



STONY CORAL TISSUE LOSS DISEASE (SCTLD) IN THE MESOAMERICAN REEF REGION

RECOMMENDATIONS FOR ADDRESSING SCTLD



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An output of the Joint Session on Stony Coral Tissue Loss Disease

Belize City

October 8th, 2019

ACRONYMS

BAS	Belize Audubon Society
BCMR	Bacalar Chico Marine Reserve
BFD	Belize Fisheries Department
BMF	Belize Marine Fund
BTIA	Belize Tourism Industry Association
BV	Blue Ventures
CCAD	Central American Commission for Environment and Development
CONANP	Comisión Nacional de Áreas Naturales Protegidas
CZMAI	Coastal Zone Management Authority and Institute
ECOSUR	El Colegio de la Frontera Sur
FKNMS	Florida Keys National Marine Sanctuary
FoH	Fragments of Hope
FUNDAECO	Fundación para el Ecodesarrollo y la Conservación
GCFI	Gulf and Caribbean Fisheries Institute
HCMR	Hol Chan Marine Reserve
HRI	Healthy Reefs Initiative
ICF	Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre
INAPESCA	Instituto Nacional de Pesca
MAR	Mesoamerican Reef
MAR2R	Mesoamerican Reef Transboundary Integrated Management Project
MARN	Ministerio de Medio Ambiente y Recursos Naturales
MAR FUND	Mesoamerican Reef Fund
MPA	Marine Protected Area
NCRMN	National Coral Reef Monitoring Network
NOAA	National Oceanic and Atmospheric Administration

PACT	Protected Areas Conservation Trust
RRI	Reef Restoration initiative
RRN	Reef Restoration Network
SACD	Sarteneja Alliance for Conservation and Development
SCTLD	Stony Coral Tissue Loss Disease
SEA	Southern Environment Association
SI	Smithsonian Institute
SICA	El Sistema de la Integración Centroamericana
SPTOA	San Pedro Tour Operators Association
TASA	Turneffe Atoll Sustainability Association
FoH	Fragments of Hope
TIDE	Toledo institute for Development and Environment
UB-ERI	University of Belize - Environmental Research Institute
WCS	Wildlife Conservation Society
WWF	World Wildlife Fund
ZOLITUR	Comisión Administradora Zona Libre Turística de Islas de la Bahía

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EXECUTIVE SUMMARY

The Mesoamerican Reef is of great importance to all four countries of the MAR region (Mexico, Belize, Guatemala, and Honduras), supporting both tourism and fishing industries, coastal communities and livelihoods, and providing protection to life and property from tropical storm events. Stony Coral Tissue Loss Disease (SCTLD) is an emerging critical threat in the region, leading to an urgent need for response at both regional and national levels.

This Joint Working Session, held on October 8th, 2019, and hosted by MAR Fund through the Belize Marine Fund (BMF) and the Mesoamerican Reef Restoration Initiative (RRI), brought together experts and practitioners from across the MAR region and beyond. The series of presentations and working groups provided opportunities to share knowledge and experiences, to strengthen communication and collaboration in addressing the disease, and to identify actions at regional and national level that can strengthen the MAR and national response to this disease.

This document provides an overview of the actions proposed by the participants, a starting point for action at the regional level, and potential recommendations for integration into action planning and implementation at the national level, as a first step draft towards a more robust regional planning exercise. There is the need to establish a core group of entities/regional partners that will take the lead on ensuring these recommendations are integrated into regional and national plans. There may also be the need for a follow-up meetings of key partners to ensure continued communication and collaboration for action as the disease moves south through the region.

