos Cochinos, will be monitored by HRI and CORAL. The Caldera del Diablo site, initially proposed in the NIP, has been replaced because of its difficult access.
- The Cayman Crown monitoring, Belize and Guatemala sides, will start as soon as the characterization will allow it and will be done by TIDE, FUNDEACO and HRI.

The Mesoamerican and Caribbean Reef Monitoring Protocol was developed in 2004. Slightly improved over the years, it has been used continuously in Belize, more recently in Mexico. It has also been adopted in other regions, including the Gulf of Mexico and the South Atlantic of the United States. This standard protocol, which will be validated during

the regional meeting, will be deployed at the 7 aggregation sites. The observations begin on the day of the full moon and take place daily for 6 to 8 consecutive days, twice a day (one around noon and one at sunset, around 5 pm), with various protocols: (1) visual evaluation and underwater video of the duration, location of fish, abundance, size and behavior (spawning, color change, bite, etc.) (2) a continuous record of the temperature of the seawater and acoustic telemetry data and (3) capture-tagging (using identification tags) - recapture of individuals for key species (groupers and snappers) to study movements and connectivity of adults.

Implementation: each partner for the sites that concern them; HRI regional consolidation with the support of the scientific advisor.

Activity 2.3.3: Upgrade the database and improve data entry

The goal is that by the end of the second year of the project (December 2020), the FSA regional monitoring network will be supported by a shared and regionally adopted database, available directly on the HRI website or on a portal via the HRI website. At the end of the project, the database will host at least all new surveillance data collected from the sentinel sites of this program. In addition, subject to a partner sharing agreement, the online database will be available to host the historical data of SEA and COBI (which have already agreed in principle), as well as any other data that partners in the MAR (and other regions) will be willing to share. The data will be subject to numerous quality assurance procedures and will be posted and hosted online. Full data sharing will be governed by data sharing agreements and authorization from data providers.

Development of the database and need for an upgrade

The standard FSA surveillance protocol (Heyman et al (2004a, b, 2018)) serves as a standard protocol in the MAR region. A database has been developed to benchmark and manage the data collected using this protocol (Heyman and Adrian 2006). COBI, SEA and other Belize SPAG network partners collect their data according to this protocol.

At present, the database has been moved to the latest version of Microsoft ACCESS. It will be operational for use by partners by the end of 2019. Some enhancements and upgrades are needed to make the system more user-friendly for data entry and automated data output for analysis and reporting (as exists today for regional reporting of reef monitoring data). With the support of this project, and the support of the scientific advisor, the system will be improved:

- upgrade the existing database using Access (by improving the data analysis requests of existing modules); in the medium term, the Access database could migrate to SQL for better online functionality and data sharing;
- working with COBI and SEA partners to compile, clean, capture and analyze existing FSA monitoring data;
- put in place agreements for the conservation and sharing of surveillance data of FSAs mutually validated by the partners;
- select the institution in charge of hosting the database; development and management of online databases.
- develop a "main server" accessible via a portal.

Currently, it is proposed that the regional database be hosted and managed by the Gulf Coast Ocean Observing System, GCOOS (Gulf of Mexico coastal ocean observing system - <http://gcoos.org/>), whose data entry interface (Figure 7) could be adapted to the HRI website, which would then serve as a point of entry for all stakeholders if the partners validate this proposal. FSA monitoring data in the MAR region. The first step in this process is for HRI to develop on its website, in the first year of the project, a presence related to the monitoring of spawning aggregations (state of the art, see paragraph 2.2.1.), which will contribute to strengthening HRI's reputation for FSA monitoring at the regional level to achieve the same level of recognition that it already has for benthic monitoring.

The MAR region serves as a pilot project for the larger Big Fish program (several geographic areas, including the Gulf of Mexico, the US South Atlantic, Cuba, the Bahamas and the Caribbean). These other geographical areas will follow the example of the MAR region, so that the data is systematically collected, stored, analyzed and disseminated on a regional scale, using the same platform and the same system. Wider scope and Big Fish are not part of the FFEM proposal.

Implementation on tender.

Add Survey

Visual Survey | Catch/Unit Effort Survey | Tag Release Survey | Asia Pac Survey

General Information

Date (mm/dd/yy): Time In: Time Out: Survey ID:

Site: Organization:

Survey Participants

Team Leader: Team Members:

Add Other Information

Site Characteristics

GPS Coordinates:

Surface Conditions:

Air Temp: °F Water Temp: °F Sea State:

Surface Current Speed and Direction: Number of Fishing Boats Nearby:

Wind Speed and Direction:

Underwater Conditions:

Depth: ft Temperature: °F Visibility: Estimated Survey Area:

Current:

Convert: in <-> cm m<-> ft °C <-> °F

Species Characteristics

Delete Selected Species

Species	< 10	10-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	Total	Behavior
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Record: of 1

Close

Figure 5: Data entry interface in the existing ACESS database

Activity 2.3.4: Analysis of data at the regional level

A first part of the analysis will concern data collected at sentinel aggregation sites; these results will then be shared, in a regional workshop, with all the partners in order to achieve a regional vision of the aggregations.

2.3.4.1 Sentinel sites analysis

Partners in charge of sentinel sites will upload their data using a digital entry form in the central database. The data will be verified by the database manager. The database already contains and develops additional standard analysis tools (queries) that can be used to generate reports and results that are easily interpreted and used. These reports will be available as graphical results as well as downloadable .csv files for further analysis by others.

Aggregations and climate change

It is difficult to detect the effects of climate change using short-term data sets and the project funds required to perform this type of analysis are not enough at present.

The aim is to establish a regional monitoring network and start collecting relevant data for future climate change assessments. Nevertheless, FSA's long-term monitoring data from Gladden Spit (and other sites) can be analyzed considering monthly and annual changes in sea surface temperature and regional current patterns at mesoscale that can be derived from satellite-derived data, oceanographic models, and local climate monitoring stations (eg Smithsonian's Carrie Bow Caye laboratory and existing hydrometeorological stations in each of the four MAR countries). HRI will strive to ensure that a chemical oceanographer accompanies the reef characterization expedition, capable of providing the necessary material to measure the total alkalinity and saturation state of carbonates, required to assess the acidification of the oceans - a major concern in this area which probably receives upwelling from the depths of the Cayman Trench (hence naturally more saturated with CO₂ by adding GCC-mediated acidification). HRI has been monitoring Cayman Crown for the last two bleaching seasons and has included this data in a recently submitted publication and in the international NOAA compiled coral bleaching data. We will continue to

organize the regional BleachWatch over the years with coral bleaching events - ensuring that this site is monitored. HRI will continue this monitoring.

Implementation by each sentinel site partner and consolidation by HRI with the support of the scientific advisor.

2.3.4.2. Regional Data Sharing Workshop with all partners in the region

This regional workshop will bring together all organizations working on aggregations to present results on the 7 sentinel sites, the presentation of the database and the interface of HRI to promote the extension of the observation network at all sites monitored in the region.

A regional status report (MAR region) will be produced, which will be reported throughout the Caribbean (in connection with Big Fish) and internationally (with the Society for the Conservation of Reef Fish Aggregations - SCRFA).

Implemented by MAR Fund and the Scientific Advisor (organization of the workshop and coordination of works) and by all the partners participating in the workshop.

III.3 Component 3: Promoting the social acceptability of protecting spawning grounds

Context

The importance of spawning aggregations for fisheries and the need to continue their protection remains a key objective for the region. The objective of this component is:

- To develop a communication strategy to unite actors (scientists, fishermen, environmentalists, policy makers and citizens) through a common history; highlight how their work is part of a wider effort at the regional level and develop a vision shared by all, aiming at developing a regional vision for the spawning aggregations;
- To compensate for the loss of Cayman Crown's fishing due to conservation, facilitate fisher's participation in the project and the rules that will be put in place. In fact, the area, very far out at sea, is not much frequented by fishermen.

Expected outcome of component 3: Fostering the social acceptability and support for protecting spawning aggregations

Expected results and activities:

Result 3.1. The communication campaign makes it possible to establish links between the actors

- Activity 3.1.1 Development and implementation of short videos
- Activity 3.1.2 Development of a website on spawning aggregation information in the MAR
- Activity 3.1.3 Radio spots developed and aired at a local level
- Activity 3.1.4 Hold information meetings for local fishing communities through regular visits to buffer zone communities
- Activity 3.1.5 Report Cards, Eco-audits & Media outreach and communication to decision makers

Result 2.2. Community development activities compensate for lost income

- Activity 3.2.1 Diagnostic of the current use of Cayman Crown
- Activity 3.2.2 Design and execution of local initiatives to compensate and create alternatives

RESULT 3.1. RULES TO PROTECT SPAWNING AGGREGATION SITES ARE RESPECTED

The communications items will be developed based on a call for tenders; planned products include:

- A short film to show how participants in the four countries of the project are working together to monitor, study and protect fish spawning aggregations. The film will bring together a diverse set of stakeholders united by a common cause. The film will be distributed on the HRI website and by the project partners on their websites; it will be available later on the Big Fish Regional Initiative website; it will be featured in special screenings for policymakers in Belize and Guatemala.
- The HRI website will help to unite the participants in the initiative and develop its community. In addition, there will be a specific website for the project, hosted within the HRI or MAR Fund websites. The project website will be an online resource for everything related to MAR Fish in the region. The site will include a series of communication products, including short films, interactive maps, animated graphics, reports on the latest scientific discoveries with links to documents, fish songs and natural history resources.
- Radio Press Packs: In order to reach the fishermen, TIDE and FUNDAECO will work with radio producers and journalists in Belize and Guatemala to brief them on the project, providing them with stories, and links with spokespersons and interviewees who will be able to get the message across.
- Synthetic summary of FSA results, in a dedicated section of HRI's biennial Report Card. HRI will use its extensive network of partners and logistical experience to help publicize the project to national stakeholders and media.

RESULT 3.2. COMMUNITY DEVELOPMENT ACTIVITIES COMPENSATE FOR LOST INCOME.

A single 10-day fishing expedition by a good crew in a spawning aggregation site can yield up to \$ 7,000. A fishing ban can therefore have a significant negative economic impact. But in Cayman Crown, far away from the coast, few fishermen come to the area, mostly from communities in Honduras and Guatemala.

The goal is to carry out community development activities for these communities near the site (Belize, Guatemala and Honduras). Although fish replenishment zones support local fish stocks in the long term, short-term costs may be high for some families. These remote fishing villages have limited sanitation infrastructure, precarious health services and limited alternatives to fishing.

This activity will be carried out with the support of Rotary International District 4250 (which covers Belize, Guatemala and Honduras), with the support from NGO staff of FUNDAECO and TIDE, who will identify community-based compensatory community development initiatives and work with communities to raise funds adapted to each community. Based on Rotary's methodology for identifying priorities, communities will be able to opt for the installation of clean water mechanisms and / or alternative economic activities, as has been defined for several communities in the region (tourism initiatives, fishing guides, cocoa plantations, among others).

Implementation: FUNDAECO (Guatemala), TIDE (Belize) with financial and technical support from Rotary International.

III.4 Component 4: Project Management

Expected outcome of component 4: A rigorous project management facilitates concerted decisions and ability to adapt to unforeseen circumstances

Expected results and activities:

Result 4: The project is well-managed

- | | |
|--------------|----------------------------------|
| Activity 4.1 | Initial planning workshop |
| Activity 4.2 | Program manager (Mar Fund Staff) |
| Activity 4.3 | Scientific Advisor |

At the beginning of the project, it is expected that an initial planning workshop will be held, in particular so that all the actors involved can agree on the respective responsibilities, including the logistical aspects related to scientific expeditions in the field. The development of the initiative will be coordinated by MAR Fund, which will oversee the successful implementation of the activities. MAR Fund will hire a full-time Project Manager for the 3 years of the project. The project manager will have the following responsibilities:

- Ensure the technical implementation of the project and the good coordination between the various partners;
- Promote synergies and collaborations with other actors at the regional and national levels, and with relevant projects under way in the different countries involved in the project;
- Ensure the administrative and financial management of the project;
- Write project activity reports;
- Ensure reporting to the FFEM.

Given the advanced scientific skills required for the proper implementation of the project, MAR Fund will also use the services of an internationally renowned scientific advisor, for a duration of approximately 60 days, distributed throughout the project. This scientific advisory work will include:

- Assist the project manager on all scientific issues;
- Support for the drafting of terms of reference;
- Review the quality of the results;
- Participate in training and workshops (content and animation);
- Participate in the revision of historical data;
- Help to structure the regional aggregation database;
- Help analyze data collected at the regional level.

Implementation: MAR Fund.

IV INSTITUTIONAL SET UP

IV.1 Project implementation

MAR Fund will oversee the management of the project, both from an operational and financial point of view. Mar Fund will provide financial reports as needed. The Cayman Crown endowment sub-account will be established with MAR Fund's financial advisor J.P.Morgan. The sub-account will be supervised by the MAR Fund Investment Committee and the MAR Fund Investment Policy will be applied, thanks to the support of the asset manager, MG Capital. MAR Fund will prepare a contract and grant agreements, as required, to carry out project activities that respond to annual work plans and will oversee tendering. Beneficiaries will include at least TIDE, FUNDAECO, HRI and COBI. Regarding MAR Fund's operating procedures, the project will be audited as part of the external annual audit of MAR Fund.

