1. Title page:

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- Project name: Healthy Reefs for Healthy People: Strengthening the Scientific Foundation
- Grantee: Smithsonian Institution
- Author of the report. Melanie McField
- Address. Smithsonian Marine Station, 701 Seaway Dr., Ft Pierce FL 34949
- Period covered in the report and date of presentation October 1st 2017 to October 11th 2018 (Date of Submission).

2. Executive summary to date: briefly describe activities and results to date.

Healthy Reefs for Healthy People (HRI) is a globally unique international collaboration among reef research, management and conservation institutions dedicated to safeguarding the MAR off Mexico, Belize, Guatemala and Honduras. HRI works closely with over 72 partners throughout the region, to convene and coordinate collaborative monitoring and communication about the overall health of the Mesoamerican Reef and our efforts to manage it. HRI uses scientific data to generate coral reef management plans and evaluation tools that regional leaders, local partners, and policymakers can use to protect the MAR such as the Report Cards and Eco-Audits. Its mission is to improve scientific understanding of the functioning of the Reef and enhance its ecosystem health through implementation of science-based management interventions. HRI is creating a more informed and powerful stakeholder base, a fundamental requirement to the successful implementation of conservation management actions.

HRI has maintained its leadership position in the conservation of the MAR and has become a global leader in science-based adaptive management that provides direct assistance to conservation practitioners and decision-makers.

During this granting period HRI has produced and launched the 2018 Report Card on the Health of the Mesoamerican Reef. As an opening to the International Year of the Reef, HRI's 2018 Report Card was launched in all four countries on January 10th, 2018, marking a decade of data gathered, analyzed and published by HRI. The launch events were a success, garnered substantial press coverage in-country as well as international media, with over 70 stories found in print, TV, radio and online.

HRI is currently conducting monitoring in Belize with over 25 sites completed this far. Mexico has recently almost finished its monitoring season, with 27 sites completed. Guatemala has completed its 10 sites. Currently, Honduras has completed 60 sites from a total of 81. We have had a successful monitoring season with many partners collaborating.

HRI has advanced in targeting the four cornerstone strategies: healthy watersheds, healthy fisheries, healthy communities and healthy futures.

Healthy Watersheds – HRI's direct involvement with the local West End water management entity, Polo's Water Association, has secured 2 more grants totaling $61K. CORAL has granted $31K in order to accomplish 41 new connections to the treatment system; while MAR Fund's $30K are directed towards pumping out and completely sealing off 60 septic tanks around Half Moon Bay, Roatan, Honduras.

Our policy focus on international agreements helped to secure Honduras' recent signing and ratification of the Cartagena Convention's protocol on Land-based sources of Marine pollution paving the way for strengthened wastewater treatment in that country (https://www.dropbox.com/s/j81ktwzck9fjb5o/Decreto%20No_%209-2018%20Convenio%20de%20Cartagena.pdf?dl=0).

In Mexico, HRI coordinator participates actively to the Yucatán Peninsula, Solidaridad and Benito Juarez watershed and clean beaches committees meetings presenting the state of the reefs, the disease outbreak, the direct link of these threats to water quality and pushing towards Cartagena Protocol for land based pollution ratification and tertiary waste water treatment.

Healthy Communities – Our human communities in the Mesoamerican Region depend on productive coastal ecosystems. HRI is improving its understanding of the linkages between human and ecological health, and promote sustainable development alternatives. This strategy is closely linked with healthy watersheds and fisheries; we need healthy waters and sustainable fisheries in order to have healthy communities. HRI is collaborating with the Global Coral Reef Monitoring Network to plan a socioeconomic indicators training workshop for 2019. We are also working with RARE do determine a set off social indicators that could be used for their fisheries work and our reef ecosystem assessments for the 2019 Report Card.

Healthy Fisheries – Our strategy includes activities supporting ecosystem-based fisheries management, including the region-wide protection of parrotfish, important fish spawning sites, and the promotion of fisheries replenishment zones.

HRI is working closely with strategic partners within key organizations, and continues to push for more conservation science and funding for management in the Cayman Crown reef. HRI is a partner and co-sponsor of a grant proposal for over a million Euros, submitted through MAR Fund to the French Fund for the Environment (FFEM). It strives to advance science, conservation and MPA establishment in the shared Cayman Crown area of Belize and Guatemala.

In Mexico, the actualization of the protected species law (NOM-059-SEMARNAT-2010) and its public consultation process allowed to submit a request to include 10 species of Caribbean parrotfish. HRI coordinator in Mexico has also been actively involved in the process of identifying socio economic principles for the design of replenishment zones with COBI and

TNC. HRI is the representative of the CSO sector for the Lion Fish National Action Plan design process and have collaborated to the elaboration of the draft plan.

In Honduras, HRI is collaborating with partners in Utila (CORAL, BICA Utila, CEM and WSORC) and Guanaja (BICA Guanaja and CEM) to monitor the success of no-take zones established on both islands. In Guanaja, 5 new monitoring sites were created within the 2 no-take areas in 2016, and will be surveyed again this season. While on Utila, the recent declaration of 2 no-take zones has led to HRI creating 4 new monitoring sites in 2018.

Healthy Futures – HRI lead the MAR's BleachWatch Program and mobilized a coordinated network of trained surveyor teams to evaluate the extent of bleaching throughout the Mesoamerican reef region during the 2017 bleaching event. A total of 20,334 corals were assessed for bleaching and mortality during October 2017, as part of this Bleach Watch effort. The results of the 2015-16 bleaching events were summarized in the recent Report Card, with the newer data being evaluated as part of the PhD thesis for Andrea Rivera, CINVESTAV, on whose committee HRI Director, M. Mcfield served. Andrea just successfully defended her PhD in April adding another scientist to the growing cadre of expertise in the MAR.

This year, a coral disease outbreak that emerged and had been confined to Florida's reefs (since 2014), appears to now be spreading into the wider Caribbean (we have identified it in Jamaica and Mexico this far). HRI issued an alert in June, and by early July we had details of an outbreak in Puerto Morelos, Quintana Roo, Mexico. As of late September, there are multiple sites within Mexico suspected of being affected by this new disease (no confirmatory tests exist because the exact pathogen has still not been identified). We are engaging with Florida researchers to learn from their experience about this disease and HRI's Mexico Coordinator is now leading some trials treatments.

The Secretary of Ecology and Environment (SEMA) in Quintana Roo did a series of workshops to modify the law for solid waste management. Our Mexico Coordinator and Communications Consultant attended to give recommendations, which were integrated in the new law of solid waste management, which includes the ban of plastic bags and straws, as well as styrofoam. The modifications passed to the state deputies for approval, and it will be decreed hopefully before the end of the year 2018. Our Communications Consultant also participated actively to design with SEMA a communications campaign to reduce consumption of single-use plastics among Q. Roo, which will be launched September-October 2018.

3. Objectives: The objectives of the project, as established in the approved proposal.

A. Convene and Coordinate the region's collaborative monitoring and communication about the overall health of the Mesoamerican Reef and our efforts to manage it.
B. Healthy Watersheds: Working alongside existing local and national water entities, HRI will promote the adoption and replication of effective management schemes that will allow better management of potable and waste water in coastal communities improving reef health (and community health).
C. Healthy Fisheries: HRI aims to advance the network of scientifically justified replenishment zones or no-take fish refuges, protecting at least 10% of territorial sea by 2020, including 75% of the known fish spawning sites. Increase herbivory and reef health by protecting parrotfish region wide by 2018.
D. Healthy Communities: Convey consistent, scientific information and recommendations to policymakers, decision-makers and the public, such that the connections between

reef health, human health and socioeconomic sustainability, result in effective conservation action at an unprecedented scale.

E. Healthy Futures: Expand HRI science to address main impediments to reef health by exploring management interventions and monitoring specific responses including emergency bleach watch monitoring if needed to improve our understanding of reef resiliency.

4. Project progress

The originally planned methodology for each of the objectives still applies. Each of the objectives and accomplishments is explained in the following paragraphs.

A. Convene and Coordinate the region's collaborative monitoring and communication about the overall health of the Mesoamerican Reef and our efforts to manage it.

- **Collaborative training and reef monitoring with partners**

This spring we convened five coral reef monitoring training workshops throughout the MAR region (three in Honduras co-hosted by the Coral Reef Alliance). All together 70 field biologists were trained in the AGRRA reef monitoring protocol and database entry in the MAR, including 18 from Mexico, 7 from Belize, and 37 from Honduras and 8 from Guatemala. Trainers that were certified the previous year participated in the training in all countries. (https://www.dropbox.com/s/d9y9apr3dp5i8ga/AGRRA%20Trainees.xlsx?dl=0).