A series of key recommendations were made by the participants:

- Engage regional and national level support for addressing the SCTLD issue:
 - Request time to present on SCTLD at the CCAD heads of state meeting.
 - Ensure the Biodiversity and Oceans Technical Committee of the CCAD is informed and kept updated.
 - Produce policy briefs to engage government and donor support.
 - Request a joint meeting with Mar Fund and MarR2R to develop bullet points to form base of an action plan at regional level.
- Look at other countries for examples of actions and lessons learned that can be taken when crisis events affect the reef.
- Act locally, but capitalize on regional opportunities. Talk as a region, demonstrating the ability to make a difference through scaling up.
- Continue to use platforms such as this workshop and identify synergies and collaborative partnerships that can strengthen action.
- Provide replicable models for interventions that can be used by other marine areas.
- Make use of available resources from the US – both human and knowledge.
- Reach out to reef stakeholders such as tour guides / divers, and engage through providing opportunities for citizen-based actions.

INTRODUCTION

Stony Coral Tissue Loss Disease (SCTLD) is an emerging disease that results in high levels of mortality in over 20 species of hard corals in the MAR and wider Caribbean. First detected in 2014 in Florida, it has now also been reported in the Caribbean (Jamaica, Mexico, St. Maarten, the Dominican Republic, the USVI, the Turks & Caicos Islands, Belize and Sint Eustatius), and the disease has been mapped as it has spread southwards along the coast of Quintana Roo, Mexico, where it was first recorded in 2018. The first SCTLD-infected corals have now been identified in northern Belize as of June 2019.

With its wide geographic range, extended duration, high rates of mortality, and the large number of coral species affected, this disease poses a significant threat to reefs, impacting the large, iconic, slow growing corals that form a major part of the protective reef structures. These provide important habitats for a rich variety of marine species, protective nursery and growth sites that support local fishing industries, and are of aesthetic and recreational importance to the tourism industry. The massive brain, pillar and star corals such as boulder brain coral (*Colpophyllia natans*), pillar coral (*Dendrogyra cylindrus*) and elliptical star coral (*Dichocoenia stokesii*) are particularly susceptible, being the first species affected during an outbreak, with rapid progression of the disease and total mortality over one to two months for larger colonies.

SCTLD is suspected to be caused by bacterial pathogens and/or virus. It is water-borne and can be transmitted to other corals through direct contact. The disease has particularly high rates of transmission and mortality – once a coral starts to lose living tissue, there is a high probability that the colony will die within weeks to months. Many efforts are under way to better understand the disease - to identify disease agents, relationships with environmental factors, strategies to treat diseased colonies, and to identify resistant genotypes.

Whilst the transmission mechanisms are not fully known and understood, precautionary strategies identified in Florida include promoting ballast water management with exchange of ballast water offshore, away from the presence of reefs, preventing potential spread of the disease on dive gear and equipment and survey tools through decontamination protocols, and no-cost practices such as diving unaffected reefs before infected reefs and not touching corals. Possible interventions include *in-situ* treatment of lesions on affected corals. Mechanical, chemical and biological treatment protocols have been tested in Florida and the lowest failure rates have been achieved by treating SCTLD-affected corals with antibiotics directly applied to lesions. Large-scale field trials indicate that the best practice to date is application of amoxicillin trihydrate powder with CoreRx Base2B. However, this may not actually save a coral colony, as new lesions may appear, and this method requires multiple, repeated applications. This may not always be logistically feasible. The recommendation from SCTLD experts in Florida is to treat the disease as quickly and as aggressively as possible once identified in new locations. The Mexican Natural Protected Areas Commission (CONANP) tested a number of treatments using medicinal plants and organic compounds, but with 100% failure rate in treating SCTLD.

Also highlighted was the importance of the restoration efforts in place across the region, particularly those focused on the larger, disease resistant species such as the acroporids. This includes the highly

effective Fragments of Hope programme in Belize. Recognition and support of these efforts will be doubly important in the future in maintaining the structure of the reefs in the MAR region. Whilst site level restoration is now moving beyond the experimental stage, it is recognized that there is an urgent need to scale up restoration efforts using resistant coral species beyond the initial sites, as is being planned in Australia in efforts to halt the decline of the Great Barrier Reef.