As MAR Fund Executive Director, María José González, will be the Project's main coordinator, along with the partner organizations. It will bring together the Steering Committee (see IV.2) and hire the Project Leader who will carry out and organize the daily activities.

All project partners have long experience in the Mesoamerican Reef, each in their own niche. Regardless of their specific role or activities in the program, they all cultivated long-term relationships with key actors, including government authorities (protected areas and fisheries), fishers, local communities, civil society organizations and the academic world. This wealth of interrelationship is one of the most important assets that the partners bring to the project and should accelerate the progress observed in each zone.

All organizations involved in the project have demonstrated outstanding technical capacities in their areas of expertise and demonstrated ability to collaborate across borders, in partnership with government agencies and local fishing communities, in favor of the MAR. Civil society, communities and governments are also key partners, and the project will work intensively with them to achieve its goals.

All project partners, as well as their respective responsibilities, are presented schematically in the table below.

Summary of the role of partners in the project

	Component 1: Characterization and protection of Cayman Crown			Component 2: Réseau d'observation des sites sentinelles		Component 3: Développement et communication	
	Characterization of Cayman Crown	Protection and management of Cayman Crown	Financing of Cayman Crown	Protocol validation and data analysis	Data collection	Community development close to Cayman Crown	Communication
MAR Fund							
HRI (Regional)					Belize et Guatemala CC / Honduras - General		MAR
LGL / Scientific Advisor							
COBI (Mexico)				Mexico	Mexico		Mexico
TIDE (Belize)	Belize	Belize			Belize CC	CC Belize	CC Belize
FUNDAECO (Guatemala)	Guatemala	Guatemala			Guatemala CC	CC Guatemala	CC Guatemala
SEA (Belize)				Belize	Belize GS		GS Belize
CORAL (Honduras)				Honduras	Hon – Punta Sal		Honduras
EDF (Belize / regional)		Belize		Belize			Belize
WCS, TASA and others (Belize)				Belize	Belize		
BICA and others (Honduras)				Honduras	Honduras	Honduras	
Rotary (Regional)						Gulf of Honduras	

	In charge		Partners		Participants		Scientific advisor
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The partners of the project are presented below, with their implications in the project:

Partners and field of expertise	Involvement in the project
Healthy Reefs Initiative (HRI) - USA	
Dr Melanie McField	
(HRI - www.healthyreefs.org ; http://www.agrra.org)	
Coalition of member organizations (71 partner organizations, independent scientific researchers and the general public).	<ul style="list-style-type: none"> • Characterization of Cayman Crown's coral reef, (for potential AMP designation). Will focus primarily on the health and diversity of coral reef ecosystems
Has a representative in each project country	<ul style="list-style-type: none"> • Technical studies necessary for the declaration of marine protected areas of Cayman Crown in Belize and Guatemala
Specialized in the assessment of the health of the ecosystem	<ul style="list-style-type: none"> • Surveillance: will train and work closely with FUNDAECO in Guatemala, TIDE in Belize and CORAL in Honduras to implement surveillance protocols in selected sentinel sites. • Make regional fish spawning aggregation data from the seven sentinel sites available through their online database and GeoPortal.
LGL Ecological Research Associates Inc. (LGL) (www.lgl.com) USA	
Environmental research and consulting firm	<ul style="list-style-type: none"> • Basic bathymetric cartography • Provide the scientific and technical advisor to MarFund
Guatemala	
Foundation for Eco-development and Conservation (FUNDAECO) (http://www.fundaeco.org.gt)	
Local NGO engaged in the creation, management, protection and conservation of protected areas of Guatemala.	<ul style="list-style-type: none"> • In charge of promoting Cayman Crown as a no-fishing zone and as a future MPA in Guatemala. • Will participate in the collection of data necessary for the establishment of Cayman Crown and the management of the protected area. • Organize briefings with local fishing communities, tour operators and guides, municipalities, fisheries officers and protected areas managers. • Identify high-potential community development projects that will be supported by Rotary International. • Lead the policy development process with key decision makers in Guatemala, submit technical studies in support of the reserve declaration, and request co-management of the Cayman Crown MPA from Guatemala during its setting up.
Important work with communities	
Belize	
Toledo Institute for Development and Environment (TIDE) (TIDE - www.tidebelize.org)	
Community participation in resource management and sustainable use of ecosystems	<ul style="list-style-type: none"> • Lead organization for the promotion of Cayman Crown as a no-fishing zone and future MPA in Belize.
Monitor the natural resources of Toledo,	
Assist with planning and management of protected areas	<ul style="list-style-type: none"> • Will participate in the collection of data necessary for the establishment of Cayman Crown and the management of the protected area.

<p>Develop responsible tourism and other sustainable economic alternatives</p> <p>Responsibility for co-management, in partnership with the Fisheries Department, of the Port Honduras Marine Reserve (PHMR)</p> <p>Founding and active member of the Belize Spawning Aggregations Working Group.</p>	<ul style="list-style-type: none"> Organize briefings with local fishing communities, tour operators and guides, municipalities, fisheries officers and protected areas managers. Identify high-potential community development projects that will be supported by Rotary International. Lead the policy development process with key decision makers in Belize, submit technical studies in support of the reserve declaration, and negotiate co-management of the Belize Cayman Crown MPA during its setting up. TIDE will participate in the surveillance of the Cayman Crown Sentinel Site.
<p>Belize</p> <p>Southern Environmental Association of Belize (SEA)</p> <p>www.seabelize.org</p>	<ul style="list-style-type: none"> Monitor the Gladden Spit spawning aggregation site
<p>Mexique</p> <p>Communauté et Biodiversité (COBI)</p> <p>www.cobi.org.mx</p> <p>Local NGO in charge of the Quintana Roo spawning aggregation site</p>	<ul style="list-style-type: none"> Will share its expertise on research, assessment, monitoring and conservation of fish spawning aggregation sites in the Mexican Caribbean and on monitoring protocols for spawning aggregation sites (as per the guide already produced). Monitoring of two sentinel sites along the Mexican MAR, working closely with partners to ensure the use of standardized monitoring protocols for fish spawning aggregation sites.
<p>Honduras</p> <p>CORAL Coral Reef Alliance in Honduras</p> <p>https://coral.org</p> <p>Honduran NGO committed to establishing a network of well-managed MPAs in Honduras (Roatan, Utila and Tela) and protection of coral reefs.</p> <p>Their goal is that 35% of the MAR's coral reefs are well adapted to cope with climate change through their diversity, connectivity and scale.</p>	<ul style="list-style-type: none"> Monitor spawning aggregations in Honduras Work with fishermen on awareness for the protection of Cayman Crown Collaborators to monitor spawning sites (local partners, in addition to HRI): <ul style="list-style-type: none"> Tela: <ul style="list-style-type: none"> Asociación Amigos de los Arrecifes de Tela (AMATELA) Tela Marine Research Center Roatan: <ul style="list-style-type: none"> Roatan Marine Park (RMP) Bay Islands Conservation Association (BICA) Cayos Cochinos: <ul style="list-style-type: none"> Fundación Cayos Cochinos / Honduras Coral Reef Fund (HCRF)
<p>Guatemala/régional</p> <p>Rotary International</p> <p>www.rotary.org</p>	<p>In this project, the economic impact of fishing restrictions at Cayman Crown might affect fishing communities. The International Rotary District 4,250 (which includes Belize, Guatemala and Honduras) will support community development initiatives to minimize its impacts.</p>

IV.2 Project supervision

The project will have a Steering Committee, itself composed of an executive body and a technical body, in order to streamline the discussions of the latter. The Steering Committee will meet at least once a year and will be responsible for contributing to project planning, approving annual work plans and budgets, reviewing and approving key project outputs and deliverables. The annual work plan will be approved by the MAR Fund Board of Directors.

The Steering Committee will discuss implementation issues and identify solutions to improve coordination and communication among key partners. Decisions taken during the Steering Committee meetings will have to be implemented by Mar Fund.

The composition and roles of the Steering Committee may be reviewed, if necessary, unanimously by the members of the Executive Steering Committee.

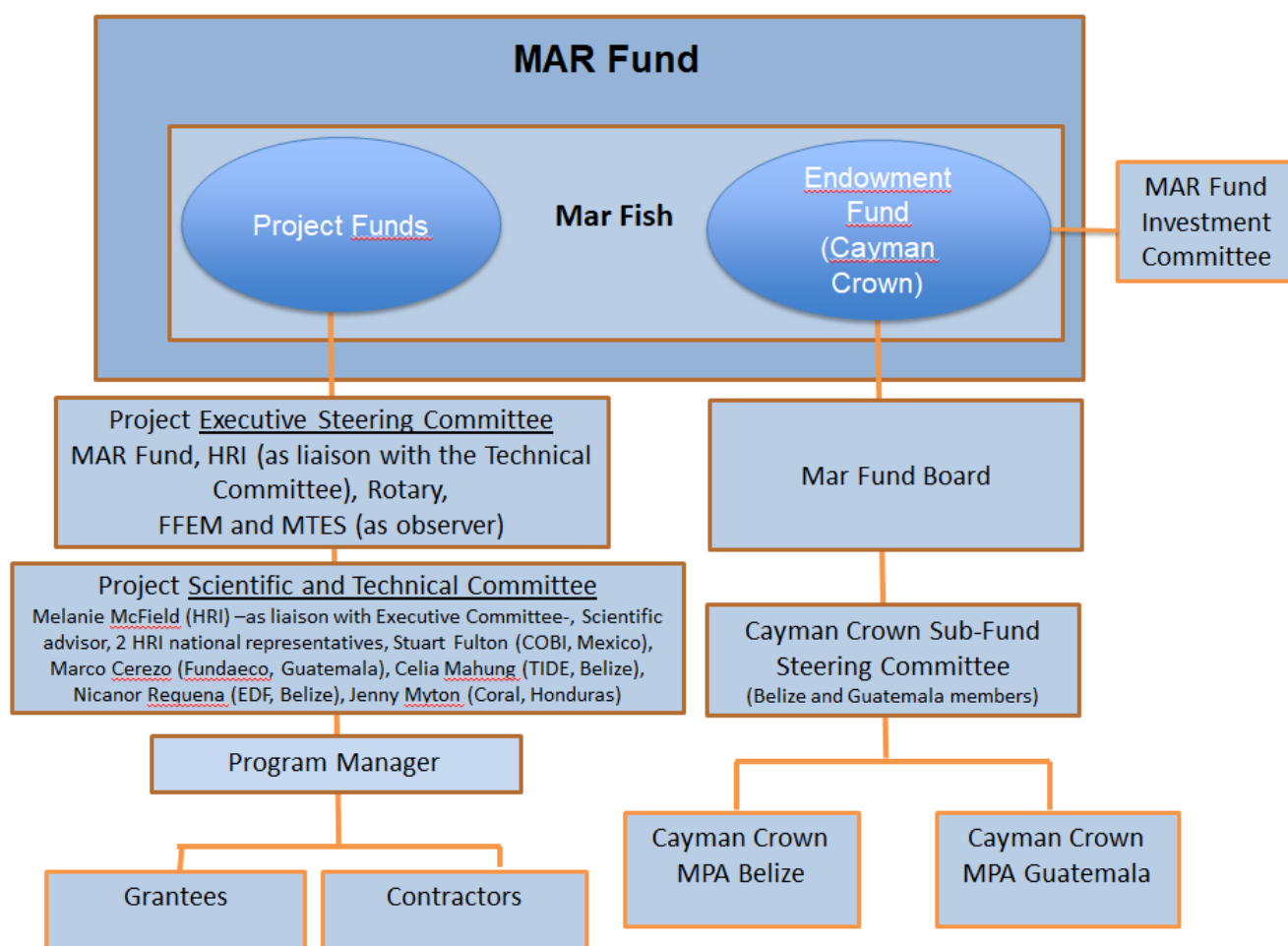


Figure 6: Project supervision

The Cayman Crown sub-fund (or “window”) will also have a Steering Committee and will consist of Belize and Guatemalan parts, yet to be defined precisely.

IV.3 Means deployed

Project management

The day-to-day management of the project will be handled by MAR Fund, which will hire a project manager, for the duration of the project, selected by the Steering Committee and hired by MAR Fund. The Project Manager will manage and administer grants to local NGOs, tenders and contracts to local and international consultants for the implementation of project activities.

The project manager will have the following responsibilities:

- Ensure the technical implementation of the project and the good coordination between the various partners;
- Promote synergies and collaborations with other actors at the regional and national levels, and with relevant projects under way in the different countries involved in the project;
- Ensure the administrative and financial management of the project;
- Write project activity reports;
- Ensure reporting to the FFEM.

For the scientific part, the project manager will be assisted by a Scientific Advisor, working part-time on the project, whose responsibilities will be as follows:

- Assist the project manager on all scientific issues;
- Support for the drafting of terms of reference;
- Review the quality of the results;
- Participate in training and workshops (content and animation);
- Participate in the revision of historical data;
- Help to structure the regional aggregation database;
- Help analyze data collected at the regional level.