HRI also participated in a training of trainers course in the Bahamas. Ana Giro was the benthic instructor and certified 4 additional trainers in Coral Reef Monitoring.

Monitoring started after training and now is almost finished, with over 118 sites so far, 23 Sites for Mexico, 10 for Guatemala, over 25 for Belize and 71 for Honduras. We had 4 partners assisting in monitoring in Guatemala, 14 in Honduras and 15 partners in Mexico (Belize is still underway). Belize and Mexico coordinators are also gathering additional data from partners (normally about 60% of the sites in these countries in the report cards are from partners) in order to be included into the 2019 RC.

(https://www.dropbox.com/sh/xrk8rrxoux3pzf8/AACukmgzDBJVOIPtNTGwuK57a?dl=0),

- **Enhance partner capacity and participation with HRI**

Four new partners have entered the initiative in the last year (See the point 7 of this report).

In Mexico, the authorities from the Natural Protected Areas Commission, preoccupied by the data presented on herbivorous fish biomass and the fact that only Mexico still does not protect them, officially invited HRI's coordinator to collaborate and write a chapter about herbivorous fish importance and needs for protection. This information will be included in the Mexican Caribbean Biosphere Reserve Management Plan to be published soon. This would be the first step, and an important one, towards the protection of parrotfish in Quintana Roo as this newly declared area covers 5 million hectares of territorial sea in the MAR, roughly 97% of the total area in Mexico. Additionally, Ecosur has included HRI into their proposal for monitoring this Biosphere Reserve for a governmental financing program.

HRI is the only group consistently providing training in species identification and reef monitoring techniques in the MAR. These trainings enhance partner capacity and participation with HRI during our monitoring season.

In 2018, the Report Card has been collectively and individually presented to PNCOIMPCPN (Cancún and Isla Mujeres), PNAPM (Puerto Morelos and Isla Contoy), PNAC (Cozumel), PNASK (Sian Ka'an) and RBCM (Mexican Caribbean) MPAs directors and staff where the results where discussed and reviewed. It also has been presented to the State Secretary for Environment, the Regional MPA director and the partners SCO. As one of the results, the Coordinator for Mexico has been reached to evaluate the possibility of switching to AGRRA protocols for monitoring Mexican Caribbean MPAs in order to facilitate comparison of data and decisions. In Cozumel, the HRI map is being used in almost all the MPA environmental education and diffusion materials. Most of the MPAs use adapted protocols, some very similar to AGRRA such as in Cozumel or Puerto Morelos, which could be uploaded to the AGRRA platform easily. However, other MPAs such as Cancún or Sian Ka'an uses a time consuming method that, given their limited resources, is jeopardizing their monitoring capacity and make them dependent on other institutions. Surveyors in Xcalak and Chinchorro are already trained to AGRRA and RBCM has been approached to familiarize them to this method. The Biosphere Reserve of the Mexican Caribbean's management plan draft includes our comments on water quality issues and needs to comply with the Cartagena Convention. A pilot project to assess the effectiveness of King Crab herbivory effect on reefs is also being implemented in collaboration with MPA and Fisheries Authorities.

Organization of special events such as the Environment Day, Oceans Day, and projection of documentaries where HRI participated such as Flows, presentations and workshops strengthened the links with partners in Mexico and reached a wider audience. (https://www.dropbox.com/sh/tbhgj20wo8dl450/AAAIZUWDP-SQo436wrRfLkZOa?dl=0)

In Guatemala, HRI has been invited to attend several meetings and workshops on coral reef restoration, artificial reefs, ocean health and plastic pollution organized by partners. HRI also supported the Motagua River Cleanup organized by partner organization Semillas del Oceano (https://www.dropbox.com/sh/lh73rkgbcq2zsk9/AABp3sJbMJcuUQTGKUJVLl9ra?dl=0).

HRI was invited to a press conference held by the Merchant Marine on World Ocean's Day (June 8th) to celebrate the ratification of the Cartagena Convention. And HRI was a key partner in the declaration of Tela as Marine Wildlife Refuge, which was published on May 4th, 2018.

- **Enhance public awareness and support for marine conservation**

While our primary efforts are focused on effectively communicating what we learn with partners in the Mesoamerican Region, our ability to protect coral reefs also extends outside of our MAR borders, so international outreach is important. We continue to share information through our Regional Partner Meetings, Report Cards, Eco-Audits, Monitoring Trainings, open access data portal and social media. A special event for the Mesoamerican Reef Day (March 10) was organized in Cancún from which followed a whole month of activities around the theme of coral reefs at the planetarium. Experts presented their work and reached the general public. From these rich exchanges, a collaboration with FMCN to elaborate a list of recommendations as an "environmental agenda" general policy arose.
Pictures: https://www.dropbox.com/sh/msxbz7oltlszp74/AADYryVjVlG4_cFLGKiaxbWRa?dl=0

Agenda:
https://www.dropbox.com/s/g5ux55q9pnhp3ev/Agenda%20Ambiental%20SAM%202703.docx?dl=0

An event at Sayab Planetarium (Playa del Carmen), Solidaridad municipality and Maya Court at Tulum, for the week of the Day of the Environment and the Day of the Oceans was organized from which followed a whole set of actions and activities to diminish single-use plastic consumption in the state of Q. Roo and how they affect coral. Our communications consultant prepared a conference with Alejandra Cornejo, to talk about the history of plastics, statistics about the impact on the oceans, and tips to diminish single-use plastic consumption starting from homes. This same talk was then given by Alejandra in the town of Puerto Morelos to inform and support the initiative of local businesses to remove single use plastic from their operation.
(https://www.dropbox.com/sh/qixes4zwr0zswqt/AADWHsgrxq4Y8SA6Fe8jXoF_a?dl=0)

Successful Launches of the 2018 Report Card in all four countries on January 10th, 2018, as an opening to the International Year of the Reef.
(https://www.dropbox.com/sh/bq93fbqegghydsw/AAA-ode2bLxLm7vAHbCgrFRJa?dl=0)

The event held in Belize was co-hosted by Oceana, and also celebrated the recently announced complete ban on any offshore oil exploration in Belize. This is a colossal success after a seven-year effort by the Coalition to Save Belize's Natural Heritage, of which HRI's Director played a formative and leadership role over the last eight years, including the historical People's Referendum, where over 90% of voters said NO to offshore oil – and the government eventually listened. The CEO for Economic Development noted how reef conservation contributes to the Sustainable Development Goals (SDG) Belize has committed to, and to the overall national vision described in their *Horizon 2030* plan. Belize reaffirmed commitment to the new Fisheries Act and increasing Replenishment Zones to 10% of territorial sea by the end of the year.

The launch event in Honduras led to an invitation to a prime-time news television program called "Frente a Frente", which has an estimated viewership of around 2,000,000 people. 3 of HRI's partners collaborated at the show: UNDP, CORAL and Proyecto Marino Costero (UNDP and GEF Funded), where many subjects contained within the report card were approached. HRI's Ian Drysdale stated, at least 4 times during the show, the need for the Honduran Congress to ratify the Cartagena Convention and to declare Tela Bay as a Marine Wildlife Refuge; as sanitation infrastructure needs to improve and Honduras has many undiscovered coral reefs all along its Caribbean coast that call for protection. Both of these results were achieved by March, as they were approved and ratified by Congress.

The publication of the new Tela MPA in the official newspaper (La Gaceta) was paid for by CORAL. The publication of the Cartagena Convention (around $6,700) was paid by Proyecto Marino Costero/PNUD/GEF, MARFund, Dirección General de la Marina Mercante and CORAL. This was achieved by creating an agreement by all parties, which was signed at a press conference held on World Ocean's Day (June 8). (Carta de Intenciones Publicacion Convenio de Cartagena.
(https://www.dropbox.com/sh/pkow12vw9y175lu/AACu_1hX9lNMk66jZiByP8yja?dl=0)

In Mexico, the event took place in the impressive auditorium of Cancun's Planetarium, a venue renown for its relevant science and environmental events. All Mexican HRI partners, allies and media contacts were invited to this exclusive, plastic free, almost waste free, event. The panel

was composed by important environmental local personalities from government, academia and civil society. The Report Card was presented before inviting the panel members to share their comments and experiences about MAR's importance for the region. The audience was very participative and the panel very keen to answer their questions, media then interviewed Melina and several panel members. Over 45 partners and allies assisted the event and 23 media were registered.