While coral restoration efforts are ongoing in the Caribbean, they are largely focused on acroporids with a small number of people working with massive corals. Mexico has so far included 13 species of corals in its restoration efforts and has started micro-fragmenting and out-planting these species. Belize has also been working with five other species in addition to the acroporids. However, there is a risk that out-planted, non-acroporid corals can be affected by SCTLD, leading to mortality and also potentially increasing SCTLD prevalence among other species. In Florida, Mexico, and the US Virgin Islands, the decision was made to only out-plant acroporids until SCTLD has some resolution. Belize needs to make a decision for its restoration efforts in 2020 and beyond, based on the appearance of SCTLD in northern Belize in 2019. The consensus thus far is that acroporid restoration will continue as planned.

Some restoration strategies involve the capture of gametes from spawning corals, assisted fertilization in laboratories, propagation in land-based nurseries and then out-planting. Florida and Mexico are utilizing these methods combined with 'rescue' efforts, all of which require land-based nurseries. Bio-banking, or *ex situ* conservation of corals is being employed in Florida and Mexico to save genetic material. This is being referred to as 'coral rescue' and involves collecting colonies of susceptible species in advance of the disease margin (identified through monitoring efforts), taking corals out of the reef and keeping them in land-based facilities for future propagation and restoration efforts with the idea of returning them to the marine environment once the disease has passed. However, even by collecting as many genotypes as possible, continued ocean warming, poor water quality, pollution, sedimentation and other stressors will influence the success of future coral out-planting. It is unknown how long the rescued corals will remain in captivity, and if they will survive in potentially changed field conditions years from now, even if SCTLD recedes or diminishes. In Florida, and (at a smaller scale) Mexico, funds and facilities are accessible for considering the option of bio-banking and coral rescue efforts with land-based nurseries. This option, however, is not considered feasible for Belize nor most small islands in the Caribbean. Instead, efforts to at least bio bank multiple genets of the more susceptible and rare species like *Dendrogyna cylindrus* will be trialled away from coral reefs in water nurseries.

Effective crisis communications measures are essential in the face of the threat posed by SCTLD to coral reefs and associated economies. The lesson learned in Florida has been to ensure unified messaging by all partners involved in disease treatment and monitoring, with careful use of appropriate language, minimum use of abbreviations, acronyms and technical jargon.

Of final note is the role environmental conditions are also thought to play in the virulence of the disease, with a continued need to reduce in-water and watershed pressures on coral reefs to improve reef resilience. The recently developed Mexican Action Plan for SCTLD (CONANP, 2019) takes a holistic approach to the issue – not just focusing on the disease itself, but also on reducing environmental pressures. This includes strategies for improved tourism practices, integrated management of the coastal zone, improved water management, and improved fishing practices, in addition to the more

academic understanding and treatment of the disease, monitoring of the impacts, and establishment of a genetic bank for live tissue culture and cryopreservation. It has also included temporary closure of the best-preserved sites at Cozumel, to reduce tourism impacts and promote resilience and recovery.

The Joint Session on SCTL, held on October 8th, 2019, brought together experts and practitioners from across the MAR region and beyond. The series of presentations provided opportunities to share knowledge and experiences from Mexico, Belize, Guatemala, Honduras and the Dominican Republic. Members from the Florida Disease Team (represented by the Smithsonian Institute, NOAA, AGGRA and the NOAA-GCFI MPA Connect Network), also provided their input, sharing knowledge and perspectives on management of the disease in the US, including intervention and rescue activities. An update on the SCTL status in the Caribbean was provided and SCTL educational materials and experiences were shared from past disease exchange workshops. A common theme was the need to strengthen communication and collaboration in addressing the disease, and to identify actions at international, regional and national levels that can improve the MAR response to this disease in the region.