In addition, the project will use consultants and consulting firms to implement some of the activities planned in the project. The project manager will oversee all the activities according to the decisions taken by the project's steering committee and the decision-making bodies of Mar Fund. Each grant and / or contract will detail responsibilities, reviews and results and provide a clear reporting, systematically incorporating monitoring and evaluation criteria.

Mar Fund's accounting will be validated by an accounting firm that will verify the accounts and ensure their quality against international standards in the field. In addition, an international independent auditor will be hired by Mar Fund to conduct account verification activities and to comment on their quality and the procedures applied.

Partners participation

All Project partners will provide substantial co-financing in kind, either by providing men / days or by providing equipment (boats).

Some partners also provide funding to cover the costs of certain activities, such as monitoring the general health of the reef and observation of the spawning aggregations sites, carried out respectively by HRI and COBI. These funds will be administered directly by the partner organizations who will be committed to spend them in these project activities. The Rotary Club, due to its internal operating structure, raises funds directly and manages them through their internal mechanisms.

COBI, SEA, LGL and Healthy Reefs Initiative have some of the equipment needed to characterize Cayman Crown, monitor spawning aggregations sites and reefs, and are also contacting potential collaborators to provide, in cash, additional equipment needed to carry out the field studies.

V DURATION, COSTS & FINANCING PLAN

V.1 Duration and implementation schedule

The project will last 3 years and the endowment fund will support the management of Cayman Crown in the long term. Below is an initial schedule of the main activities.

Main activities	Year 1	Year 2	Year 3
1.1.1. Preliminary mapping for Cayman Crown (through compilation of existing bathymetric)			
1.1.2. Final bathymetric data collection through cooperative field expedition, and global comprehensive bathymetric mapping of Cayman Crown			
1.1.3. Characterization of coral reefs and megafauna			
1.1.4. Characterization of fish spawning aggregations and set up of baseline data for aggregation's monitoring			
1.1.5. Compile and analyze characterization data into site description to support management			
1.1.6 Collaboratively develop management recommendations and proposed zoning			
1.2.1 Drafting of documents for the legal declarations (technical document depending on the MPA status)			
1.2.2 Follow up high-level political discussions with decision makers to advance in the declaration and management of the Cayman Crown Site			
1.2.3 Protection is gazetted and management plans are developed (Regional meeting for regional policy coordination and harmonization)			
1.3.1 Provide initial management funding for Cayman Crown MPAs in Belize and Guatemala			
1.3.2 Tentative Business planning for Cayman Crown MPAs			
1.3.3 Establish and manage a specific endowment fund for both Cayman Crown Protected Areas			
2.1.1. Complete rapid status report of FSA research, monitoring and management status in the MAR region with revision of historical data (baseline)			
2.1.2. Validate a common monitoring strategy through a regional workshop: prioritization and validation of sites, protocol and partners, data sharing agreements			
2.2.1. Provide regional training (NGOs, administrations and fishermen) on standard techniques and protocols for monitoring spawning aggregations and fish tagging, and provide continued coaching. (In situ equipment installation and maintenance, as feasible.)			
2.2.2 Trainings for coral reef monitoring			
2.3.1. Equipment of monitoring stations			
2.3.2. Collection of new field data			
2.3.3. HRI platform extension for aggregation data			
2.3.4.1 Data analysis of sentinel sites (partnerships with academia)			

[illegible]

V.2 Costs and contribution of the FFEM

MAR Fund is requesting **€ 1,115,800** from the FFEM, to which should be added € 40,000 for the final external evaluation. The total budget of the project is **€ 3,496,100**, the FFEM's share thus reaching **31.9%** of the total. Of this sum, an amount of **€ 460,500** (or \$ 525,000) will be allocated to the endowment fund for the management of Cayman Crown. The allocation can be established and invested as from 2019, with co-financing from Mar Fund.

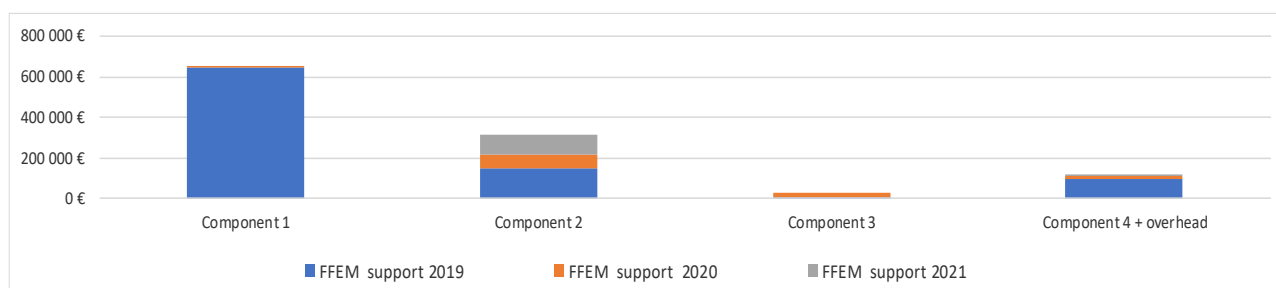


Figure 7: FFEM financial support, per component

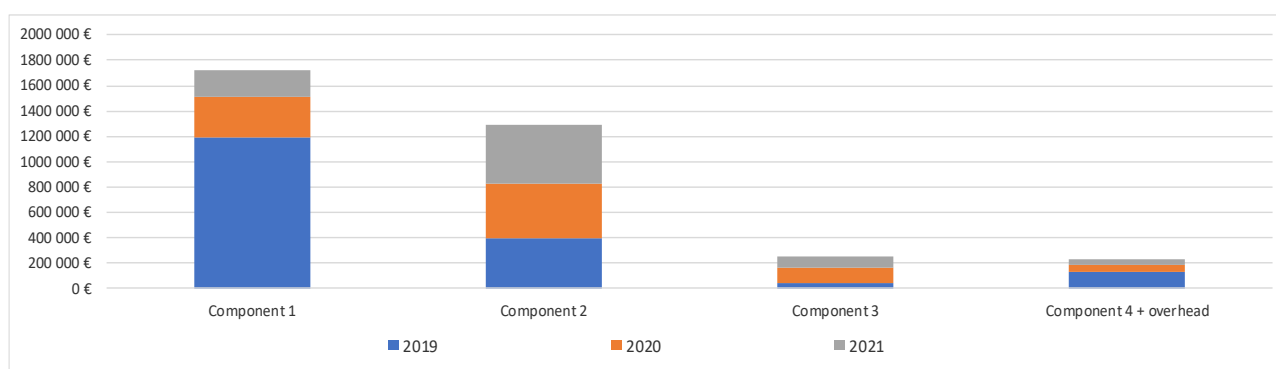


Figure 8: Total project needs, per component

V.3 Provisional Financing Plan

The project costs and the financing plan, in euros, are summarized below: (1) the total amount of the project, the FFEM share and the associated co-financing, by component (details by activities are in annex 5); and (2) the FFEM budget per year. A complete Excel document, detailing the financing plan year by year is at the disposal of the FFEM and all the stakeholders of the project.

Component	Total Besoins	Co-financements												LGL
		FFEM	MAR Fund	HRI	COBI	SEA	CORAL	Oceans 5	Marisia	Cayman Crown endowment	TIDE	FUNDAECO	EDF	
Component 1: The Cayman Crown spawning aggregation is legally recognized and managed in Belize and Guatemala	1 724 600 €	653 500 €	558 100 €	29 000 €	0 €	0 €		118 400 €	0 €	100 000 €	65 700 €	164 800 €	35 100 €	0 €
Composante 2 : Réseau d'observation des sites sentinelles de frai	1 291 600 €	315 700 €	485 400 €	49 300 €	211 400 €	71 100 €	18 400 €	79 000 €	0 €	0 €	0 €	22 700 €	17 500 €	21 100 €
Composante 3 : Acceptabilité sociale de la protection des frayères	247 400 €	30 800 €	173 400 €	43 200 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €	0 €
Component 4: Project management	154 500 €	52 600 €	66 800 €	0 €	0 €	0 €	0 €	17 600 €	17 500 €	0 €	0 €	0 €	0 €	0 €
Overhead	78 000 €	63 200 €	0 €	0 €	0 €	0 €	0 €	14 800 €	0 €	0 €	0 €	0 €	0 €	0 €
Total Euros	3 496 100 €	1 115 800 €	1 283 700 €	121 500 €	211 400 €	71 100 €	18 400 €	229 800 €	17 500 €	100 000 €	65 700 €	187 500 €	52 600 €	21 100 €

Figure 9: Budget by component, FFEM share with co-financing

It should be noted that all funding is acquired; letters were sent to the FFEM by the co-donors including: MAR Fund, HRI, COBI, SEA, CORAL, TIDE, FUNDAECO and EDF (a letter from LGL is expected - but its financial support is already confirmed by email).

	Total FFEM support	FFEM support 2019	FFEM support 2020	FFEM support 2021
Component 1: The Cayman Crown spawning aggregation is legally recognized and managed in Belize and Guatemala	653 500	644 700	8 800	0
Component 2: Réseau d'observation des sites sentinelles de frai	315 700	150 800	67 500	97 400
Component 3: Acceptabilité sociale de la protection des frayères	30 800	8 800	22 000	0
Component 4: Project management (and overhead)	115 800	95 600	15 800	4 400
Total	1 115 800	899 900	114 100	101 800

Projected distribution of FFEM funding by year (in euros)

This table summarizes the **planned disbursement of FFEM funding** by component (an Excel table has also been prepared with the beneficiary and sent as a separate file to the FFEM secretariat, which also details the financing plan by sub-component, by year, and for each co-financier). This table will be updated as the project is implemented, in consultation with the beneficiary and the partners, and based on annual activity reports and half-yearly financial reports on the one hand, and forecasts of expenditure for the next 12 months. Except for the contribution of the FFEM to the Cayman Crown endowment fund, for which, once the suspensive condition has been lifted, the payment of the full amount, ie € 460,500, will be made in one go, on the specific sub-account created, the FFEM payments will be made in the form of an initial advance, and then advances in accordance with the terms and conditions that will appear in Appendix 4 of the agreement to be signed with Mar Fund (in particular: the renewal of the initial advance can be done as soon as 80% of the previous advance is justified, and 100% of the antepenultimate advance). The payment of the initial advance can only be made once the suspensive condition has been raised to open an account in the name of the project in an "acceptable" bank for AFD. Since MAR Fund is a foundation hosted in the United States, the easiest way would be for the bank to be in the United States.

VI MONITORING AND EVALUATION SYSTEM, COMMUNICATION

VI.1 Assessment of expected impacts & impact indicators

The logical framework presents one or more quantitative indicators for each expected result and activity. These indicators will be used for project evaluation and monitoring system.

VI.1.1 Aggregate indicators

MAR Fund will inform the FFEM of the estimated value of the aggregate indicators listed in the table below:

Indicator	Value of the indicator	Unit of measure	Comments
Population residing in the project area put into management	N/A	Nb de people	Counts populations residing in the project area
Total area of protected areas financed by the project	N/A	Km2	Counts the total area covered by protected area management support
Population benefiting directly from sustainable fisheries resource management projects	N/A	Nb de people	Counts the number of fisheries involved in the project multiplied by the average household size

VI.1.2 Other indicators

In addition to the aggregate indicators above, specific indicators related to the project are proposed in the logical framework (see Annex 4). The most relevant of these should be regularly monitored and clearly described in the annual reports.

VI.2 Monitoring system

The monitoring system will be put in place from the start of the project and be finalized in the first 3 months by Mar Fund, under the leadership of the project manager. It will be presented and discussed in the Steering Committee and will consider the indicators developed in the logical framework (see above and Annex 4).

The system will document the annual reports and the final report by highlighting the lessons, either positive or negative.

The project team will prepare annually an annual report on all project activities and an annual plan of activities, which will be presented to the Steering Committee for validation. The Project Steering Committee will meet at least once a year. "E-Committee" meetings (virtual meeting) may be held at the request of the project team.

At the end of the project, the team will draw up a final project report reporting on the resources mobilized, achievements and results, all the products produced (publications, reports, films, photos, etc.) that will be given to the FFEM. This report will assess the impacts and sustainability from MAR Fund's point of view.

VI.3 Evaluation system

The project will benefit from a final, external evaluation, financed by the FFEM. The evaluation process will use traditional criteria to measure project results:

- Relevance, or the answer to the question "Has the project met the expectations of stakeholders? "
- Coherence, or the answer to the question "Did the project have means consistent with the objectives? "
- Effectiveness, which translates into the answer to the question "Has the project achieved its objectives? "
- Efficiency: "Were the means used consistent with the effects produced? "

- Impact: "What were the effects produced by the project? "
- Sustainability: "Can the actions implemented by the project continue beyond the duration of the project? "

The final evaluation should focus on the following points:

- Describe the actions achieved through the project;
- Compare these actions with those planned and explain any differences identified;
- Use the six criteria listed above to evaluate the project's performance.

VI.4 Communication strategy

Mar Fund will ensure that all project related products, reports and communications adequately displays FFEM and co-financers' logos (including on the cover page) and, where applicable, a detailed description of the project.

The project has specific activities dedicated to communication (see component 3).