In Guatemala, the launch had over 65 participants from government, academia, NGOs and the private sector. Key members of the presidium included, Marco Vinicio Cerezo - FUNDAECO, Luisa Fernandez -Ministry of Environment, and Carlos Marin- Fisheries Department. They publicly commented on the importance of the Report Card and the need to implement the recommended management actions emphasizing on the importance of the creation of new Replenishment Zones in strategic sites mainly to increase fish biomass. About 12 different media attended the event, including an international Latin America media distributor such as "Agence France Presse", which led to coverage in South America, as well as national headlines in Guatemala.

International coverage included:

- Monga Bay: https://news.mongabay.com/2018/01/mesoamerican-reef-gets-improving-bill-of-health
- Smithsonian's Ocean Portal:http://ocean.si.edu/ocea…/improving-grades-mesoamerican-reef
- International Year of the Reef: https://www.iyor2018.org/news/healthy-reefs-mesoamerican-reef-report-card-2018-launch
- Coral Reef Alliance: https://coral.org/blog/celebrating-a-decade-of-conservation-and-collaboration-in-the-mesoamerican-reef/
- https://relay.nationalgeographic.com/proxy/distribution/public/amp/2018/04/belize-restores-coral-reefs-oil-drilling-ban-environment?__twitter_impression=true

Our total media coverage included over 72 media stories in different media outlets (see in Media Hits folder file: Media hits RC 2018,
https://www.dropbox.com/s/uvfr08tfk7zvddt/Media%20hits%20RC%202018.docx?dl=0).

Ana Giro also presented Report Card findings at the international scientific conference for the Gulf and Caribbean Fisheries Institute (GCFI), which was held in November 2017 in Merida, Mexico; where a new initiative to create a fisheries management network for the region was explored. In addition, Melanie presented at the European Society of Reef Studies symposium in Oxford, England in December 2017- resulting in two new data analysis and reporting opportunities. One opportunity is with Cambridge University's Conservation Measures program, now seeing to add more marine indicators (http://www.cambridgeconservationforum.org.uk/initiative/harmonising-measures-conservation-success) and the other is with Oxford University through Dan Exton, for a new analysis of species level data looking for ecological drivers of change.

HRI gets a Royal "Shout Out" and a "Message in a Bottle" in Times Square, N.Y.
We were honored to be recognized by His Royal Highness The Prince of Wales at an inaugural International Year of the Reef Symposium, as one of two exemplary collaborative coral reef initiatives that warrant increased support in order to help protect reefs from the effects of climate change. See the full speech at: http://bit.ly/2F7gDnH. HRH The Prince of Wales said,

"We must strenuously augment those initiatives that can provide platforms for future action; such as the Coral Triangle Initiative, a partnership of six countries in South East Asia working together to sustain the extraordinary marine diversity in that incredibly rich area of ocean; or, the Healthy Reefs for Healthy People Initiative, that works with over 50 partner organizations to track and improve the health of the Mesoamerican Barrier Reef".

National Geographic's Encounter Exhibit in the heart of New York's Times Square, now features Melanie's voice in a lively poem message about loving corals. The permanent exhibit featured 100 plastic bottles transformed into inspirational art by Asher Jay, each with a recorded message about ocean conservation from 100 global ocean leaders. The web version can be found at:
http://www.asherjay.com/message-in-a-bottle/mxa6ig2ds97i1wph98r3zlf1us0m8w

Melanie continues to accelerate the pace of Smithsonian's Conservation Commons, by co-leading the Working Land and Seascapes (WLS) Program, along with Tom Akre (SCBI). Smithsonian is now covering approximately a third of her time, now dedicated to the advancement of a strategic plan, business plan and funding strategy for the program, to be completed by December 2018. With these plans in place, the WLS program will be submitting large funding requests to several new donors, including support for existing programs and new expanded efforts. WLS and Conservation International have secured a two year post Doc position that will be shared to provide scientific analysis for our similar land and seascape level conservation programs.

All coordinators have given talks and conferences in national meetings about HRI work and the 2018 Report Card after the official launch event, these meetings have helped enhance public awareness and support for marine conservation in the MAR. HRI Guatemalan coordinator gave two presentations at the Regional MAR Leaders meeting held in Puerto Morelos, focusing on the 2018 Report Card and how to measure reef health based on the Reef Health Index.

Social media is a great tool used by HRI to enhance public awareness. In the last months, HRI's social media programming (for Facebook, Twitter, Instagram and YouTube) included at least one 'institutional' or original content publication per week. Previously, the institutionally produced content happened only once a month. By following the plan of at least once a week, we have increased our institutional content a minimum of 400% up to 800% in some months.

Link of all supporting documents for collaborative training and monitoring reef health can be found:
https://www.dropbox.com/sh/ldas3g7hrkfjzb6/AACleNjO1IhWm83NlygqQ7FEa?dl=0

Supporting documents for all social media and communications can be found:
https://www.dropbox.com/sh/gf9dbht4ipifr5m/AACDKgN5guACkzXQtxSpoIfMa?dl=0

B. Healthy Watersheds

- **Effective management of wastewater in the West End community improves local water quality and reef health.**

HRI's direct involvement with the local West End water management entity, Polo's Water Association, has secured 2 more grants totaling $61K. CORAL has granted $31K in order to accomplish 41 new connections to the treatment system; while MAR Fund's $30K are directed

towards pumping out and completely sealing off 60 septic tanks around Half Moon Bay. The work over the past years has resulted in Enterococcus levels in this bay to comply with those stated by the US EPA and Blue Flag Beach Program - a major success for improving water quality. The program included a public awareness campaign about the links between wastewater, public health and reef health. Now >70% of households in West End have connected to the treatment system, with over 8 million additional gallons of sewage being properly treated per year as a result of these efforts. Polo's incorporated a neighboring failing water board, and is assisting two additional water boards on Roatán in improving their collections and treatment systems. This work is expensive and incremental but it is progressing, with measured decreases in contaminants.

(https://www.dropbox.com/s/4oy7qkxiz50bjum/Grant%20Agreement%20POLOs%20y%20MARFUND.pdf?dl=0).

Honduras' recent signing and ratification of the Cartagena Convention's protocol on Land-based sources of Marine pollution - paving the way for strengthened wastewater treatment in that country.

(https://www.dropbox.com/s/j81ktwzck9fjb5o/Decreto%20No_%209-2018%20Convenio%20de%20Cartagena.pdf?dl=0).

- **Replicate successful Water Board management scheme in two more areas by 2020**

Over the last few years, HRI has helped provide a successful example and pilot program of improved water and sanitation management in the town of West End, Roatán, Honduras. Our direct involvement has led to a 30% decrease in *Enterococci* counts within Half Moon Bay, based on data provided by BICA Roatan and CORAL. This reduction stems from the moment BICA/CORAL began the monitoring (2013) until August 2018. Now, 95% of the community is connected to the local waste water treatment plant: 276 connections out of a possible 290 without major infrastructure built. The local water management entity, Polo's Water Association, has been spearheaded by HRI's Honduras Coordinator and his collaboration has led to acquiring grants to better improve and increase treatment. Other local water boards are struggling to provide safe drinking water, with sewage treatment beyond their scope with their inadequate billing and funding situations. Through this grant, HRI's Honduras Coordinator plans to continue the work of sharing the lessons learned and replicating this success for human and reef health.

There have been very dramatic and important changes in the operation of Polo's Water Board in West End in the last months. The new Municipality, which took office in January, decided to suspend the payment of the electric costs to operate the waste water treatment plant and pumping station. This equates to an added cost of approximately $7000 per month to the local water board and the users of the system. This change has led to the creation of a new tariff for the services of potable water and sewage treatment, in conjunction with ERSAPS (ente Regulador de Servicios de Agua Potable y Saneamiento).

Polo's Water held a community meeting on Tuesday, April 17th, where ERSAPS's Juan Carlos Fuentes presented the new tariff and community members had the opportunity to express any questions or comments they had. The new tariff was approved and will be implemented as of May 1, 2018. The community members that attended the meeting understand that the cost of

not operating the plant is much higher than operating it. They understand the link between clean marine waters and tourism, and how much West End depends on tourism.

This change has been seen as both an opportunity and a threat: opportunity, in that it now allows Polo's Water to have complete control over the entire system; and a threat, as this is now an added cost that has to be transferred to the customers. As soon as Polo's Water learned of this change, we were able to meet with the General Manager of the electric utility company (Roatan Electric Company (RECO)), to discuss avenues on how this local water board can cover this new cost. RECO have offered Polo's a very attractive rate for the electricity consumed at the treatment plant, as it now falls under an "industrial" rate, and is much cheaper by the Kw/h than the cost that the Municipality was paying.