METHODOLOGY

A meeting of national and regional organizations was held on the 8th October, 2019 in Belize City, Belize, to discuss climate change/reef resilience, the region's efforts in coral reef management, reef restoration, and existing knowledge and regional response to the threat to coral reefs from the newly occurring stony coral tissue loss disease. Sixty-three participants attended, including government representatives, non-governmental organizations and academics from the following institutions:

BAS	Hawaii Coral Restoration	Red Arrecifal Dominican
BFD	Nursery	Republic
BMF	HCMR	Roatan Marine Park
BTIA	HRI	SEA
BV	IBEROSTAR Group	SI
CONANP	ICF-IB	SPTOA
CZMAI	INAPESCA	TASA
ECOMAR	MARN	TIDE
FoH	MARFUND	UB-ERI
FUNDAECO	Oceanus A.C.	WCS
Fundacion Cayo Conchinos	PACT	WWF
GCFI	Projects Abroad	ZOLITUR

During the meeting, a planning exercise was conducted to bring together information from the different countries and organizations in the region, and to identify required interventions for addressing SCTLTD in Belize and the MAR, as follows:

- Gathering information on SCTLTD to feed into regional and national planning
- Sharing information on current status of SCTLTD and implications for the MAR
- Identifying required interventions for addressing SCTLTD in the region

Given the short time available for the exercise (1 hour 30 minutes, including plenary feedback), the methodology selected was focused on rapid brainstorming in working groups, using a simple matrix for collection of inputs from the participants. Participants were asked to select the group they wished to work in, based on their areas of expertise:

- Monitoring
- Treatment
- *Ex situ* conservation
- Policy and regulation
- Communication and outreach

Participants provided input on the following areas for their respective topics:

- Current actions / lessons learned
- Proposed actions
- Opportunities
- Challenges/barriers

RECOMMENDATIONS

THEMATIC AREAS / STRATEGIES	LEVEL	TIMEFRAME	CURRENT ACTIONS	OPPORTUNITIES / CHALLENGES
MONITORING				
Improve coordination and communication between countries and organizations towards addressing the spread of SCTL	Regional	Short Term	<ul style="list-style-type: none"> ▪ SCTL Joint Session and 2nd Biennial Reef Restoration Network Meeting (8th and 10th October, 2019) ▪ AGRRA website with reports of presence/no presence SCTL 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Reef Restoration Network ▪ MAR Fund Reef Rescue Initiative ▪ Funds available for exchange visits between MAR countries
Build capacity for ID and monitoring of SCTL and other coral diseases	Regional	Short Term	<ul style="list-style-type: none"> ▪ Florida ID sheets, NOAA underwater SCTL ID cards, Florida Sea Grant training materials available for use in MAR countries ▪ Distributed in Belize last year/earlier this year. 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Belize: Training for MPA managers, several MPA managers have extra manpower through community researchers ▪ Can distribute ID sheets again at start of 2020
Standardize monitoring protocols for coral disease	Regional	Short Term	<ul style="list-style-type: none"> ▪ Belize: Bar drop is used for rapid bleaching surveys, roving diver for larger areas, AGRRA methods are employed every two years, and soon may be used annually. ▪ NCRMN has standard monitoring protocols across MPAs. ▪ FoH also using photomosaics 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Belize: National Coral Reef Monitoring Network (NCRMN) ▪ MPACoast template monitoring and response action plan for SCTL
Expand capacity for water quality monitoring	Regional / Per Country	Short Term	<ul style="list-style-type: none"> ▪ Water quality monitoring (including nitrates and phosphates) is ongoing CZMAI (central Belize), WCS (Glover's Reef), SACD (Northern Belize), but is not standardized and some areas not covered 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ NCRMN - discussions on standardizing water quality monitoring in Belize