The communication documents will have to be carefully defined because the communication of the project and the Fund will be key for the success of the project. The team will carefully select the agencies responsible for producing the tools and communication media.

VII JUSTIFICATION OF FFEM FUNDING

VII.1 Contribution to local, economic and social development of the country

The Project contributes directly to two of FFEM's priorities: 1) Integrated management and resilience of coastal and marine areas; and 2) Innovative finance of biodiversity (through the endowment fund). Robust economies are dependent upon a healthy resource base – the goal of this project. The Project provides the type of decisive leadership—through a collaborative transboundary consortium of local groups—to address one of the biggest threats to food security and local economies in the MAR: declining fisheries. The MAR's renewable natural resources underpin the coastal economy of the region, from small subsistence fishing villages, to international tourism industries. This four-country project will establish and monitor the first-ever regional network of sentinel spawning aggregation sites, contributing to the already existing network of coastal and marine protected areas and the growing network of fish replenishment sites. The monitoring and protection of these reproductive sites contributes to the other on-going efforts to protect and better manage resources in the MAR to support the conservation and restoration of fisheries resources, food security and overall ecosystem health and resilience. The conservation efforts are intimately integrated with community development projects towards sustainable fisheries and resilient coastal communities, for better resource management and governance. Management activities will be sustained with the support of the innovative endowment fund that will support conservation of a shared resource by two countries.

VII.2 Contribution to the Protection of the Global Environment

The French government's Climate Plan pledges to assist developing countries in the fight against climate change. The Project works to preserve the role played by the ocean and coastal ecosystems in both food security and ultimately climate adaptation as increased fish biomass and productivity help the whole ecosystem stay healthier.

The Project also supports the United Nation's Sustainable Development Goals with an emphasis on Goal 14 to "Conserve and sustainably use the oceans, seas and marine resources". In addition, the Project is fully aligned with Goal 17 "Strengthen the means of implementation and revitalize the global partnership for sustainable development" by helping countries and organizations cooperate instead of compete, and Goal 2 by promoting food security through more sustainable use.

The International Coral Reef Initiative (ICRI) action plan, adopted in Paris in 2016, prioritizes:¹⁸

- analysis of global and regional policy instruments and governance mechanisms related to the protection and sustainable management of coral reefs; and
- support the further development of coral reef indicators, regional coral reef assessments as well as the preparation of a global report on coral reef status and trends through the International Coral Reef Initiative Global Coral Reef Monitoring Network.

The Project, with its focus on multi-species FSAs, is a further support to developing important indicators that can be fully shared with the Global Coral Reef Monitoring Network.

The Project has also built in a substantial communications component. The work and results will be conveyed to local actors in support of the conservation efforts and shared with the global audience through the outreach component via videos, website and stories, among other forms of communication. The contribution of coral reefs—and reef fish to coral health—will also be linked to the critical role that ocean ecosystems play in mitigating and adapting to climate change and its impacts.

18 Action plan of the International Coral Reef Initiative (ICRI) Secretariat (2016-2018). Adopted on November 4th, 2016, at the 31st ICRI General Meeting (Paris, France)

VII.3 Exemplary and Innovative Character

The Project promotes co-management solutions for the sustainable use of natural resources. The design is inspired by the past successful experience of the consortium of partners in including local community members and government agencies in citizen-based research and advocacy. By providing support and technical guidance for partners to monitor and conserve a network of individual sites, and supporting synthesis of these data and regional experiences, local behaviours will be informed and will influence national, regional and even global conservation policy. The exciting part is that the actors involved in the work are from the local communities and include local fishers and park managers with the objective of engaging them in improved policies and management. That their efforts can be shared regionally, building a regional vision and structures for FSA conservation, is highly innovative.

In addition, the technical side of the Project is also innovative. For example, the data generated from the proposed network of monitoring sites can be used to monitor each local site but can also be synthesized to offer time-series data on physical and biological responses of multiple species FSAs to climate change at the regional scale. The research will be able to detect movement, localized extirpations and new colonization as species ranges respond to changing conditions.

Finally, the Project has considered the long-term economic viability of Cayman Crown through the establishment of a permanent endowment. This provides continuity of action for both Belize and Guatemala – and their civil society partners. By having a capital that will continue to generate revenue in perpetuity, basic management costs can be covered—more of them as the endowment is recapitalized and grows—to protect the ecological functions of Cayman Crown.

VII.4 Demonstrative and Replicable Character

Efforts to protect the MAR are efforts to save the largest reef system in the Atlantic Ocean. The protection of FSAs and monitoring methodologies will be replicable in other coral regions of the world, contributing to the preservation of the global environment. Specifically, as part of the larger Big Fish Initiative, the experience and lessons learned in the MAR will be able to be replicated in the wider Caribbean and wider Gulf of Mexico.

All eight partner organizations in the Project are renowned for their generous approach to sharing data and promoting collaborative conservation. Their capacity to create linkages among different stakeholder groups, build awareness and capacity across borders, and invest in social capital with important decision makers has been impressive.

One notable example is the replication of the Healthy Reefs Initiative methodology and reporting in the insular Caribbean. Several countries have been trained in the monitoring system and use of the reef health index and have already produced report cards modelled on the HRI experience. These include The Bahamas, Antigua and Barbuda, Grenada, Saint Lucia, Saint Vincent and the Grenadines, St Kitts & Nevis, and Dominica. Turks & Caicos is also interested and Melanie McField, HRI Director, will travel to the country to provide training in the coming months.

While no budget is currently set aside to take the findings and methodologies globally, the fact that the protocols, reports, and findings are all public will build opportunities for others to reach out for guidance or tools. As successes are documented there will be an opportunity to promote the approach to other nations and regions, especially those already working on fisheries management and conservation, such as the French Antilles, where a project is being developed to design conservation areas based on fisheries aspects. For this project, learning about methodologies and results on FSAs in the MAR, may be very useful.

VII.5 Post-project Economic and Financial Sustainability

The MAR Fund is an established funding mechanism for the region. To support the administration of protected areas and the coastal and marine resources of the region, a number of long-term financing and management tools have been developed.

This project, as described in Section III, covers both up-front and long-term funding for the protection of Cayman Crown and the establishment and monitoring of the network of FSA sentinel sites. Project funds will be used for the characterization, establishment and management of sentinel sites. An endowment fund, as a long-term mechanism, will be established to support the activities and management of Cayman Crown Protected Areas in a sustainable

manner. The Endowment Fund will be established as a sub-account within the MAR Fund, in a separate account for accountability purposes. As noted, the \$ 875,000 endowment is expected to generate approximately \$ 45,000 in revenue per year (at 5%). This mechanism also foreshadows the rise of the Mar Fund and its central role in improving conservation funding in Central America.

VII.6 Ecological and Environmental Viability

Although few fishermen now go to Cayman Crown to fish due to its relative distance, upon obtaining protection status it will become more “visible” to local stakeholders that currently may not be aware of its presence. To prepare for a possible surge in fishing the Cayman Crown, TIDE and FUNDAECO will begin to build presence in the communities and at Cayman Crown site prior to the declaration of the sites. They will complete regular patrols for surveillance and monitoring of activities that occur within the area. NGO staff in each country will make regular visits to buffer communities to dialogue and build trust prior to full management implementation.

The purpose of the Project is to contribute to the ecological and environmental viability of MAR fisheries by protecting FSAs. As indicated in Section I above, understanding FSAs is critical to their conservation and the maintenance of healthy fisheries as well as for the benefit of the communities that depend on them. By providing information on FSAs and engaging local actors in their monitoring, effective policy for their protection and effective enforcement and conservation of FSAs is expected as a long-term result of this initiative.

VII.7 Social and Cultural Acceptance

The Project is building and strengthening partnerships with many individuals and institutions throughout the region. The Initiative will attract and integrate those that are willing to facilitate and catalyze dialogues with the different stakeholders and take the time to engage them in the research, monitoring and communications. Past efforts to actively engage local participation have built strong local momentum in favour of fish replenishment zones. Fishers have taken leadership in designating and enforcing fish refuges, in many cases participating in their design, management and monitoring. Local community groups are increasingly engaged in conservation and management activities, and protected area administrators collaborate with interested communities to develop sustainable alternate sources of income.

In all countries, marine protected areas and taxa benefit from advisory councils or co-management agreements in which not only governmental authorities, but also local community groups, academia and NGOs participate. The Project will build on this legacy of engaging fishers in the process of research and conservation.

VII.8 Suitable Organizational and Institutional Framework

The Project is designed to build a network of partners who cooperatively monitor and conserve a network of mutually replenishing Marine Protected Areas that protect fish spawning aggregations throughout the MAR. To achieve the long-term vision requires expanded institutional development and fundraising for the program, as well as technical support and partnership with multiple partners and at multiple sites throughout the region. Thanks to the prior investments of FFEM, KfW and other partners, MAR Fund has developed strong and impactful relationships with an array of partners, seven of which have been described in detail in this proposal. Finally, MAR Fund, as described in Section V, has the institutional structure and experience to effectively raise the match, implement the program with its allies, and manage both sinking funds and the endowment.

VIII RISKS, CONDITIONALITIES AND ACCOMPANYING MEASURES

VIII.1 Operational and institutional risks

Operational and institutional risks	Level of risk	Risk Mitigation Measure
Given the large number of actors involved, the project may encounter difficulties in coordinating each other's efforts.	Medium	The project will have 2 supervisory bodies: a classic steering committee assisted by a scientific and technical committee. The latter will allow all partners to express their points of view and agree on a common vision. In addition, a workshop at the beginning of the project will allow all stakeholders to clearly define their respective roles, under the leadership of Mar Fund and with the support of a scientific advisor.
The characterization of Cayman Crown may not lead to the expected scientific conclusions.	Medium	A priori Cayman Crown has all the characteristics of an exceptional site. At least 2 large-scale expeditions are envisaged under this project and should allow a good characterization of the area. If these expeditions prove to be insufficient, support from other partners, such as American universities, should help to finalize the work.
The establishment of the Mesoamerican FSA database could be confronted with national obstacles or considerations.	Medium	An iterative approach is envisaged, namely that the project will not attempt to collect data from all the existing sentinel sites in the area from the beginning. An initial network of 7 sites is envisaged, this network will have to prove its usefulness and then be completed by a larger number of FSAs.
Political tensions between Guatemala and Belize could challenge the regional approach initiated by the project.	Low	The project has been designed with fair share of stakeholders both from Belize and Guatemala. The authorities of the two countries will gradually be brought to collaborate further, especially for the recognition of the 2 Marine Protected Areas on Cayman Crown, auguring a perspective of binational cooperation on an environmental subject.

VIII.2 Financial risks

Financial risks	Level of risk	Risk Mitigation Measure
An unfavorable change in the Euro / USD exchange rate could negatively impact the contribution of the FFEM, once changed to USD.	High	The exchange rate used at the time of writing the PIN was 1.17. The Euro / USD exchange rate was 1.15 at the time of writing the NEP. It was decided to use a conservative exchange rate of 1.14 to limit the currency risk.
At the end of the project, the Cayman Crown dedicated coral reef fund counter will be set at 875,000 USD. This is a good start, but probably not enough to ensure long-term financing.	High	Mar Fund will need to continue its resource mobilization efforts and direct some of these efforts to the Cayman Crown window. Institutional donors, private foundations, companies, sponsors and innovative financing will be considered.
The Cayman Crown window housed within the Mar Fund may prove to be obsolete if political problems taint the collaboration envisaged in this project.	Low	If for any reason the FFEM financing in favor of the Cayman Crown window cannot happen, the same funding could be used for a similar purpose in the same region. For example, the network of FSAs in the region could benefit from the support considered.

VIII.3 Conditionalities and accompanying measures

Conditions precedent to the signature of the agreement:

No specific conditions precedent to the signature of the agreement, in addition to those of a contractual nature requiring proof of the acquisition of the co-financing indicated.

Conditions precedent for disbursements:

- Regarding the mobilization of funds from the FFEM excluding the capitalization of Cayman Crown Sub-fund (excluding activity 1.3.3.): Opening of an account in the name of the project, in a bank acceptable to AFD (solution recommended as the most adapted: in the USA).
- Regarding the capitalization of the Cayman Crown sub-fund by the FFEM (activity 1.3.3.): Opening of a specific "Cayman Crown" sub-fund within MAR Fund.

Special commitments:

- Any modification of MAR Fund management tools should be sent to the FFEM secretariat to receive a no objection (strategies, investment policy, operation / procedure manuals, monitoring and evaluation system).
- Inform the FFEM of the creation of the Cayman Crown sub-fund as well as the list of the members of its Steering Committee.

IX ANNEXES

Annex 1 – CST's opinion and answers provided

Annex 2 – Opinion of FFEM's Steering Committee on the PIN and answers provided

Annex 3 – Opinion of the Secretariat of the FFEM on the PIN and answers provided

Annex 4 – Logical framework

Annex 5 – Detailed financing plan

Annex 6 - Communication on the project

Annex 7 – Letter of co-financing from MAR

Annex 8 – Maps of Coastal and Marine Protected Areas of the Mesoamerican Reef

Annex 9 – Map of fish spawning aggregation sites and indications of the level of protection

Annex 10 – Bibliography

ANNEXE 1

CST's opinion on the PIN (May 3rd 2018) and answers provided

Opinion

The CST gives a positive opinion on this project, despite some reservations. It is a project with a strong research component, which seems justified because it consists in setting up, in a coordinated and simultaneous way, the protection and the knowledge of a reef which could be a multi-species fish spawning aggregation site that is particularly important for the entire Mesoamerican reef. International coordination among several coastal countries is also an important issue of the project.