A meeting was then held with the new Mayor on Wednesday, April 18th, requesting a Municipal Ordinance that will obligate all West End homes and residents to connect to the sewage facility. Up to date, we have approximately 20 homes and businesses that have refused to connect, whether through their own funding or through grants acquired by Polo's.

As of Oct 2018, 276 households and businesses are connected to the treatment plant, of a total of 290 possible connections, resulting in 95% of households/businesses being connected and receiving improved treatment. Polo's Water has a total of 343 potable water connections, but not all of these can be connected to the treatment system without major infrastructure being built.

- **Working to Improve Waste Water Management in Mexico**

Even tough most of our efforts on successful water management schemes are being focused on Honduras, HRI has been pushing for better water management in Mexico.

The Mexican law that establishes the contaminant limits for discharge in the environment has finally been opened for public review, after more than a decade of delays. The concentration limits established in the previous version do not secure the health of the environment and do not meet the legal standards of the Cartagena Convention (as highlighted in our Eco-Audits). HRI has actively participated in providing technical information, in tight collaboration with partner organizations Amigos de Sian Ka'an and CEMDA, to ensure the new version complies with International obligations and protects water quality. A workshop was held by Amigos de Sian Ka'an to gather the opinions from other organizations from Quintana Roo; CEMDA and HRI then analyzed the results, researched and justified all the proposals. In this thorough document, karst and wetlands (including coral reefs), the limits proposed by the Cartagena Convention were included and the addition of several new indicators such as Toxicity Unit were justified. The proposal for actualization of the Mexican law that establishes contaminants limit for discharge in the environment was submitted to the official online portal for public laws consultation (Comisión Federal de Mejora Regulatoria) on March, 6th as a group and as individuals in order to achieve higher impact and reach more key stakeholders.
Link: http://www.cofemersimir.gob.mx/expedientes/21218
So far, no response to this proposal has been received nor actualization has been published in the official diary.
The coordinator keeps actively working in Watershed Committees to lobby for Cartagena Convention Pollutant limits and tertiary waste water treatment to be applied in Quintana Roo.

Link to Healthy Waters supporting documents:
https://www.dropbox.com/sh/2rj3kzqomb1bmek/AADNaGvEMYb5Y05xJNxJxJ27a?dl=0

C. Healthy Fisheries

- **Increase herbivory and reef health by protecting parrotfish region wide by 2018**

HRI has submitted proposals to the Wildlife Secretary in order to include parrotfish species into the protected species list NOM-059-SEMARNAT-2010. These proposals have to be written separately per species and sustained by robust scientific information, to be then reviewed by a panel of experts in order to be included in the legal process and approved by the authorities. A total of 10 parrotfish species technical factsheets have been submitted to legal process in order to be reviewed by authorities and included into the Mexican law for protected species. The proposals were officially sent early September (the public consultation only opened mid August) and supported by several local NGOs but also by Quintana Roo's State Secretary for the Environment, the Yucatan Peninsula Regional Direction of Protected Areas and the Federal Direction of Wildlife. On the same topic, the newly decreed Mexican Caribbean Biosphere Reserve authorities officially requested HRI to provide data and write a report on the state of parrot fish in Quintana Roo and the need for their protection to be included in the Reserve's management program which should be published before the end of this administration. Also, this management plan includes our comments on water quality issues and needs to comply with the Cartagena Convention. In Cozumel, in collaboration with CONANP and a tour operator, didactic material is being designed for tour guides about marine biodiversity and the importance of parrotfish.
(https://www.dropbox.com/sh/tytq1e72b45gv30/AAC_PCIO4NTdm2cBab5WEUhKa?dl=0).
Draft material:
https://www.dropbox.com/sh/8r4k34219wxmc0v/AACz5uQeJrw9brtQCdIAYb_Ea?dl=0

CORAL has been invited to sit at the committee that is rewriting the Fisheries Law for Honduras. CORAL has agreed to support HRI's request to include a couple of articles that foster protection of parrotfish and herbivores in this new draft of the law. The need to rewrite this recently published law is due to the fact that over 48% of the articles contained within it cannot be made into regulations. The document that was approved through the consultation process, that lasted over 8 years, is not the same document that was published as the law. Apparently, certain interest groups changed the law, and did it in a way that would benefit their interests, but it was not done correctly and now the entire law needs to be rewritten.

- **Enhance commercial fish biomass and reef health by protecting spawning aggregation sites.**

HRI Coordinator for Guatemala, Ana Giró, continues to push for more conservation science and funding for management in the Cayman Crown reef. She is working closely with Marco Cerezo Director of partner organization Fundaeco, to expand the Wildlife Refugee Punta de Manabique to include the Cayman Crown Reef.

Guatemala has the smallest percentage of the MAR and offers full protection to only 0.6% of its territorial seas and 0% of reef habitats. Cayman Crown provides the opportunity to engage Guatemala in greater conservation efforts, improve MPA management capability and potentially provide new economic opportunities; Guatemala has yet to develop robust tourism

opportunities along its Caribbean coast. Ana has cultivated sound relationships with the government agencies needed to protect the site and presentations have been made to high government officials from the Environmental Commission of Guatemala's National Congress, Ministries of Foreign Affairs and Ministry of Defense. Also, the data has been used in Belize to push for protection. Cayman Crown has been included in the document on the proposed expansion of replenishment zones for deep water in Belize; we are waiting for the official declaration of the site. We are declaring two separate but adjacent areas one in Belize and the other one would be an expansion of the Wildlife Refugee Punta de Manabique to include Cayman Crown, this is the idea, however much work is still needed.

HRI is a partner and co-sponsor of a regional grant proposal, submitted through MAR Fund to the French Fund for the Environment (FFEM). HRI has been essential in the FFEM grant writing and follow up process that are required by FFEM. HRI assisted in the recent field visit from two of FFEM consultants by answering questions regarding the proposal and setting up important meetings with partners working on spawning aggregations through the Mesoamerican Reef. Through the project partners have identified a need for HRI to assist in the compilation of data and reporting on regional fish spawning aggregations, as a step towards improved management.

(https://www.dropbox.com/sh/f6ett4nvnk4g5sa/AAD8JhMgX7KaxSSalU4b1irla?dl=0).

Ana also led a donor trip with Mr. Adrian Arias, Oceans 5 Program Manager for Latin America & Caribbean, to meet with key partners and explore new collaborations. This resulted in a request for a proposal for $362,944 to advance the declaration, cooperative management, monitoring and sustainable finance for marine conservation in Guatemala. The proposal was written by HRI and MAR Fund, and has been reviewed by Mr. Arias, final proposal has been submitted to Oceans 5 on April 11th. Mr. Arias has requested other documents and information to support the proposal, he has been in close contact with Maria Jose Gonzalez from MAR Fund. The idea is that with the supporting documents presented Mr. Arias will give a presentation to his board at the end of this year.

- **Increase the percent of sea within fully protected zones to 10% by 2020**

HRIs Director and Guatemalan Coordinator are part of the core team for establishing a network of replenishment zones in the MAR, an initiative led by The Nature Conservancy (TNC). They have provided scientific input and collaborating as co-authors in the recently published document named "Biophysical Principles for Designing a Network of Replenishment Zones for the Mesoamerican Reef System, the final document was published on February 14th (English) and February 19th (Spanish).
(https://www.dropbox.com/s/ue0uhs3x907wzpr/Biophysical%20Design%20Principles%20for%20Designing%20a%20Network%20of%20NTZs%20in%20the%20MAR.pdf?dl=0)

HRI continues to work to increase the percent of sea within fully protected Replenishment Zones. In Guatemala and Belize, HRI has provided scientific data that is being used in both countries to push for the protection of the Cayman Crown reef. In Belize Cayman Crown has been included in the document on the proposed expansion of replenishment zones for deep water in Belize; maps have been reviewed however, we are waiting for the official declaration of the site. In Guatemala scientific data has been presented to the Environmental Committee of the National Congress to promote the expansion of the Punta de Manabique Wildlife Refugee to include the Cayman Crown site.