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MONITORING				
Seek umbrella permits to facilitate rapid action / monitoring response	Per Country	Short Term	<ul style="list-style-type: none"> ▪ Belize: Belize Fisheries Department taking lead. Permit for rapid response is available ▪ Mexico: Issues with the time taken to obtain rapid response permits 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Permit issues may be resolved through CCAD engagement, as a specific requested emergency action to CCAD Governments
Build capacity of citizen science network of dive shops for ID of coral disease and reporting	Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Belize: Disease reporting info is on Fisheries Department webpage, images and videos being distributed. If people suspect SCTLD, they are asked to send in photos and locations for confirmation; ▪ Belize Port Authority is aware of SCTLD (deal with ballast / water bilge issues), a lot of communication on the disease in Belize ▪ Hol Chan Marine Reserve working with local tour guides / tour operators 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ ECOMAR reporting mechanism for citizen science ▪ Tourism and fishing sector engaged through MPA outreach ▪ Sea Grant is implementing workshops to build stakeholder capacity for monitoring detection – provides a model for the region ▪ Training resources available through multiple organizations in MPACoast posters for divers to help with SCTLD detection and prevention in the US
Identify one to two experts per country who can respond to reports and verify presence of SCTLD	Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Belize: Lisa Carne for southern Belize/Nicole Craig for northern Belize 	<p>Challenges:</p> <ul style="list-style-type: none"> ▪ Requires funds for rapid response mobilization if site visit needed
Improve access to funds and personnel for more frequent monitoring	Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Belize: Fisheries Dept. and NGO MPA managers have monitoring programmes in place 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Funding opportunities through MAR2R, MAR Fund, PACT, BMF, Other donor organizations. ▪ Belize is doing bleaching surveys across MPAs this month - pictures can be taken of any suspect corals and sent to experts for verification <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Monitoring programmes limited by funding availability

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TREATMENT				
Ensure access to most up-to-date information on potential treatment for SCTLD	Regional Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ US working on potential treatment (V. Paul, K. Neely at Nova Southeastern University, D. Wusinich-Mendez at NOAA Coral Reef Conservation Program) ▪ Florida Coral Disease Intervention Action Plan (Neely, 2018) See References 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Reef Restoration Network website for dissemination of information
Experiment with potential treatments and monitor and report on short term and medium term results	Regional Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ USA: Florida managers strongly advise to treat the disease quickly and aggressively with most effective treatment known – amoxicillin with CoreRX Base2B. ▪ Suggest letting others with more staff, resources and SCTLD experience do the experimenting. ▪ Belize: Tried chlorine-cocoa butter covered with clay/epoxy on pillar corals - (natural remedies mixed with amoxicillin) – but it didn't work. ▪ Tried cement - didn't do 3" barrier; Second attempt did go 3", still didn't work... need to have a wider barrier. ▪ About to try CoreRx – the medium (ethanol and acrylic acid) mixed with amoxicillin ▪ Honduras: using shea butter, but a cheaper option may be batana oil (a palm oil used for treating damaged hair in Honduras). 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Probiotics – issues around application in the field and survival of the applied probiotic. Ideally the bacteria persist but at the moment would probably require repeating the treatment multiple times. ▪ EcoPro Solutions Ltd. (Belize) has two products: one is of microbial nature and the other is mineral based and could promote healthy bacterial growth. Both are supposed to be environmentally friendly. ▪ In Belize, cement is already used for restoration and is cheap - could be used for treating the disease margins

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TREATMENT Experiment with potential treatments and monitor and report on short term and medium term results (continued)			<ul style="list-style-type: none"> ▪ Honduras: Strategic removal of affected fragments. Either amputating part of the coral (e.g. pillar) or removing a small colony of massive coral. ▪ Natural remedies (pepper, garlic, etc.) ▪ Strategic removal of affected fragments. ▪ Chlorine epoxy mixture works on some but not on others ▪ Mexico: tested a number of treatments using medicinal plants and organic compounds but with 100% failure rate 	Opportunities: <ul style="list-style-type: none"> ▪ Dr. Andy Bruckner (FKNMS) recommends that disease margins (where the coral tissue is already dying) should be covered with clay, putty or cement to contain the pathogen, then the CoreRx Base2B or shea butter with antibiotics be applied several inches back over the live tissue (which already probably is internally infected with the pathogen). Challenges: <ul style="list-style-type: none"> ▪ Manpower required for treatment over the long term (5+ years) – could utilize volunteers, but need funding for logistics / support costs ▪ Permits for treatment and setting up nurseries ▪ Long term nature of the problem: 10 year +++ investment in treatment. ▪ Unintended consequences of introducing microorganisms
Develop region-wide best practices for diving/working in disease-hit areas e.g. washing gear in 1% bleach solution after diving in diseased sites; protocols while working at disease site to limit potential transmission	Regional	Short Term	<ul style="list-style-type: none"> ▪ The disease is known to be water-borne and transmissible by contact 	Challenges: <ul style="list-style-type: none"> ▪ Engaging dive shops and dive / snorkeling operations in adopting best practice protocols