The project is designed in strong interaction with local populations and should contribute to both ecosystem protection and local development through the establishment of protected areas (including non-take zones) including fishermen. In the short term, locals will see the benefits to the economic health of their own business.

Opinion	Answers
<i>The project should nevertheless be much more specific about this local fishing activity, its organization, and the local institutions on which the management and protection system will largely depend.</i>	<p>The Cayman Crown site, far from the coast and in the open sea (offshore, unprotected by the reef), is not much frequented by fishermen. Belize fishermen do not fish there; only fishermen from two Guatemalan communities and communities in Honduras (who fish outside their territorial waters) fish there.</p> <p>The Cayman Crown area, which is poorly fished and not yet protected, should be distinguished from other fish spawning aggregations sites of the project, all of which are already protected and managed by NGOs and / or co-managed with neighboring fishing communities. In Mexico, the zones are monitored by the NGO COBI, in partnership with the fishing cooperatives</p> <p>In Belize, Gladden Spit is overseen by the NGO SEA, in partnership with the Coast Guard</p>
<i>The project should better describe the modalities of integration with the public authorities of each country. Beyond the importance of good coordination with government authorities, it could also be particularly necessary if the problem of illegal fishing, insufficiently described for the moment in the project, was to be a significant risk.</i>	<p>The modalities for integration with the public authorities are done via the Belize National Spawning Aggregation Working Group in Belize and the Quintana Roo Working Group, in Mexico.</p> <p>In Belize, the Secretary General of the Ministry of Fisheries was met and agreed to the project (letter of validation to come). In Mexico the 2 project sites are within the Sian Ka'an Biosphere Reserve, which is under the Ministry of the Environment, and the NGO COBI works closely with Sian Ka'an management.</p>
<i>The distribution of the existing MPAs and their different levels of protection, as well as the location of the FSA sites that will be included in the sentinel site network and the level of protection they enjoy, should be detailed, particularly in a cartographic manner.</i>	<p>The distribution of existing MPAs, the location of spawning areas, and their level of protection are presented in Annexes 7 and 8 and in the text (Component 2) respectively.</p> <p>A global map should be provided later, as a result of project activities.</p>

ANNEXE 2

Opinion of FFEM's Steering Committee (1st of June 2018) on the PIN and answers provided

RECIF MESO-AMERICAIN (MEXIQUE, BELIZE, GUATEMALA ET HONDURAS) - « Big Fish » Récif Méso-Américain - CZZ235901G

The CST expresses its interest in this project, where the importance of the research component is well-justified. The steering committee joins the CST on its favorable opinion, on a project well in line with the international priorities in marine biodiversity and with the commitments of France, in particular within the framework of the ICRI. The Committee would like clarifications and additions to be made at the feasibility stage, including: (i) the situation of the small-scale fishing sector (actors, stowaways, illegal fishing zones, socio-economic characterization of the sector and planned arrangements); monitoring and evaluation (in particular in the context of possible short-term income loss, following the establishment of non-fishing zones), current and future governance, etc.), as well as the modalities envisaged for involving in the project, along with the conservationists, fisheries and EAF specialists; ii) a mapping of actors and stakeholders, distinguishing in particular civil society from public institutions, and specifying the terms of partnerships by type of actor. The feasibility will also ensure that all stakeholders have been consulted (in a logic of "environmental diplomacy"); clarify how the project fits into the regional "big fish" initiative; and finally detailing and securing the co-financing announced, the financial circuit and the conditions envisaged for each (in particular as regards the financing of the Oak Foundation).

- The project is accepted at the identification stage.

Opinion	Answers
<i>The situation of the artisanal fisheries sector (actors, illegal fishing zones, socio-economic characterization of the sector and planned monitoring and evaluation mechanism (particularly in a context of possible short-term income loss, following the in place of non-fishing zones), current and future governance, etc.)</i>	<p>The situation of artisanal fisheries in the region, which is very informal, is poorly known in the area, except for a few punctual and often old studies. This question should be the subject of a future MAR Fund project. Several elements are indicated in the text (see paragraph Socio-economic context of fisheries in the project countries, which gives an idea of the number of fishermen, cooperatives in the project area).</p> <p>Loss of fishermen's income: The Cayman Crown site, far from the coast, with high transfer costs, and in the open sea is hardly frequented by fishermen. Fishing activity in the area is therefore limited and prohibitions will only affect few fishermen; poorly known in a precise way it will be the subject of more detailed studies in the framework of the project.</p> <p>On other sites that are already protected, in Mexico and Belize, fishermen are very involved on protection issues, monitoring and management of spawning aggregations (they participate in monitoring, and, the captains of boats ensure the safety of the divers, and the surveillance of the zones).</p>
<i>As well as the modalities envisaged to involve in the project, alongside the conservationists, the fishermen and specialists in the ecosystem-based fisheries management</i>	<p>The project scientific advisor, Will Heymann, is a scientist and has been working on spawning aggregations for more than 20 years. The NGOs involved in the project (COBI, SEA) have also been working for many years to study, monitor and protect the spawning aggregations. Their level of knowledge is very important and sufficient for the project.</p>
<i>A mapping of actors and stakeholders, distinguishing in particular civil society from public institutions, and specifying the terms of partnerships by type of actor.</i>	<p>In section IV, the NEP details all the project stakeholders and presents a summary of the partners' role in the project.</p> <p>The terms of the partnerships have been the subject of much discussion. Some activities are intended to be implemented by well-</p>

	<p>identified partners, others will be the subject of calls for tenders launched by Mar Fund. It should be noted that Mar Fund has a long history of working with NGOs involved in this project (see section 1.4).</p> <p>The issue of active participation of public institutions varies from country to country; in Mexico and Belize, where support from the Belizean authorities is strong, it will go through multi-stakeholder platforms on the spawning aggregations (see paragraph 1.4.); On the other hand, the active but very measured approach of Mar Fund and FUNDAECO in Guatemala is highlighted because of the political issues in the area.</p>
<i>The feasibility will also ensure that all stakeholders have been consulted (in a logic of "environmental diplomacy")</i>	<p>It should be noted that the initiators of the project demonstrate an excellent diplomatic sense and adequately integrate all stakeholders in the consultations necessary for good project design. The authorities of the countries concerned are the subject of attention, considering that each country has its own rhythms and ways of operating. Except for Guatemala where the situation requires special attention and in Honduras where the mission did not go, all the main partners were met or were informed (fishermen, NGOs, scientists, and administrators).</p>
<i>Clarify how the project fits into the regional big fish initiative</i>	<p>It emerged during the feasibility study that the "Big Fish" regional initiative, the result of a consultation of an FAO working group, was still under development at the time of writing the NEP. Only a succinct draft proposal was available and the "Mar Fish" project is indeed the first concrete initiative of "Big Fish". It is understood that data sharing, at scales larger than the MAR, will have to be ensured: either through Big Fish, if this initiative is successful, or through other data sharing networks.</p>
<i>Detail and secure the co-financing announced, the financial circuit and the conditions envisaged for each (in particular regarding the financing of the Oak Foundation).</i>	<p>All co-financing has been reviewed and the financing plan is in equilibrium. Mar Fund is a very important contributor to the financing of this project and all the partners of the civil society also contribute (see the letters of commitment of all the partners, given to the FFEM). The feasibility made it clear that the role of the Oak Foundation is much lower than expected when reading the PIN. Indeed, the Oak Foundation has recently withdrawn from the geographical area concerned by the project. As a result, in its exit strategy, it proposed a "Blue Challenge", including co-financing for any capitalization identified on the Mar Fund's endowment fund.</p>

ANNEXE 3

Opinion of the Secretariat of the FFEM on the PIN and answers provided

Eligibility

The approach is in line with the orientations of the FFEM strategic programming framework 2015-2018, on the two concentration themes: i) integrated management and resilience of marine and coastal areas and ii) innovative financing of biodiversity (axis 2, trust funds).

The Project contributes to the achievement of some of the SDGs, particularly Goal 14 "Conserve and sustainably exploit the oceans, seas and marine resources and Goal 17" Strengthen the means of delivery and revitalize global partnerships for sustainable development "by helping countries and organizations to cooperate, as well as Goal 2 by promoting food security through more sustainable use of resources (fisheries). In addition, it is fully in line with the priorities of the International Coral Reef Initiative's (ICRI) action plan, adopted in Paris in 2016, including (i) analyzing regional and global policy instruments and governance mechanisms related to protection and sustainable management of coral reefs, and ii) support the development of coral reef indicators, regional monitoring of the coral reef, as well as the preparation of global coral reef status report and trends via the ICRI (International Coral Reef Initiative - Global Coral Reef Monitoring Network).

The project is innovative, in particular as regards the production of knowledge about the coral reef, just discovered, and its transboundary character which makes it an issue of environmental diplomacy, as for the production of knowledge about important Fish Spawning Aggregations sites and the development of sentinel sites, the various and complementary partnerships that will be mobilized, and finally the use, in part, of funding, of an endowment fund, a guarantee of sustainability, in order to take advantage of the competence acquired in this field by the project beneficiary (MarFund).

Project Instruction

It will be necessary during the feasibility study, in addition to the usual information complements expected from a NEP (institutional set-up, governance and distribution of roles between partners, financial arrangement, reality of co-financing, etc.), to give additional elements on the following points:

Favorable opinion

Opinion	Answers
<i>Detail and clarify the interactions and complementarity between the Big Fish Project and the Big Fish Initiative.</i>	It emerged during the feasibility study that the "Big Fish" regional initiative, the result of a consultation of an FAO working group, was still under development at the time of writing the NEP. Only a succinct draft proposal was available and the "Mar Fish" project is indeed the first concrete initiative of "Big Fish". It is understood that data sharing, at scales larger than the MAR, will have to be ensured: either through Big Fish, if this initiative is successful, or through other data sharing networks.
<i>Detail the existence of other initiatives in the same region and on the same subject, their complementarity and the way in which the project will coordinate with them in order to create maximum synergies and avoid duplication in the operation of the project.</i>	Refer to section 1.7

<i>Explain how visibility and image feedback will be done for the FFEM and French cooperation.</i>	It was discussed that the FFEM would be systematically mentioned as a Mar Fund partner. Logos and other verbatim records should be included systematically in the communication related to the project, or even more widely.
<i>Scientific Aspects: Clarify the state of scientific knowledge of the new Cayman Crown Reef</i>	<p>The new Cayman Crown Reef has been the subject of a few short expeditions. At this stage, it is recognized that it is exceptionally well preserved. Summary mapping, including basic bathymetric data, exists. This work should be completed, as well as the identification and characterization of spawning sites.</p> <p>Refer to the context of component 1.</p>
<i>Clearly distinguish the different characteristics of the sites according to whether they are (sometimes at the same time) MPAs, spawning aggregations sites, refuge areas, sentinel sites, coral reefs and mapping each category. In order to more accurately determine the potential impact of the project, provide an exhaustive list of all the spawning aggregation sites already identified in the MAR, with their main characteristics.</i>	<p>Annexes and the context of Component 2 provide maps of MPAs and spawning aggregation sites, indicating their status (protected or not).</p> <p>It was not possible, despite our requests, to obtain a synthetic map of this information, but it should be provided during the timeframe of the project.</p>
<i>Local development aspects: specify how fishermen will be involved and interested in this project.</i>	Fishermen and other community members are involved in both reef monitoring and monitoring of FSA sites; many of them have already been trained throughout the MAR, and the project will provide new training. Some of them who work with NGOs will also participate in the workshops.
<i>"Environmental diplomacy" aspect: ensuring that all stakeholders have been consulted on this project and that they agree with the role that will be assigned to them. Ensure that the governments concerned are involved, beyond the mere role of observer.</i>	It should be noted that the initiators of the project demonstrate an excellent diplomatic sense and adequately integrate all stakeholders in the consultations necessary for good project design. The authorities of the countries concerned are the subject of attention, considering that each country has its own rhythms and ways of operating.
<i>Financial aspects: specify management fees and with respect to the planned endowment fund: (i) analyze the returns achieved by Mar Fund over the long term since its inception in order to properly adjust the financial assumptions proposed in the financial model. ii) make accurate projections of the Cayman Crown staffing, compared to financial requirements for conservation of the area.</i>	<p>The endowment fund for Cayman Crown will be designed as a window within Mar Fund. As a result, the management fees applicable to this window will be the same as those of the foundation as a whole, ie approximately 0.6% of the capital per year.</p> <p>The consultants analyzed the investment policy of Mar Fund, substantially in line with international recommendations on the subject (CFA). The expected financial income is 4-5% annual, in line with the average results achieved by the fund since its creation.</p>

ANNEXE 4

Logical Framework

The overall objective of the project is to promote the recovery of fisheries in the Mesoamerican Reef region, by strengthening the network of protected spawning aggregation sites of commercial fish, as critical areas in the life cycle of these species.