Link of all supporting documents for Healthy Fisheries can be found:

https://www.dropbox.com/sh/x5qdb5qe0n6mslw/AABpzv9bZzWcLh9UJOaC0MJ5a?dl=0

D. Healthy Communities

- **Demonstrate the linkages between human, economic and reef health**

Land2Coast project - Marisol Rueda, was a member of the Land2Coast (L2C) Team, composed of representatives from UNAM, ECOSUR and Cardiff University. In November 2017, the L2C team held a workshop among the members at Cardiff, United Kingdom, to plan the activities for the upcoming year closing the project. Among those activities, a workshop was held in late February 2108, in Q. Roo, called Sustainable Futures Workshop: Co-Development of Ecotourism Proposals with Women from the Communities of the Maya Forest Alliance, at the Sihil Noh Ha Ecotourism Centre, Felipe Carillo Puerto, Quintana Roo. Twelve women attended this workshop, representing four of the five ejidos from the Maya Forest Alliance. The workshop focused on tourism activities as a means for sustainable development. Parallel to this one in early March 2018, a second workshop was held in Playa del Carmen, Q. Roo among members of the government, private sector, academia, and NGOs, to present results from the research project, which has focused on investigating the impacts of land use change on the marine environment in Quintana Roo and the institutional arrangements governing these processes. It also served to have a discussion on how we can begin to advance new approaches to addressing governance gaps in relation to land use impacts on the state's important marine ecosystems. Finally, a public presentation in early March 2018, was given at Sayab Planetarium (Playa del Carmen) to inform the general public of this project, its results and how they can help on making the needed changes for having healthier ecosystems.

In Mexico, HRI is also collaborating to the establishment of socio economic principles for the design of replenishment zones in the MAR (as a follow up on the previous project on biophysical principles), a project leaded by COBI and TNC, which began in the summer 2018 with a workshop and the elaboration of a first draft. HRI coordinator suggested several indicators designed during one of the very first exercise of HRI (Guide to indicators of reef health and social well being in the MAR.
(https://www.dropbox.com/sh/cp35n4thlrbupmk/AABsOdz-1x6rPVOju7I-Nfg2a?dl=0)

Conversations with Global Coral Reef Monitoring Network (GCRMN) to collaborate on their project that includes Socioeconomic Monitoring Initiative for Coastal Management (SocMon) training for HRI. HRI will then training others in the wider Caribeban on SocMon and AGRRA, subsequently to the training, a socioeconomic site assessment will be done in 4 MPA sites selected in each of the 4 countries. Partner voting will be during partner meeting. Funding likely through GCRMN and NFWF for spring 2019 (http://www.socmon.org/regions.aspx?region=Caribbean&centerpoint=17.5,-72.0&zoomlevel=5).

E. Healthy Futures

- **HRI leads the incorporation of the latest reef science into reef management testing out new theories to improve reef management**

MAR-wide Coral Bleaching emergency response plan in operation, with an established protocol.

The third mass global coral reef bleaching event began in 2015 and persisted until the end of 2017 (during each summer/autumn). The 2017 event produced the strongest overall bleaching response, but still not reaching the intensity of the record 1997-98 bleaching – the event that was the most devastating in the Mesoamerican (MAR) region to date. The Healthy reefs Initiative has coordinated regional rapid response monitoring basis each of these years, thanks to MAR Fund's assistance with emergency monitoring funds. The precise and rapid timing of these events presents challenges to activate a coordinated, effective Coral Bleaching Rapid Response Plan for the entire Mesoamerican Reef. A dedicated and planned response, given the future predictions of more warming would be beneficial to all of the partners.

During the 2017 bleaching event a total of 20,334 corals were assessed for bleaching and mortality during October, as part of this Bleach Watch effort. Belize and Guatemala had the most severe bleaching with 17% and 16% of colonies FULLY bleached. The amount affected by bleaching was 49% and 60% respectively. These are the most sever of the 3 years assessed. Honduras also had higher fully bleached (11%) and overall affected (81% - close to the same if 2015). For Mexico the results are similar but varying over the three years, with the fully bleached category (5%) being slightly less than in 2016 (7%), while the combined percent affected (by all categories of bleaching) was highest in 2017 (55%) (https://www.dropbox.com/sh/i75tn53q4u1xsrt/AADsf-wUIyFnqAsK960mjx6Za?dl=0).

Pilot restoration sites have been selected to test methods and success of re-seeding Caribbean King Crab and Diadema and manually removing macroalgae.

HRI's Macroalgae Reduction Strategy goes beyond innovative reporting on ecosystem health and management, to enter into the research and development of innovative techniques to improve reef health aimed at alleviating a major problem: macroalgal proliferation. The proliferation of fleshy macroalgae has continued in the region, despite the protection of grazing parrotfish in Belize, Guatemala and offshore Honduras.

Pilot sites have been selected in Mexico, Honduras and Belize to test several methods to restore herbivory. Data will be available in our next report.

- **Direct removal of harmful macroalgae.**

In Mexico Akumal bay was selected since coral reefs in the bay and surrounding areas are facing declines in live coral cover over the past two decades, due to, among several threats, global warming, overfishing, coastal development and marine water pollution, provoking the proliferation of macroalgae, diseases and bleaching events.

The Ecological Center of Akumal (CEA), a grassroot local civil society organization dedicated to the protection and sustainable management of Akumal's coastal marine resources for more than 23 years, has been working on a coral restoration program in the last 4 years, focusing mainly on Acroporids, some of the main reef building corals in the region. This program aligns with the State of Quintana Roo's commitment to the Península of Yucatan Agreement for Sustainability to recover 20% of its coastline by 2030. CEA is working in close collaboration with the National Fisheries Institute (INAPESCA) among some other institutions, being INAPESCA in charge of the State's coral reefs restoration program.

Following a series of methods defined by both HRI and CEA, fleshy macroalgae (competing and overgrowing corals) will be removed prior to restoration in some plots and continuously done

in other plots to follow their rate of growth and their impact on recently outplanted corals. This project has just received, at the beginning of September, the permits and the funding. Reef patches have been selected and monitoring is underway to have initial situation values.

To provide potential solutions for macroalgae proliferation in Belize, HRI is conducting a pilot study, which will test the herbivory potential of the Caribbean King Crab. The study will use the AGRRA benthic protocol to record benthic data prior to introducing the crabs, at one month and at six months. If the project proves successful, the long term goal of HRI and our partner organization Fragments of Hope, would be to create a separate research project proposal to lend technical and scientific support to a Co-op or organization for the potential development of a sustainable King Crab Mariculture linked to a 'hand's on' Reef Ecosystem Restoration Plan/management strategy for Belize. The project is coordinated by HRI and local partner Fragments of Hope, with the assistance of trained AGRRA surveyors.

In Honduras, HRI is coordinating with the Roatán Marine Park and community dive operators on selecting exact sites for the removal of macro-algae. They will work through a volunteer program established by the park, as soon as the required government approval / research permit is issued.

King Crab supporting documents:
(https://www.dropbox.com/sh/zpyxuldwoor1yz5/AAC6OaK6hbjSv2EMc3KswrWha?dl=0)

- **Restore key herbivorous *Diadema* populations**

Over the last decade, *Diadema* densities have slightly increased an average of 0,04 ind/m^2 in the MAR region. The highest change observed for Guatemala is mainly due to the inclusion of a higher number of monitoring sites, some of them showing high densities of *Diadema*. Mexico shows a decrease of 0,05 ind/m^2, going against the regional tendency. Regional densities of *Diadema* are still about 6 times lower than densities reported before the 1980's mass mortality event (https://www.stri.si.edu/sites/publications/PDFs/2015_Lessios_annurev-marine-122414-033857.pdf). Recovery of Diadema populations is still slow more than 30 years after the die off. The need for effective herbivory to counteract macroalgae proliferation in the region is a strong argument to develop and strengthen Diadema reproduction and restoration programs.

Nevertheless, a few sites along the MAR region have shown in the past few years highest densities, which could serve as potential collecting sites to supply larvae to restore other neighboring areas. This is the case for Honduras where 5 sites have been located to have densities higher than 1.5 ind/m^2 of Diadema.
(https://www.dropbox.com/sh/h2tf12tjk6bumlr/AAD1mZ9QzxDgCKIHEeuzTWDGa?dl=0)

A research plan has been drafted between HRI, Tela Marine, RMP, Roatan Coral Restoration Foundation CRF), Roatan Institute for Marine Sciences (RIMS) and CORAL encompassing a coral and *Diadema* restoration project in Half Moon Bay. The project can begin after the research permit is issued from the Protected Areas Department. This bay shows the highest water quality in West End (based on CORAL/BICA data). HRI will collaborate with Tela Marine Research in techniques to reintroduce Diadema urchins into this area. Tela Marine and Operation Wallacea are also studying the possibilities of rearing *Diadema* from the larval stage to young urchins, with HRI providing needed connections to similar researchers elsewhere.