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EX SITU CONSERVATION				
Integrate <i>ex situ</i> strategies into National Action Plans, aligned to regional goals and objectives	Per Country	Short Term	<ul style="list-style-type: none"> ▪ Mexico: Action Plan for the SCTLD, 2019 includes establishment of genetic bank in Quintana Roo with cultivation of living material and cryo-preservation of micro-fragments, germinated cells, sperm, ovules and fertilized larvae. 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ US has established a genetic bank in collaboration with aquaria for 50 genotypes of each of the 20+ species of stony coral that are susceptible to SCTLD ▪ Several facilities are experimenting with <i>ex situ</i> cultivation of coral fragments <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Human and financial resource limitations result in these options being inappropriate for Belize, and possibly Honduras
Develop regional / national protocols to manage live specimens (which corals can be collected, how they should be selected, how they should be handled, maintained, disease prevention etc.).	Regional	Short Term	<ul style="list-style-type: none"> ▪ Belize, Mexico Guatemala and Honduras have no national protocols 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Look to US for transferable protocols <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Human and financial resource limitations result in these options being inappropriate for Belize, and possibly Honduras
Build capacity for establishing and management of a genetic bank – training and programme exchanges	Regional	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ US has transferable experience in establishing and management 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Expertise available for rescuing corals, quarantine protocols, how to maintain in aquaria, cryo-preservation <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Human and financial resource limitations result in these options being inappropriate for Belize, and possibly Honduras

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EX SITU CONSERVATION				
Establish one or more genetic banks in the region	Regional	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Mexico: <i>Orbicella faveolata</i> & <i>Dendroyra cylindrus</i>. Looking for financing for a Genetic Bank - live tissue & cryo-preservation. ▪ Dominican Republic has pilot project – <i>Dendroyra cylindrus</i>, <i>Diploria labyrinthiformes</i> & <i>Colpophyllia natans</i> ▪ Belize, Guatemala and Honduras: No action yet- beyond the resources available to Belize and possibly Honduras 	<p>Challenges:</p> <ul style="list-style-type: none"> ▪ Need to ensure duplication - genetic banks in multiple places in case of failure in one lab ▪ Very expensive to build and maintain – need to identify less costly system e.g. low-cost mobile holding tanks using water tanks buried in sand for climate control with UV treatment of intake water. ▪ Aquarium hobbyists have knowledge about feeding and keeping coral alive. ▪ No network of aquariums in MAR countries (very few in the region) for collaboration, so need other low-cost methods- maybe in natural areas that don't require big structures ▪ Difficulties with promoting sexual reproduction in <i>ex situ</i> conditions
Alternatives: Explore options for in-water nurseries for rescues	Regional	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Mexico: Established in-water nurseries for coral restoration fragments for SCTLD susceptible corals over sand, away from reef ▪ Belize will be trialing in-water nurseries in 2019/2020 for species susceptible to SCTLD 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ There is funding for this in Belize ▪ Potential for establishing over seagrass beds, away from reefs, as seagrass has some antibiotic properties

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POLICY AND REGULATION				
Fully engage CCAD for regional / national support in addressing the threat	Regional	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Mexico: CCAD / MAR2R support for SCTLD Action Plan ▪ Belize: MAR Fund support for Joint Session on SCTLD 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Request a 20-minute slot at the next CCAD Head of States meeting for presentation of the SCTLD issue by scientists ▪ Request support for a regional Action Plan <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Need improved Government support at national level and improved rapid access to permits in some countries for monitoring and treatment ▪ Need access to regional funding – e.g. through MAR2R and MAR Fund
Develop a Reef Restoration Network (RRN) Policy Brief on SCTLD targeted at Governments and funding agencies	Regional	Short Term		<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ RRN is electing new Executive Committee – potential to designate a sub-committee for policy brief development / CCAD engagement
Ensure CCAD Biodiversity and Oceans Technical Committee is engaged and kept fully informed and updated on SCTLD by the RRN	Regional	Short Term		<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ Carlos Rodriguez of MAR2R was elected to the RRN Executive Committee at 2nd Biennial Meeting, on the 10th of October – providing a link to CCAD
Develop Regional and National Action Plans based on common goals and objectives and including clear budgets	Regional / Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Mexico: SCTLD Action Plan, 2019 ▪ Belize: Initiated actions for development of Action Plan, Oct. 2019 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ MPA Connect template for monitoring and response action plan for SCTLD