Results	Activities	Indicators	Source of verification	Hypothesis
Component 1: Knowledge and protection of the Cayman Crown site				
Result of Component 1: The Cayman Crown spawning aggregation is legally recognized and managed in Belize and Guatemala		<ul style="list-style-type: none"> • Official declaration in Guatemala • Official declaration in Belize • Management plan (for each country or in common) • Maintain the spawning aggregation site of Cayman Crown in a good state 	Management plan document Guatemala decrees Belize decrees Scientific documents presenting the Cayman Crown characteristics	
	1.1.1. Preliminary mapping for Cayman Crown - Baseline mapping and plan for final bathymetric data collection expedition (through compilation of existing bathymetric)	<ul style="list-style-type: none"> • Preliminary bathymetric map of the area 	Preliminary map	Political events and the political will of countries do not allow progress ➤ Guatemala and Belize fail to agree on management arrangements ➤ National considerations outweigh the collective interest of the countries ➤ Weather conditions prevent smooth field expeditions
Result 1.1: Acquired knowledge on Cayman Crown allows to fully document the request for protected area creation.	1.1.2. Final bathymetric data collection through cooperative field expedition, and global comprehensive bathymetric mapping of Cayman Crown	<ul style="list-style-type: none"> • Detailed bathymetric and geomorphological map of the area 	Final map	
	1.1.3. Characterization of coral reefs and megafauna	<ul style="list-style-type: none"> • Report on reef state • Photos and movies 	Reports, photos and movies	
	1.1.4. Characterization of fish spawning aggregations and set up of baseline data for aggregation's monitoring	<ul style="list-style-type: none"> • Characterization report on the Fish Spawning Aggregation • Films and photos of concentrations 	Reports, photos and movies	
	1.1.5. Compile and analyze characterization data into site description to support management	<ul style="list-style-type: none"> • Consolidated report presenting the environment and specificities of Cayman Crown concentrations 	Consolidated final report	
	1.1.6 Collaboratively develop management recommendations and proposed zoning	<ul style="list-style-type: none"> • Specific recommendations for the management plan 	Consolidated final report	

Results	Activities	Indicators	Source of verification	Hypothesis
Result 1.2: Cayman Crown Protected Areas Declaration in Belize and Guatemala is on track (or done)	1.2.1 Drafting of documents for the legal declarations (technical document depending on the MPA status)	<ul style="list-style-type: none"> Dossier de déclaration à destination des élus et politiques Les textes légaux sont prêts Specific recommendations for zoning plan management plan Declaration file for elected officials and politicians The legal texts are ready Specific recommendations for zoning plan management plan 	Meeting reports	
	1.2.2 Follow up high-level political discussions with decision makers to advance in the declaration and management of the Cayman Crown Site	<ul style="list-style-type: none"> Reports of high-level meetings Report on the progress in the 2 countries The Government Agencies of each country initiate the process of legal creation of protected areas before the end of the third year. 	Meeting reports Letters exchanged with political leaders	
	1.2.3 Protection is gazetted and management plans are developed (Regional meeting for regional policy coordination and harmonization)	<ul style="list-style-type: none"> Report of the regional meeting Legal documents Management plan 	Official documents	
Result 1.3: Funding mechanisms are established	1.3.1 Provide initial management funding for Cayman Crown MPAs in Belize and Guatemala	<ul style="list-style-type: none"> Number of grants made % of matching funds collected Number of funding requests submitted to donors following discussions with partners. Number of successful proposals (60% target) 	Activity reports Accounting document	
	1.3.2 Tentative Business planning for Cayman Crown MPAs	<ul style="list-style-type: none"> Business plan defining a funding gap and strategies to reduce it 	Business plan document	
	1.3.3 Establish and manage a specific endowment fund for both Cayman Crown Protected Areas	<ul style="list-style-type: none"> Capitalization of the endowment fund Identified opportunities for new capitalisations Annual return of the endowment fund; The average annual return on investments should be greater than or equal to 4%. 	Activity reports Accounting document	

Results	Activities	Indicators	Source of verification	Hypothesis
Component 2: Sentinel Site Observation Network				
Result of Component 2: an observation network for fish spawning aggregation sentinel sites is operational and supports the protection of a regional network of multi-species spawning aggregations.		<ul style="list-style-type: none"> Positive evolution of commercial fish biomass at sites monitored by HRI 	HRI annual report Project final report	<ul style="list-style-type: none"> ➤ Weather conditions make it difficult to follow up on the ground during spawning ➤ Willingness of partners to share their data
Result 2.1. Observation network and protocols are validated	2.1.1. Status report of FSA research in the MAR region with revision of historical data (baseline)	<ul style="list-style-type: none"> Status report 	Status report	
	2.1.2. Validate a common monitoring strategy through a regional workshop: prioritization and validation of sites, protocol and partners, data sharing agreements	<ul style="list-style-type: none"> Minutes/report of the regional meeting Strategy agreed by all partners (charter of commitment?) 	Strategy or Charter signed by all partners	
Result 2.2. People in charge of monitoring are trained	2.2.1. Provide regional trainings (NGOs, administrations and fishermen) on standard techniques and protocols for monitoring fish spawning aggregations	<ul style="list-style-type: none"> At least 25 people trained At least 50% of the people trained participate to regular monitoring 	Field mission reports	
	2.2.2. Trainings for coral reef monitoring	<ul style="list-style-type: none"> At least 10 people trained At least 50% of the people trained participate to regular monitoring 	Field mission reports	
Result 2.3. The data collected and analyzed provide information on the status of FSA and their responses to CC	2.3.1. Equipment of monitoring stations	<ul style="list-style-type: none"> The planned equipment is installed and provides reliable scientific data 	Equipment invoices Reports detailing field installations and photos of underwater installations	
	2.3.2. Collection of new field data	<ul style="list-style-type: none"> At least 1 monitoring per site per year Each sentinel site has a monitoring team throughout the project. 	Field mission reports	
	2.3.3. HRI platform extension for aggregation data	<ul style="list-style-type: none"> Operational database Data entry platforms created At least 50% of the monitored sites are in the database 	HRI database and website	
	2.3.4. Data analysis and sharing	<ul style="list-style-type: none"> Bulletins périodiques de l'état des aires de frai et des récifs publiés et disponibles en ligne. Periodic bulletins on the status of FSA sites and reefs are published and made available online. 	Drafted documents and website	

Component 3: Fostering the social acceptability and support for protecting spawning aggregations				
Result of component 3: rules to protect spawning aggregation sites are respected		• Negative trend in the number of infractions	Fines	
Result 3.1. The communication campaign makes it possible to establish links between the actors	3.1.1 Development and implementation of short videos	• Number of short films broadcast	Short films produced and broadcast	
	3.1.2 Development of a website on spawning aggregation information in the MAR (hosted within the HRI or MAR Fund websites)	• Number of visits to the website	Website	
	3.1.3 Radio spots developed and aired at a local level	• Number of broadcast spots	Spots produced and broadcast	
	3.1.4 Hold information meetings for local fishing communities through regular visits to buffer zone communities	• Number of meetings per year with fishing communities	Activity reports of the NGOs in charge	
	3.1.5. Report Cards, Eco-audits & Media outreach and communication to decision makers (production, printing, dissemination)	• Number of Government Agencies that acknowledge receipt of reports of the state FSA	Acknowledgment letter	
Result 3.2. Community development activities compensate for lost income	3.2.1 Diagnostic of the current use of Cayman Crown	• Status report of uses	Report	
	3.2.2 Design and execution of local initiatives to compensate and create alternatives (Conservation agreement / small grant / Rotary / or other methodology)	• Number of project financed	Activity reports	

Component 4: Project management and evaluation				
Result of Component 4: a rigorous project management facilitates concerted decisions and ability to adapt to unforeseen circumstances		<ul style="list-style-type: none"> • Annual meeting of the Steering Committees and their reports • Reporting of activity, based on logical framework and financial audits • Final project report 	Activity reports Evaluation report Project final report	
Result 4: The project is well-managed	4.1 Initial planning workshop	<ul style="list-style-type: none"> • Number of participating NGOs • Quality of the conclusions produced 	Compte rendu	
	4.2 Program manager (Mar Fund Staff)	• Number of months worked and quality of services rendered	Activity reports	
	4.3 Scientific Advisor	• Number of days worked and quality of services rendered by the scientific advisor	Activity reports	

ANNEXE 5

Detailed financing plan, in euros

	Total Project	FFEM	Cofinancing											
			MAR Fund	HRI	COBI	SEA	CORAL	Oceans 5	Marisla	Cayman Crown endowment	TIDE	FUNDAECO	EDF	LGL
Component 1: Knowledge and protection of the Cayman Crown site														
1.1.1. Preliminary mapping for Cayman Crown - Baseline mapping and plan for final bathymetric data collection expedition (through compilation of existing bathymetric)	193 000	122 800	61 400	8 800	0	0		0	0	0	0	0	0	0
1.1.2. Final bathymetric data collection through cooperative field expedition, and global comprehensive bathymetric mapping of Cayman Crown														
1.1.3. Characterization of coral reefs and megafauna														
1.1.4. Characterization of fish spawning aggregations and set up of baseline data for aggregation’s monitoring														
1.1.5. Compile and analyze characterization data into site description to support management														
1.1.6 Collaboratively develop management recommendations and proposed zoning	8 800	8 800	0	0	0	0		0	0	0	0	0	0	0
1.2.1 Drafting of documents for the legal declarations (technical document depending on the MPA status)	61 400	0	0	8 800	0	0		0	0	0	17 500	30 700	4 400	0
1.2.2 Follow up high-level political discussions with decision makers to advance in the declaration and management of the Cayman Crown Site	61 400	0	0	8 800	0	0		0	0	0	13 200	21 900	17 500	0
1.2.3 Protection is gazetted and management plans are developed (Regional meeting for regional policy coordination and harmonization)	110 600	8 800	20 300	2 600	0	0		35 100	0	0	13 100	26 300	4 400	0
1.3.1 Provide initial management funding for Cayman Crown MPAs in Belize and Guatemala	500 000	52 600	169 400	0	0	0		61 400	0	100 000	21 900	85 900	8 800	0
1.3.2 Tentative Business planning for Cayman Crown MPAs	21 900	0	0	0	0	0		21 900	0	0	0	0	0	0

1.3.3 Establish and manage a specific endowment fund for both Cayman Crown Protected Areas	767 500	460 500	307 000	0	0	0		0	0	0	0	0	0	0
Total Component 1	1 724 600	653 500	558 100	29 000	0	0		118 400	0	100 000	65 700	164 800	35 100	0
Component 2: Sentinel Site Observation Network														
2.1.1. Status report of FSA research in the MAR region with revision of historical data (baseline)	17 500	17 500	0	0	0	0	0	0	0	0	0	0	0	0
2.1.2. Validate a common monitoring strategy through a regional workshop: prioritization and validation of sites, protocol and partners, data sharing agreements	35 100	18 400	12 300	4 400	0	0	0	0	0	0	0	0	0	0
2.2.1. Provide regional trainings (NGOs, administrations and fishermen) on standard techniques and protocols for monitoring fish spawning aggregations	143 800	48 200	58 800	4 400	13 200	0	0	0	0	0	0	19 200	0	0
2.2.2. Trainings for coral reef monitoring	31 500	0	26 300	5 200	0	0	0	0	0	0	0	0	0	0
2.3.1. Equipment of monitoring stations	248 300	35 000	170 200	0	0	0	0	22 000	0	0	0	0	0	21 100
2.3.2. Collection of new field data	0			0		0	0				0	0	0	0
2.3.2.1 Monitoring sentinel sites in Cayman Crown	100 100	34 200	3 600	1 800	0	0	0	57 000	0	0	0	3 500	0	0
2.3.2.2 Monitoring five other sentinel sites	544 800	122 900	114 900	1 800	198 200	71 100	18 400	0	0	0	0	0	17 500	0
2.3.2.3 Monitoring reef health near or at sentinel sites	63 300	17 500	40 500	5 300	0	0	0	0	0	0	0	0	0	0
2.3.3. HRI platform extension for aggregation data	41 300	8 800	6 100	26 400	0	0	0	0	0	0	0	0	0	0
2.3.4. Data analysis and sharing	0					0	0				0	0	0	0
2.3.4.1 Analyse des données des sites sentinelles (partenariats avec académies)	26 400	0	26 400	0	0	0	0	0	0	0	0	0	0	0
2.3.4.2 Atelier régional pour l'analyse et le partage des données	39 500	13 200	26 300	0	0	0	0	0	0	0	0	0	0	0
Total Component 2	1 291 600	315 700	485 400	49 300	211 400	71 100	18 400	79 000	0	0	0	22 700	17 500	21 100