Reef Restoration Network

HRI's Guatemala and Honduras' coordinators continue serve on the Steering Committee of the MAR Reef Restoration Network. They play a crucial role to apply and spread the Network's best practices, experimental designs and recommendations. Numerous projects in the region participate in coral nursery efforts, either through raising nursery corals or out-planting nursery corals to new areas. HRI plays an important role in the success of these restoration efforts through the coordination and exchange of reef health information regionally. They recently participated in a coral reef restoration exchange led by Fragments of Hope in Belize. Participants were able to see Belize's restoration sites and projects first hand and also exchange knowledge among participants who are all important conservation leaders across the MAR all working on restoration projects.
(https://www.dropbox.com/sh/8c4mu36ijwmy091/AABKJyNcD3rckSThIw74iCMZa?dl=0).

HRI's Guatemala and Honduras' coordinators attended the Executive Committee Meeting on September 17 through the 19th, 2018 in Belize City. The meeting was to revise the bylaws of the Committee and develop the strategic plan for 2019 and 2020.

HRI is also expanding reef restoration to focus on critical ecosystem functions like herbivory, in addition to coral propagation. This new restoration work is aimed at directly addressing the macroalgal proliferation problem highlighted in our Report Cards, as parrotfish alone cannot contain their growth and water quality improvements require longer time-frames and substantially more financial resources to implement on a regional scale. Thus, this additional layer of active management through restoration of other herbivores and manual reduction of macroalgae is being explored.

Coral disease outbreak in the Caribbean
Sick corals first appeared offshore the Miami-Dade County area in September 2014. The outbreak area has since progressed 175 km to the northern limit of the Florida reef tract and southwest to Looe Key in the Lower Keys. Numerous coral species (except the acroporids) have been afflicted, disease prevalence has reached 80% of all colonies present at a site, and a number of coral diseases have been observed. On July 3 researchers from UNAM and CONANP discovered a reef near Puerto Morelos, Mexico to have a severe outbreak of coral disease affecting similar species and exhibiting similar patters as those in Florida. Although diseased colonies have been observed in other reefs in the north of the Mexican Caribbean, the prevalence seems to be lower (50% of several species are affected. Photos and information about this Mexico are posted at www.barcolab.org. So far we have surveyed 3,631 coral colonies in 17 sites, besides sites in Cozumel (that seems to be relatively free of diseases) we found strong evidence showing that the disease outbreak is spreading rapidly across Northern Mexican Caribbean. A few attempts to counteract the proliferation of the disease on some colonies using chlorine epoxy have remained unsuccessful. HRI is working in coordination with a viral specialist to try to isolate the disease cause. Permits are in process.

Up to date, HRI has notified all local partners about the disease and is now expanding the protocol and instructions of regional data collectors, to focus their attention on reporting the new coral disease during the monitoring season. Data on disease will be available on the next Report Card.

5. Indicate the advance of the project in relation to the original timetable and explain the reason for any delays there may have been.

- **Increase herbivory and reef health by protecting parrotfish region wide by 2018**

Honduras recently published the new Fishing Law, which replaces the former one, published in 1959 (see HON Ley de Pesca 2017.
https://www.dropbox.com/sh/zbb7ewvd6lsdwfo/AABh5SbMetzm6ZqNM3cTRRSza?dl=0)
Despite the fact that HRI participated in meetings where the inclusion of herbivorous fish was discussed, these were not included in the new law. HRI has now reached out to all Honduras partners in order to request active participation in the creation of the regulations ("Reglamento de la Ley de Pesca") in order to continue pushing for the protection of key herbivorous species and to make certain that MPA's and their management entities have a say in how these regulations will be created.

HRI Mexico has submitted the technical files to propose the inclusion of 10 parrotfish species to the protected species list. Although most of the files were ready and had been reviewed and approved by the General Direction for Wildlife (Federal Institution), the official submission had to wait until the public consultation was finally opened. It opened mid August (after almost 3-year delay) and all 10 proposals were submitted on line and in paper during the first days of September. Update: the proposals were approved and should be published in the official diary by mid November.

Macroalgae manual removal pilot project in Akumal has been delayed due to permits that were not arriving. Presidential, state and municipal elections delayed several administrative processes and the end of the actual administration is slowing everything, up date: permits have been received in late October, activities are beginning as soon as November.

Progress has been made regarding activities related to gathering information on coastal poverty and socioeconomic indicators, however we will further advance on gathering this information during 2019 by collaborating with the Global Coral Reef Monitoring Network, the plan is to have a socioeconomic indicators training workshop and gather more of this information. We are also working with RARE do determine a set off social indicators that could be used for their fisheries work and our reef ecosystem assessments for the 2019 Report Card.

6. Obstacles: Indicate if there have been any obstacles to the development of the project that have prevented achieving the planned goals or complying with the timetable, and how you have solved or plan to solve the situation.

The territorial dispute between Guatemala and Belize continues to add a layer of complication and has been an issue to advance in the protection of the Cayman Crown reef. However, we are working closely with local and regional partners to move forward. HRI has also been working on securing funding for the declaration and management of the site.

The decision of the Municipality of Roatán to no longer cover Polos Water Board's electric bill and past debt, forced Polo's Water Board to re-prioritize their efforts in order to solve this immediate fiscal hurdle, before they could reach out to coordinate with other water boards. Coordination is now getting underway.

7. Links with other organizations: Describe any alliances established as a result of the project development.

HRI Guatemala has partnered with Pixan'Ja a newly created company focusing on coastal and marine ecosystem conservation (See: Signed Partner Agreement Pixan'Ja, https://www.dropbox.com/s/9myc4lbzeeu89zz/Signed%20Partner%20Agreement%20Pixan%E2%80%99Ja.pdf?dl=0) .

In Mexico**,** Amigos de Isla Contoy A.C. and Centinelas del Agua A.C. have recently signed their agreement of collaborations with HRI. Amigos de Isla Contoy A.C. is a civil society organization, based in Quintana Roo for over 20 years, focused on conservation, MPA activities support and environmental education. They have been collaborating with HRI without formal agreement for years organizing presentations and diffusion events. Centinelas del Agua is a more recently organization dedicated to the protection of Yucatan´s aquifer, numerous collaborations have began to address the serious problem of water contamination in the region.

In Mexico**,** SEMA required the participation of HRI to develop the campaign against single-use plastics, along with other new HRI partners such as Amigos de Isla Contoy and Centinelas del Agua, as well as the private sector, such as Aguakan and Delphinus. Our Communications Consultant was integrated as special guest to the specialized group of environmental educators and communicators under the Watershed Committee of the Yucatan Peninsula.

In 2018, the Report Card has been collectively and individually presented to 5 Quintana Roo's MPAs directors and staff where the results were discussed and reviewed. It also has been presented to the State Secretary for Environment and the Regional MPA director. As one of the results, the Coordinator for Mexico has been reached to evaluate the possibility of switching to AGRRA protocols for monitoring Mexican Caribbean MPAs in order to facilitate comparison of data and decisions. In Cozumel, the RHI map is being used in almost all the MPA environmental education and diffusion materials. As a consequence of our RC launch, the regional MPA authorities officially requested our coordinator to participate in the redaction of a special chapter on parrotfish and herbivory for the management plan of the Mexican Caribbean Biosphere Reserve. Management plan that already includes our comments on water quality issues and needs to comply with the Cartagena Convention. A pilot project to assess the effectiveness of King Crab herbivory effect on reefs is also being implemented in collaboration with MPA and Fisheries Authorities. HRI has been invited by partners and other local organizations to give several presentations on the RC, plastics, sunscreen and other marine related topics. HRI has also organized events always in collaboration with partners inviting them to present their work.

Through contacts with Smithsonian we are in early discussions about potentially assisting HRI collaborative reporting efforts in Cayman and Guyana in 2018, as well as the Turks and Caicos Islands.

HRI will now collaborate with RIMS to replant corals in Half Moon Bay; and with Tela Marine Research Center to reintroduce Diadema urchins in the area.

8. Description of activities for next period: Briefly describe the activities that will be undertaken in the next period.

- Coral Reef Monitoring Reporting using the AGRRA methodology.
- Partner meeting in Caye Caulker Belize, in October 2018.
- Production of Report Card.
- Connect more houses and / or businesses to the treatment plant.

- Work with partners to further MPA zoning or enact new MPAs to protect SPAG sites.
- Follow of recently initiated pilot restoration studies.
- Seek additional funding which will support some additional research on *Diadema* populations and coral restoration efforts in the region. Characterize sites with high abundance of *Diadema*.
- Demonstrate the linkages between human, economic and reef health through different assessments like coastal poverty and impacts to human health due to changes in Reef health.
- Follow-up regarding the definition of socioeconomic indicators for the MAR.
- Reintroduce Diadema urchins and corals into Half Moon Bay in West End, Honduras.
- Continue collaboration on the campaign to reduce and ban single-use plastics in Q. Roo.

9. Project development table

Please see attached Project Development Table with updates.

Annex 1. Project Development Table

Objective	Output / Expected Result	Activity (4 year project)	Activity Year 2	Time Unit (semesters of years indicated)THIS SHOULD SAY MONTHS OF YR 2												Performance indicator	Sources and means of verification	Impact Indicator	Assumptions & risks	Percentage of accomplishment of indicators / outcomes.
				OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP					
				1	2	3	4	5	6	7	8	9	10	11	12					
HEALTHY REEFS - CORE STRATEGY																				
Collaborative training and reef monitoring with partners	Reefs are being regularly monitored by qualified local biologists, with consistent training opportunities	Reef monitoring activities	Reef monitoring activities						X	X	X	X	X	X	X	> 80 sites monitored by HRI	one database updated	Standardized quality data collection - based on agrra.org methodology	funding needed for monitoring	100% - all 4 countries carried out monitoring
																3 training workshops held	3 training workshop reports with signin sheet, photos and test results.	regular assessments of reef condition (2018) shows increase in reef health, particularly increased fish and decreased fleshy macroalgae	funding for workshops	100% Trainings have been organized and held in Mexico, Belize and Honduras (where Guatemalan trainees participated)
	Sound data regularly collected on reef health	Training workshops and certification of local data collectors	Training workshops and certification of local data collectors													>30 researchers certified	test results and cumulative log of certified researchers	Local capacity (# certified data collectors) increased by 30 people this year	local capacity to pass tests	100%- 70 people have been certified
Production of Report Cards (X) and New Community Health Report Card (Y)	Reef managers, general public, and decision makers are able to evaluate reef health via Report Cards, and understand link to human economy and health (Y)	Production and launch of report cards	Production and launch of report cards		X	x										4000 Report Cards printed	receipts of printing	Improvements in reef health (barring external impacts e.g hurricanes, coral bleaching) as measured in the Report Card	public looses interest	100%- in all four countries
							x	x	x	x	x	x	x	x	x	4 launch events successfully get media attention (both per year in report card years)	Launch reports and copies of media coverage	RC is a reference document cited in publications and management documents	hurricane or bleaching damages reef	100%- in all four countries
Evaluation reef management through a 2020 Eco-Audit	Country -level evaluations of degree of implementation of	Perform evaluation.														1000 Eco-Audits printed	Receipts of printing	Proven progress in management actions. MAR % implementation increases from 62% to 75% by 2020	public looses interest	

Objective	Output / Expected Result	Activity (4 year project)	Activity Year 2	Time Unit (semesters of years indicated)THIS SHOULD SAY MONTHS OF YR 2												Performance indicator	Sources and means of verification	Impact Indicator	Assumptions & risks	Percentage of accomplishment of indicators / outcomes.
				OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP					
				1	2	3	4	5	6	7	8	9	10	11	12					
~~Eco-Audit~~ (frequency being reduced to every 5 years)	recommended management actions. Scores for each country	Produce and Launch 2020 Eco-Audit														4 launch events gain media attention	Launch event reports and copies of media stories	partner survey indicates the EcoAudit is useful	lack of govern-ment interest or incentive for con-servation measures	
Enhance partner capacity and participation in HRI	More engaged, effective partners, better utilization of HRI products to help achieve their conservation objectives	Partners participate in annual HRI meeting - setting priorities	Partners participate in annual HRI meeting - setting priorities											x	x	partners' responses on HRI annual surveys find that at least 80% are satis-fied with HRI program	at least one major example of a collaborative 'win' each year.	continued support for HRI as meas-ured thru partner participa-tion and survey results	status quo	planned for October/Novemnber 2018
		ongoing social media posts participation in workshops and partner efforts	ongoing social media posts participation in workshops and partner efforts	x	x	x	x	x	x	x	x	x	x	x	x	HRI staff record at least 1 major conservation 'win" per year relying on the collaboration, as verified in news articles	Success stories in Report Cards RCs demonstrate partner capacity and en-gagement	Management actions result in increased reef health	conflicts with partners of contentious environmental issues, funding etc.	100%- in all four countries
Enhance public awareness and support for marine conservation	More informed public engaged in conservation, better decision making	Launch events, regular TV and newspaper articles	Launch events, regular TV and newspaper articles	X	X	X	X	X	X	X	X	X	X	X	X	>40 media stories per year about conserva-tion issues and HRI launches of reports	log of media reports	engaged public and commu-nity supports conserva-tion activities	competing headlines - economic interests counter to conserva-tion	100%- in all four countries
													x	x	x	public perception survey results	log of public engage-ment in main conservation issues	increased reef health results from actions (increased RH Index score		
HEALTHY WATERS																				
Effective management of	70% of West End						x	x	x	x	x	x	x	x	x	95% of households (276 out of 290) paying for waste water treatment	Number of households connected obtained from water board records	reduction in macro algae on proximate reefs	House-holds want to connect and pay for treatment. HRI Honduras succesfully raised at least $10,000	100% New potable and sewage tariff implemented succesfully. As of October 2018, 276 out of a possible 290 homes and businnesses have been connected to the treatment system = 95% of the possible connections without

Objective	Output / Expected Result	Activity (4 year project)	Activity Year 2	Time Unit (semesters of years indicated)THIS SHOULD SAY MONTHS OF YR 2												Performance indicator	Sources and means of verification	Impact Indicator	Assumptions & risks	Percentage of accomplishment of indicators / outcomes.
				OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP					
				1	2	3	4	5	6	7	8	9	10	11	12					
waste water in the West End community improves local water quality and reef health	community connected to water treatment plant through second phase KfW project	Connect 90 homes/businesses to waste water treatment plant	Connect 20 homes/businesses to waste water treatment plant													Gallons of waste water treated increases during period	At least $10,000 raised in order to make 10 connections @$1,000 each	reduced contami-nation proximate waters as measured in water quality tests	Nutrients from mainland could still fuel macroal-gal growth	95% and 100% -2 grants have been awarded to Polo's Water: 1 from CORAL for $61K to create 41 new connections to the waste treatement system = 95%; and 1 from MarFund, to install solar panels and create a printed document, which has been completed to 100%.
Replicate successful Water Board management scheme two more areas by 2020	2 other coastal water boards/districts are using Polo's Water Board water mgmt. scheme as	Meetings and workshops held where mgmt. scheme is presented to existing water boards and fully explained	Meetings and workshops held where mgmt. scheme is presented to existing water boards and fully explained		X			X								at least 2 Meetings and workshops carried out per year.	Attendance lists and meeting photos (in annexes: HON Meeting with Los Maestros Water Board, HON Los Fuertes Water Board)	Other coastal water boards understand current scheme and want to implement it	Water boards want to improve mgmt. of water works	50% - Meeting with Los Maestros water board. No progress to report up to Oct 2018.
		Honduran water mgmt. entity (ERSAPS) meets with water boards creates tariff spreadsheet	Honduran water mgmt. entity (ERSAPS) meets with water boards creates tariff spreadsheet				X			X						at least 2 Meetings and workshops carried out per year	Attendance lists and meeting photos	Other coastal water boards have real and accurate tariff schemes in place	communities accept water and sanitation tariff	100% - New tariff spreadsheet created for Polo's Water, one community meeting with ERSAPS = 100%
8 coastal municipalities are improving sanitation	IDB and Honduran Govt. acquire funds for sanitation projects	Honduran Govt. ratifies Cartagena Convention (which includes LBS Protocol)	Honduran Govt. ratifies Cartagena Convention (which includes LBS Protocol)						x	X						Cartagena Convention ratified by congress	Ratification printed in official gazette	LBS water quality norms are now legal in Honduras	Convention is ratified by congress. Congresman Irias helps push ratification.	100%- Cartagena convention has been ratified and printed in the official gazette.
	2 IDB/Honduran Govt. funded projects are underway to improve sanitation	2 sanitation projects are underway that improve effluent water quality	2 sanitation projects are underway that improve effluent water quality							X	X	X	X	X	X	Projects approved to improve sewage treatment meeting new standards	Project timeline. News of projects is published in IDB newsletter or newspaper	Projects measure reduced contamination in treatment plant effluents. HRI measures improved reef health in near area.	interna-tional entities want to fund sanitation projects. IDB funds sanitation projects in Honduras	25%- Still waiting for Finance Ministry to request funding to IDB.