Component 3: Fostering the social acceptability and support for protecting spawning aggregations															
3.1.1 Development and implementation of short videos	65 800	8 800	57 000	0	0	0	0	0	0	0	0	0	0	0	0
3.1.2 Development of a website on spawning aggregation information in the MAR (hosted within the HRI or MAR Fund websites)	13 200	8 800	0	4 400	0	0	0	0	0	0	0	0	0	0	0
3.1.3 Radio spots developed and aired at a local level	10 600	0	10 600	0	0	0	0	0	0	0	0	0	0	0	0
3.1.4 Hold information meetings for local fishing communities through regular visits to buffer zone communities	35 000	0	32 400	2 600	0	0	0	0	0	0	0	0	0	0	0
3.1.5. Report Cards, Eco-audits & Media outreach and communication to decision makers (production, printing, dissemination)	35 100	4 400	4 300	26 400	0	0	0	0	0	0	0	0	0	0	0
3.2.1 Diagnostic of the current use of Cayman Crown	8 800	0	4 400	4 400	0	0	0	0	0	0	0	0	0	0	0
3.2.2 Design and execution of local initiatives to compensate and create alternatives (Conservation agreement / small grant / Rotary / or other methodology)	78 900	8 800	64 700	5 400	0	0	0	0	0	0	0	0	0	0	0
Total Component 3	247 400	30 800	173 400	43 200	0	0	0	0	0	0	0	0	0	0	0
Component 4: Project management and evaluation															
4.1 Initial planning workshop	17 500	0	0	0	0	0	0	0	17 500	0	0	0	0	0	0
4.2 Program manager (Mar Fund Staff)	84 300	26 300	40 400	0	0	0	0	17 600	0	0	0	0	0	0	0
4.3 Scientific Advisor	52 700	26 300	26 400	0	0	0	0	0	0	0	0	0	0	0	0
Total Component 4	154 500	52 600	66 800	0	0	0	0	17 600	17 500	0	0	0	0	0	0
Total frais de gestion (6 %)	78 000	63 200	0	0	0	0	0	14 800	0	0	0	0	0	0	0
Total Euros	3 496 100	1 115 800	1 283 700	121 500	211 400	71 100	18 400	229 800	17 500	100 000	65 700	187 500	52 600	21 100	
Final Evaluation		40 000													

1. GENERAL ASPECTS - CHART 1

FFEM focus thematic	Biodiversity (Financing mechanisms for biodiversity)
FFEM Member Institution	- Ministry of ecological and solidarity transition - Ministry of Foreign Affairs and International Development
Bénéficiary	Mar Fund
Grant Amount of FFEM	1,12 M€
Provisional Co-financiers	Mar Fund (1.28 M€) ; HRI (121 000 €) ; COBI (211 000 €) ; SEA (71 000 €) ; CORAL (18 000 €) ; Oceans 5 (230 000 €) ; TIDE (66 000 €) ; FUNDAECO (188 000 €) ; EDF (53 000 €) ; LGL (21 000 €)
Total amount of the	3,5 M€
Commitment date	End of 2018
Duration of the project	3 years

2. ABSTRACT

The overall objective of the project is to promote the recovery of fisheries in the Mesoamerican Reef region, by strengthening the network of protected spawning aggregation sites of commercial fish, as critical areas in the life cycle of these species.

3. THE SYNTHESIS**1. Context of the project**

La pêche le long du Récif Méso-Américain (MAR en anglais) représente le moyen de subsistance de millions de personnes dans les quatre pays impliqués: le Mexique, le Belize, le Guatemala et le Honduras. Cependant, la pression provenant de pratiques de pêche non durables a contribué à une baisse moyenne de 23 % de la biomasse des poissons commerciaux (Healthy Reef Initiative, 2018). Les « zones de reconstitution des stocks halieutiques » entièrement protégées (dans lesquelles toutes extractions est interdite) se sont révélées extrêmement efficaces: durant la dernière décennie, au sein de ces aires protégées, la biomasse de poissons commerciaux a doublé. Malheureusement, alors que 57 % du récif Méso-Américain est maintenant protégé, les zones plus strictes de reconstitution des stocks ne représentent que 3 % de la superficie concernée. Ceci est particulièrement problématique dans le cas des zones de reproductions de poissons, zones de frai ou frayères (ZF) dispersées le long du récif qui sont essentielles au maintien des populations de poissons commerciaux et jouent donc un rôle vital dans la gestion des pêches.

Les frayères sont les lieux où se rassemblent temporairement des poissons dans le but de se reproduire. Elles comptent des densités de poissons jusqu'à trois fois supérieures à celles trouvées en périodes non reproductives et sont donc extrêmement vulnérables à la pêche ; elles représentent la production annuelle quasi-totale d'alevins des espèces qui s'y reproduisent. Cependant il n'existe à ce jour que peu d'informations sur la santé et l'évolution des zones de frai, informations essentielles pour leur protection. Il n'existe pas non plus de plan régional coordonné pour les surveiller et les gérer ni de compréhension de leur importance, de la part de nombreux acteurs.

L'aire d'intervention du projet inclura la zone de « Cayman Crown », récemment découverte (en 2013) grâce aux pêcheurs locaux, un récif extrêmement bien conservé, à cheval entre le Guatemala et le Belize, dont c'est la seule

zone de frai multi-espèces. En raison de sa découverte récente, les éléments de connaissance nécessaires à sa protection et sa gestion n'existent pas. Si elles sont correctement protégées avec l'appui de ce projet, la zone de Cayman Crown et les six autres frayères voisines, peuvent former un véritable réseau de frayères protégées entre les quatre nations, jouant un rôle central pour la protection à long terme de la pêche et pour la qualité de vie des personnes qui en dépendent.

2. Objectives

The overall objective of the project is to promote the recovery of fisheries in the Mesoamerican Reef region, by strengthening the network of protected spawning aggregation sites of commercial fish, as critical areas in the life cycle of these species.

3. Description of components

Component 1: Knowledge and protection of Cayman Crown site.

The site will be subject of scientific explorations, in partnership with fishermen and other members of neighboring communities, to validate the existence of fish spawning aggregations, characterize them, and study the coral reefs of the area, whose first explorations revealed its good health. These elements will serve to advocate for the creation of two new marine protected areas: one in Belize and the other side of Guatemala. High-level political discussions will be held with key decision-makers to protect and manage Cayman Crown sites in Belize and Guatemala, by bringing together the two countries, whose NGOs are already working together, for coherent management. A financial mechanism - an endowment fund in the form of a specific window hosted within Mar Fund - will be established to ensure the long-term management and protection of the Cayman Crown site.

Component 2: Sentinel Site Observation Network.

Several spawning grounds are already protected and monitored in the region, including for the Nassau grouper in danger on the IUCN Red List. The aim of the project is to set up a network of 7 sentinel multi-species spawning sites, so as to ensure a homogeneous monitoring that allows a coherent regional vision of their evolution, including with regard to climate change. A regional workshop will gather all the actors to agree on common protocols, data collection and production of analyzes. Training sessions will allow various actors to be engaged in the follow-up: fishery administrators, NGO members, fishermen and other members of coastal communities, including women. The field collections will be followed by participatory analyzes and the work will allow a regional data banking and the production of a regional inventory for the MAR region, which will be reported at the Caribbean level (in connection with Big Fish) and internationally (Society for the Conservation of Reef Fish Aggregations - SCRFA).

Component 3: Promote the social acceptability of protecting spawning grounds.

(1) A detailed communication plan will allow to develop close relationships between scientists, fishermen, environmentalists, policy makers and citizens, in favor of a regional movement to strengthen the understanding of the role of fish spawning aggregations in the management of fisheries, the importance of protecting them and fostering collaborative management. This plan will contribute to building a "citizen science" that promotes a better understanding of environmental issues by local communities.

(2) With the support of the regional Rotary network and with the support on 2 NGOs already involved in the field, community development activities will be implemented for the communities most affected by the closure of fishing areas around the Gulf of Honduras (Belize, Guatemala and Honduras), taking into account that the current fishing effort seems to be low.

4. Date and amount:

- The project will start during the first semester of 2019, for a period of 3 years.
- The grant awarded by the FFEM amounts to € 1.12 million.
- The total amount of commitments to finance the project is € 3.5 million.

3.1 Date et montant:

- Le projet démarrera au cours du premier semestre
- 2019 pour une durée de **3 ans**.
- La subvention octroyée par le **FFEM** s'élève à **1,12 M€**.
- Le **montant total** des engagements pour financer le projet s'élève à **3,5 M€**.

ANNEXE 7

Letter of co-financing from Mar Fund



11 October, 2018

Constance Corbier-Barthaux
Program Manager
French Facility for Global Environment
Paris, France

Dear Ms. Corbier-Barthaux,

I write to you in relation to the project proposal "MAR Fish: Knowledge, monitoring and protection of Mesoamerican reef spawning areas", to be developed by MAR Fund and several partners in the four countries of the Mesoamerican Reef Region.

It is my pleasure to confirm that MAR Fund commits to providing US\$1,463,000 as a match to the overall project cost of US\$3,985,000, during the three years of project implementation.

Thank you very much for your interest in and support of this exciting initiative.

With kind regards,

A handwritten signature in black ink, appearing to be "Lorenzo Rosenzweig de Pasquel".

Lorenzo Rosenzweig de Pasquel
Chairman
MAR Fund Board of Directors

Mesoamerican Reef Fund

22 Avenida 0-59, Zona 15 Vista Hermosa II, Guatemala, Guatemala, 01015
Tel/ Fax (502) 2369-3188 / 2369-1978
www.marfund.org www.fondosam.org

ANNEXE 8

Maps of Coastal and Marine Protected Areas of the Mesoamerican Reef

COASTAL AND MARINE PROTECTED AREAS FROM THE MESOAMERICAN REEF



MARINE PROTECTED AREAS

Country	MPA Area (km ²)	RZs Area	T.S. Sea	Number MPAs	Largest MPA (km ²)	Smallest MPA (km ²)
Mexico*	29,629.9	796.6	301,72.8	58	11,070	2
Belize	4,028.7	642.0	266,58.6	17	1,130	4
Guatemala	1,083.8	22	138,81.7	2	1,026	38
Honduras	9,672.8	482.1	155,64.2	10	6,449	15
MIR	34,272.0	1,864.8	819,56.3	47	—	—

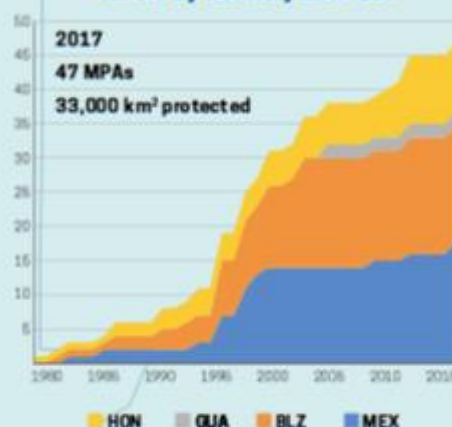
T.S.: Territorial Sea | RZs: Replenishment Zone (no fishing)

*Mexico includes only the portion of Mexican Caribbean Biosphere Reserves, the largest in the region, that is inside the T.S. MPA statistics determined jointly by INCH and collaborators.

Over 50% of the MAR is now protected.

Our region has excelled in creating and managing MPAs for 30 years. Our current focus is securing real protection through a network of connected, fully-protected replenishment zones (RZs). RZs are areas of the ocean protected from all extractive and destructive activities. A well-designed and managed RZ network will enhance biodiversity, fisheries and livelihoods.

MPAs by Country and Year



Mexico



2016 Eco-Audit¹
70% MPA MANAGEMENT



MPAs only work if well managed

Enforcement Levels:

13 good | 17 moderate | 17 inadequate

* Based on the 2016 Eco-Audit

Nearly ALL big fish found in replenishment zones

of mature fish per site:
1.4 outside MPAs
1.5 inside MPAs
6.4 in RZs

Belize



Guatemala



Honduras



¹ Just Released: "Biophysical Principles for Designing a Network of Replenishment Zones for the Mesoamerican Reef System". Download at healthyreefs.org/marshp/ | <http://eco-audit.healthyreefs.org/>