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				OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP					
				1	2	3	4	5	6	7	8	9	10	11	12					
Identify new water-treatment technologies to improve wastewater treatment in the MAR	Find new and emerging technologies that treat waste water	Search online and printed articles that explain new treatment methods and technologies	Search online and printed articles that explain new treatment methods and technologies	X												At least one applicable technology identified	Staff web-based research	reduced contamination of water quality as measured by treatment plants		100% - have identified technology but no funding to replicate. Searching for less expensive options
										X	X	X	X	X	X	At least one new technology applied (by 2020)	reduced macro algae in nearby reefs	reduced macro algae in nearby reefs		
HEALTHY FISHERIES																				
	Legal protection of parrot-fishes regionally (Mexico and coastal HN missing)	Write and submit proposal for the inclusion of all caribbean parrotfish species in NOM-059	Prepare technical justification for protecting 10 species.	X	X	X	X	X	X	X	X	X	X	X	X	regulation is passed	Eco-Audit verified legal documents	increased reef health due to successful im-plementation of herbivore protection. Herbivore biomass increases.	macro algae response may be slower than expected due to excess nutrients. Change of grouper diet to parrotfishes diet due to scarcity of groupers.	50% - 10 species' justification documentation has been submitted to the SEMARNAT, after Wildlife approval and support from Environmental authorities, final dictamination should be published before December.

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Increase herbivory and reef health by protecting parrotfish region wide by 2018	Continue communications efforts	Social awareness	Social awareness													Communication through social media, radio, conferences, tv, newspapers, magazines.	Statistics from FB, TW and YouTube tally the amount of people reached by social media outreach. Survey monkey to meas-ure perception and/or change of habits. Radio, tv, conference, press records	Knowledge of importance of herbivores in the Q.Roo state increases.		50% - Communications efforts had been done mainly through conferences, debates and podcasts with 2018 RC results and communication of herbivory activities to do by HRI, and parrotfishes importance. From Oct to Apr, 2 6 participations in Planetarium's debates, 2 participations in Planetarium's conferences, 1 particpation in Tulum's municipal event, 1 participation in a podcast from Kay Tours Mexico. HON: have created articles protecting parrotfish that we are pushing to have included in the revised fisheries law.
Enhance commercial fish biomass and reef health by pro-tecting spawning aggregation	Protection of at least 3 more spawning sites	work with partners to further MPA zoning or enact new MPAs to protect SPAG sites	work with partners to further MPA zoning or enact new MPAs to protect SPAG sites	X	X	X	X	X	X	X	X	X	X	X	X	% of known SPAG sites in protection	Eco-Audit measures this statistic	increased reef health due to successful im-plementation of SPAG site protection - increasing commercial fish biomass over approximatey 5-10 years	poor enforce-ment, lack of political will	Eventhough there has been no advances in % of protection for SPAGS. Proposals have been written to advance in Spawning Agrregation work and protection in both Belize and Guatemala. Proposals to FFEM and Oceans 5 have been presented. New presentations to the Environmental Committee form the National Congress of Guatemala.
																			low popula-tion density hampers recovery of stocks	Not yet evaluated

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Increase the percent of sea within fully protected zones to 10% by 2020	Increased NTZ	Expand existing NTZs and establish new MPAs including full replenishment zones	Expand existing NTZs and establish new MPAs including full replenishment zones	X	X	X	X	X	X	X	X	X	X	X	X	Increased area in NTZ	Eco Audit statistics measure % in NTZ	Increased biodiversity and reef health	Not having political will. ICF and DIGEPESCA approve French Cay FRZ	25% - Proposals have been written to advance in Spawning Agrregation work and protection in both Belize and Guatemala. Proposals to FFEM and Oceans 5 have been presented.
HEALTHY COMMUNITIES																				
Demonstrate the linkages between human, economic and reef health	Result 1: Assessment of impacts to human health due to changes in Reef health.	Expert and partner review of Socio-ecological indicators for the MAR	Expert and partner review of Socio-ecological indicators for the MAR						X	X						voting of HRI partners results in agreement on methodology for social indicators that successfully make linkages	Socio-Ecological indicators working group activity report	Experts and partners will endorse socio-logical indicators developed	Partners agree on methodology	40% - Land 2 Coast project. HRI is also collaborating to the establishment of socio economic principles for the design of replenishment zones in the MAR (as a follow up on the previous project on biophysical principles), a project leaded by COBI and TNC. Conversations with GCRMN to collaborate on their project that includes Soc-Mon training for HRI, and HRI training others in the wider Caribeban on AGRRA. Partner
		Field data collection of social indicators Methods, and raw data collected using social science methods Methods appropriate for MAR	Field data collection of social indicators Methods, and raw data collected using social science methods Methods appropriate for MAR													Field data collection of social indicators	Methods, and raw data collected using social science methods	knowledge generated helps target socialization and conservation campaigns to be more successful, resulting in an improvement in Eco-Audit score and rate of impplementation by 20202	We identify and hire expert to design and lead this work in all 4 countries (implemented by HRI and partners)	15% - Funding through GCRMN and NFWF for spring 2019 fortraining and field data collection.

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	Result 2: Assessment Coastal Poverty Index Assessment	Synthesis of information on Coastal Poverty	Synthesis of information on Coastal Poverty							X	X	X	X	X	X	Collection and synthesis of CPI information from secondary sources. Poverty information and tailors for Coastal Communities	Report on poverty index within the MAR		Updated secondary information exists and coastal geographical scope and analysis can be confined to the	15% - SI contract to P. Kramer to finalize this is being developed
HEALTHY FUTURES																				
	Result 1: MAR-wide Coral Bleaching emergency response plan in operation, with an established protocol.	Coral Bleaching monitoring on selected sites in the case on an event	Coral Bleaching monitoring on selected sites in the case on an event	X	X										X	Plan is ap-proved by HRI partners	Bleach watch data, photo-graphs, videos.	some reef areas do not bleach as extensively, these are related to models of resiliency which are then validated and used to guide manage-ment	Partners must be willing to monitor sites.	100% in 2017 - all 4 countries carried out bleaching monitoring which resulted in 107 sites surveyed
				x	x											Plan is im-plemented by at least 10 partners			Predictions about events are uncertain	100% in 2017 - all 4 countries carried out bleaching monitoring which resulted in 107 sites surveyed
															x	At least 40 sites are monitored next bleaching event (if funds are secured)				
		Evaluate the bleaching impact in the MAR and evaluate reef resiliency models	Evaluate the bleaching impact in the MAR and evaluate reef resiliency models						x	x	X	X				Report on MAR bleach-ing is com-plete and publicly available.	Report on impacts on bleaching in the MAR. Maps are validated about reef resiliency potential	Coral bleaching patterns are understood and validate resiliency models that guide MPA zoning	Partners are not interest-ed in partic-ipating in the coral bleach watch and emer-gency re-sponse plan.	70% - Coral BleachWatch for 2017 - Andrea Rivera defended her PhD - including much of this analysis in April. She and Israel Munoz have prepared a draft scientific publication

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HRI leads the incorporation of the latest reef science into reef management testing out new theories to improve reef management	Result 2: Conduct pilot studies to determine the feasibility for the restoration of herbivory through Diadema and Caribbean King Crab.	Support 3 pilot sites to test methods and success of re-seeding Caribbean king crab and Diadema	Set up pilot sites and have a preliminary report prepared on progress to date	X		X		X	X	X	X					3 pilot sites established and studies underway with clearly defined partners, research permits, and preliminary results	preliminary reports from each site	fleshymacroalgal cover is reduced by at least 50% in pilot sites	HRI needs additional project funding - and cofunding with partners	50% - 2 pilot sites in Mexico (King Crab and manual removal), 1 pilot site in Belize (King Crab) have began activities. 1 pilot site in Honduras for Diadema is working on permits.
											x	x	x	x	x				external impacts (hurricanes, coral bleach-ing or dis-ease)	1 site has been identified in Roatan, Honduras called Half Moon Bay, where pilot study will be carried out. Parcels for coral replanting have been identified and sectioned-off underwater, while corals for replanting (A. cervicornis) have been awarded to HRI project from another coral nursery on-island.
	Result 3: Facilitate natural recruitment of Diadema to enhance densities and im-prove reef health	Characterize sites with high abundance of Diadema.	Characterize sites with high abundance of Diadema.			X	X	X	X	X	X	X	X	X	X	Report on Diadema abundance and site characteris-tics	analysis of existing data and report produced	improved reef health in areas with high Diadema	experiments may not succeed	Permit process to transport Diadema urchins from Tela to Roatan has begun.
		Test low-cost methods of facilitating recruitment in 3 areas	Test low-cost methods of facilitating recruitment in 3 areas													Manuscript and management recommendations based on experiment results are produced	experi-mental data analyzed and re-ported	lower macro algae measured in high Diadema density areas	natural pattern may be random	
																		ways to enhance natural Diadema recruitment are discovered	funding is needed for this project	