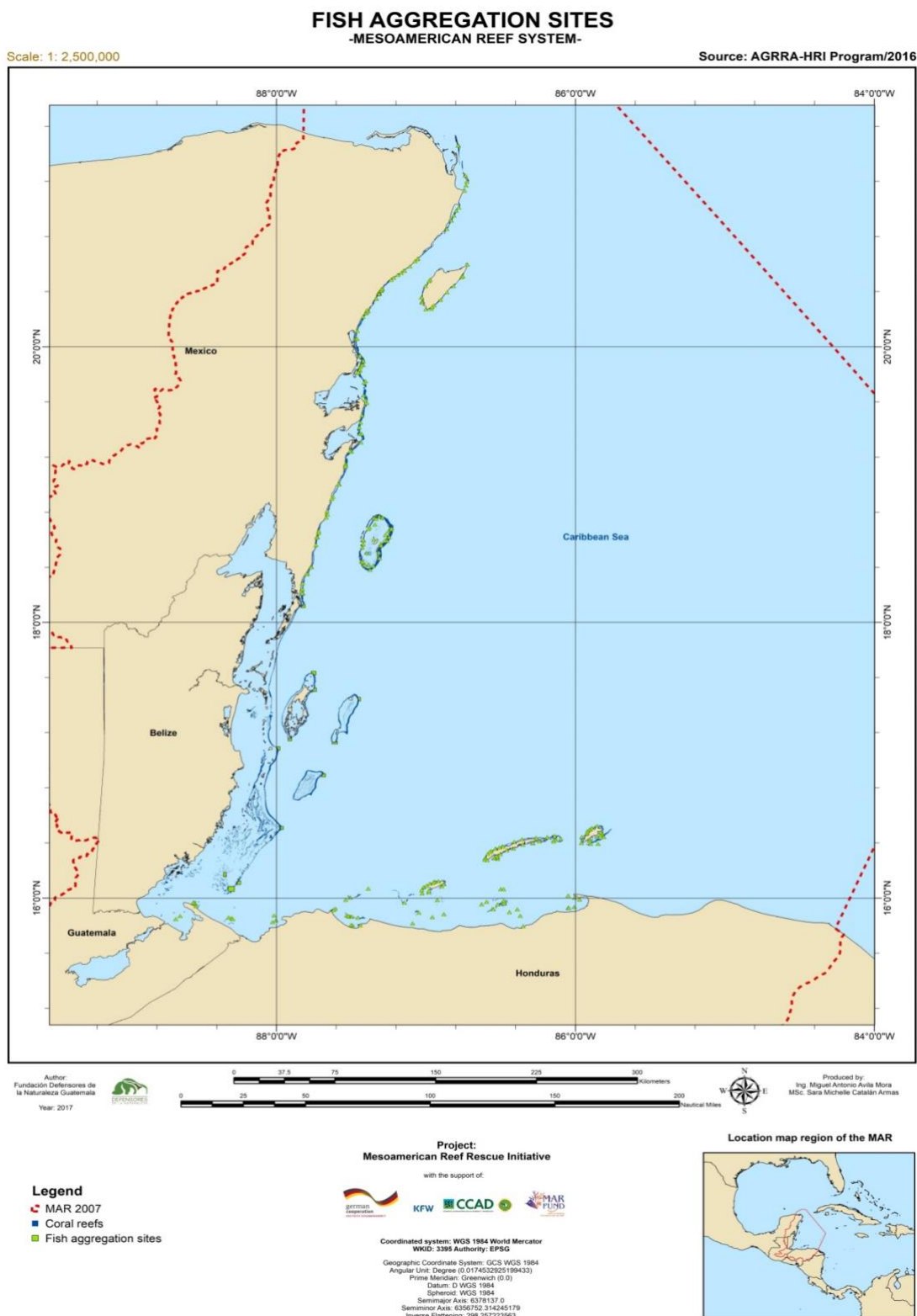


Marine Protected Area
Replenishment Zones
Coral Reef

* Percent of fish of reproductive size (sexually mature) in 2016

ANNEXE 9

Maps of fish spawning aggregation sites and indications of the level of protection



MEXIQUE

Fish Spawning Aggregations, Quintana Roo, Mexico



Level of Protection

- Inside MPA/Fish Refuge and Protected
- Inside MPA and Not Protected
- Outside MPA
- No Fishing Area
- ✱ Verified by Divers

Code	Name
M1	Xcaret
M2	Punta Xamach
M3/ARP1	San Juan
M4	Punta Xoken
M5/ARP4	Niche Habin
M6	Punta Pájaros
M7	Punta Piedra
M8	Punta Tupac
M9	Quebrado de Chal
M10/ARP7	Anegado de Chal, Punta Herrero
M11/ARP3	El Faro, Punta Herrero
M11/ARP8	Sitio "Pargos", Punta Herrero
M12	Punta Herrero
M13	Las Sardinas
M14	Punta Mosquitero
M15	Punta Pulticub
M16	Pulticub
M17	Pozas Gorilas
M18	Frente a Cazona
M19	Ubero –anegado
M20	Ubero, quebrado
M21	Rio Indio
M22	Faro viejo
M23	Mahahual –Chac-chi
M24	Mahahual – Tres piedras
M25	Mahahual –Piedra sola
M26	Rio Bermejo
M27	Puerto Angel
M28/ARP5	Herradura
M29	Xahuayxol
M30	Tanquílá –Rio Huache
M31	Hobna –Xcayal
M32	Punta Gavilán
M33	Blanquízal
M34	Xcalak, quebrado
M35	Cayo Norte
M36	Glenview
M37	Herradura-Cassel
M38	Cayo Lobos
M39	Isla Che
M40	M40
M41	M41
M42	M42 Norte Contoy
M43	M43
M44	Sur Contoy
M45	Norte Isla Mujeres
M46	Sur Isla Mujeres
M47	M47
M48	M48
M49	M49
M50	M50
M51	Punta Molas
M52	M52
M53	M53
M54	Punta Sur, Cozumel
M55	M55
M56	M56
M57	M57
M58	M58
M59	Bajos en frente Isla Holbox
ARP2	Lagos
ARP6	Maya Ha, Mahahual
ARP9	Canal, María Elena

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
 Projection: Mercator Auxiliary Sphere
 Datum: WGS 1984
 False Easting: 0.0000
 False Northing: 0.0000
 Central Meridian: 0.0000
 Standard Parallel 1: 0.0000
 Auxiliary Sphere Type: 0.0000
 Units: Meter



Sources:
 Sosa et al. 2002, Medina-Quej 2004
 Aguilar 2006, COBI 2014, COBI/ASK 2010

Belize

Marine Protected Areas Network of Belize

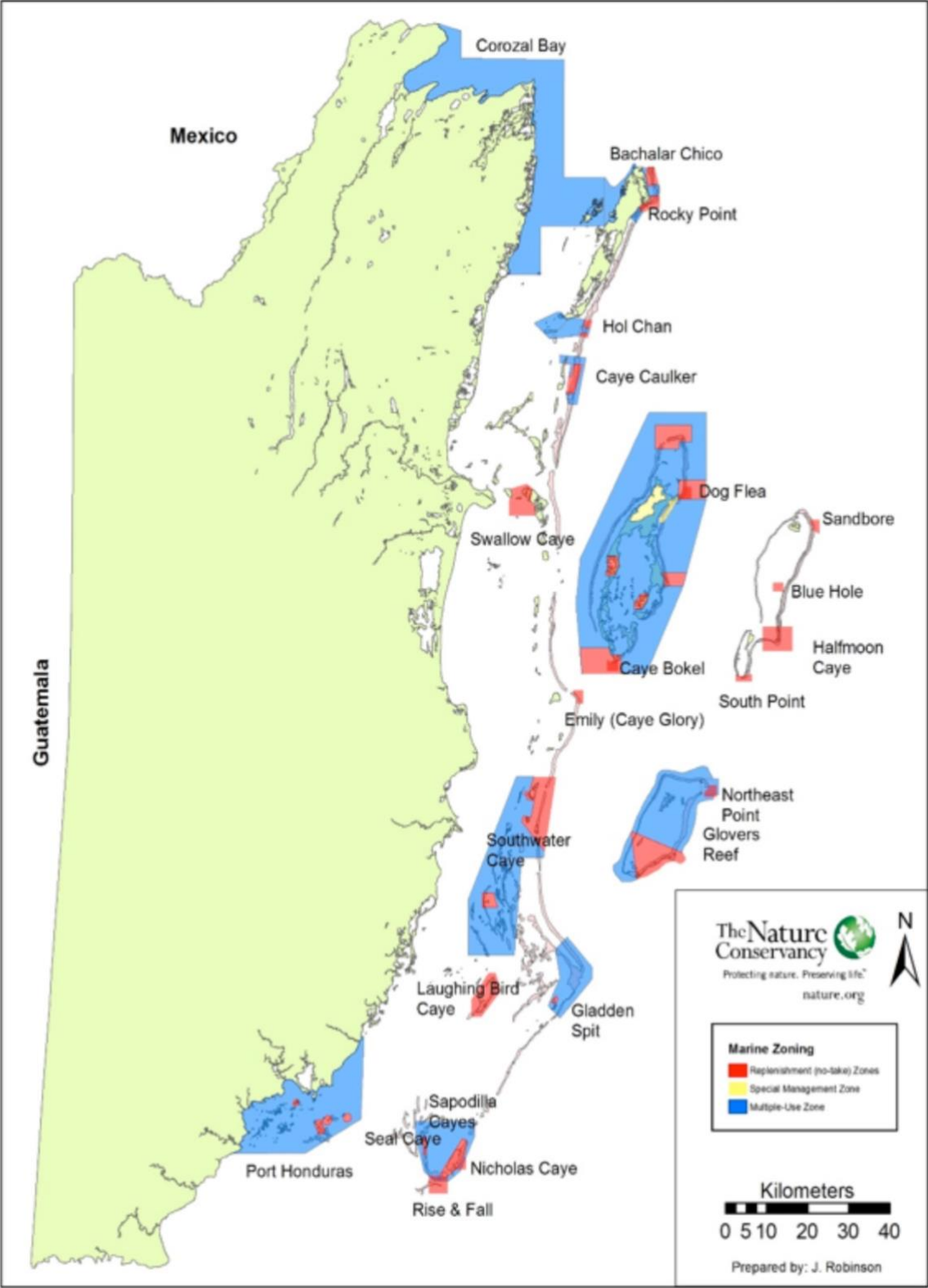
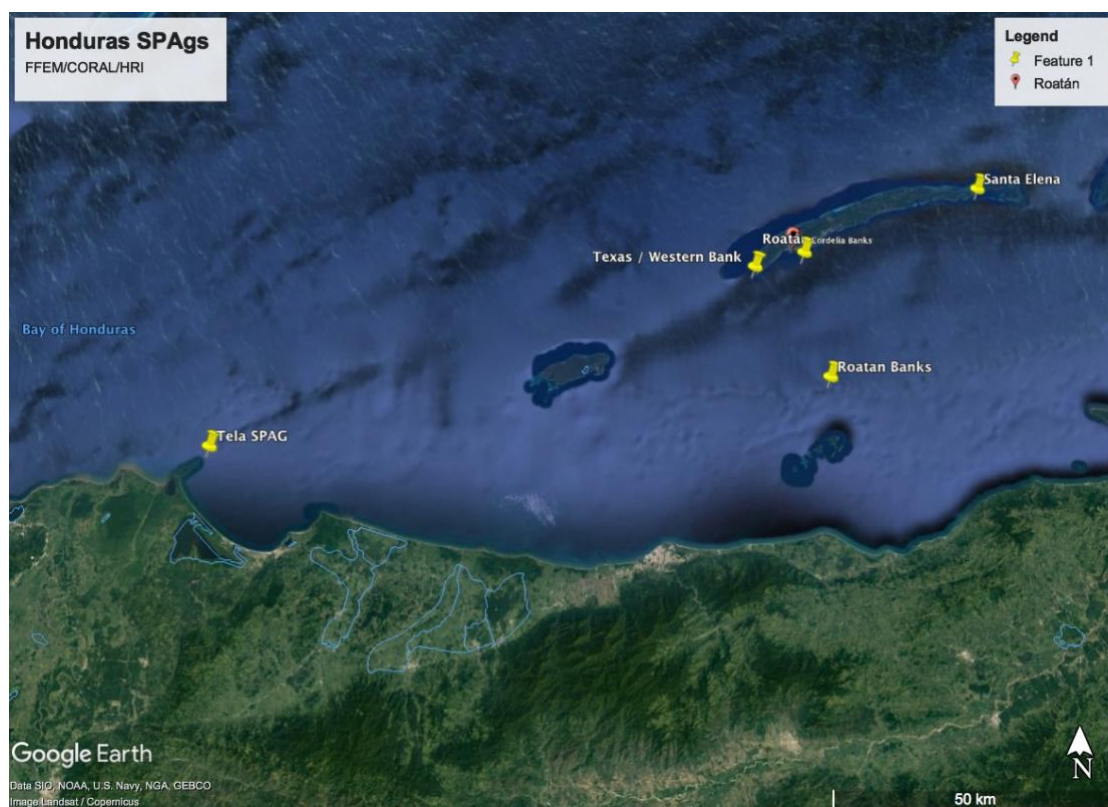


Figure 2

Honduras



LISTADO DE SPAGS PARA MEROS (Fuente The Nature Conservancy)

Number		Country	Groupers	Validated
1	Caldera del Diablo - Guanaja	Honduras	x	
2	Banco Vietnam – Tela	Honduras	x	
3	Banco Capiro – Tela	Honduras	x	
4	Sitio 1 Jeannet Kawas – Tela	Honduras		
5	Lanternas Bank - Tela	Honduras	x	
6	Punta Sal – Tela	Honduras	x	
7	Roatan Banks – Cayos Cochinos	Honduras	x	x
8	Mariposales – Cayos Cochinos	Honduras		
9	Punta Pelicano – Cayos Cochinos	Honduras		
10	La Grupera – Cayor Cochinos	Honduras	x	x
11	Western Banks (Nova Scotia / Anchor) – Utila	Honduras	x	
12	Blackish Point – Utila	Honduras		
13	Southeast Bank (Black Hills) – Utila	Honduras		
14	Salmedina Banks – Utila	Honduras		
15	Banco Cordelia – Roatan	Honduras	x	x
16	Northeast Bank (Groupers Joy) - Roatan	Honduras	x	
17	Western Banks – Roatan	Honduras	x	x
18	Black Rock Point (Guanaja)	Honduras		
19	La Mesona - Omoa	Honduras	x	

Details of the sentinel sites of Punta Allen, Punta Herrero (Mexico) and Gladden Spit (Belize)



ANNEXE 10

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