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POLICY AND REGULATION				
Develop / update national policies for coral restoration and disease	Per Country	Short Term	Belize: Has a Reef Restoration Policy that needs updating	
Establish RRN technical committee for identification and engagement of international funders for addressing SCTL D	Regional	Short Term / Medium Term		Opportunities: ▪ MAR Fund, WWF, MAR2R
Establish regional and national funding options for emergency situations / natural disasters	Regional / Per Country	Short Term / Medium Term	Belize: BMF has discretionary funds that are flexible enough to respond to emergency situations and SCTL D.	
Integrate SCTL D into the Regional Restoration Network Strategic Plan	Regional	Short Term		Opportunities: ▪ RRN Strategic Plan was approved at 2 nd Biennial Meeting, on the 10 th of October, as a living document that allows for revision / addition of strategies

THEMATIC AREAS / STRATEGIES	LEVEL	TIMEFRAME	CURRENT ACTIONS	OPPORTUNITIES / CHALLENGES
COMMUNICATION				
Continue to provide and use platforms such as the Joint Session on SCTLTD to share experiences, look for and act on synergies, and seek funding support at the regional level	Regional	Short Term / Medium Term	BMF / RRI Joint Session on SCTLTD, 8 th October, 2019	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ BMF willing to provide support for additional convening around this matter based on the recommendations and needs expressed by the lead agencies for continuing to work/discuss on how to move forward in addressing this issue. <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Funding
Strengthen communication and information exchange on SCTLTD in the region	Regional	Short Term	▪	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ RRN website exists for improved communication and information exchange between RRN members ▪ RRN Network Coordinator hired for 6 months specifically to revise and manage the website ▪ Opportunities for improving communication through sharing on MPA organization websites and through outreach programmes <p>Challenges:</p> <ul style="list-style-type: none"> ▪ Funding for continuity of website
Carry out national SCTLTD perception surveys to guide communication strategy development	Per Country	Short Term	Belize: Not conducted yet but would like to	

THEMATIC AREAS / STRATEGIES	LEVEL	TIMEFRAME	CURRENT ACTIONS	OPPORTUNITIES / CHALLENGES
COMMUNICATION				
Develop and disseminate a regional communication toolkit for integration into national communication about SCTL, with unified key messages aimed at targeted audiences	Regional	Short Term	<ul style="list-style-type: none"> ▪ Presentation by G. Parsons, (FKMNS) about crisis communications and SCTL, ▪ MPACConnect guide for managers on clear science communications for SCTL ▪ Belize began disseminating information last year with the MPACConnect posters & ID cards from Andy Brukner 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ US communication tools may be transferable. Identified target audiences: Policy makers, donors, maritime sector, tourists, and fishers. ▪ Continue engaging dive shops, MPA managers, scientists. ▪ Engage and give voice to youths – for reaching their communities and politicians. Tourists – best practices and how to help. <p>Challenge:</p> <ul style="list-style-type: none"> ▪ May need to establish a core group of entities/regional partners that will take the lead on getting this done – RRN?
Develop and implement national communication strategies, integrated into the National Action Plans	Per Country	Short Term / Medium Term		<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ MPACConnect and other organizations in Florida have tried and tested communication materials and actions that can be used as a starting point.
Develop reporting template for citizen science reporting of diseased corals	Regional / Per Country	Short Term / Medium Term	<ul style="list-style-type: none"> ▪ Belize: ECOMAR provides a portal for reporting coral disease ▪ Mexico: CONANP Cancun has online reporting form ▪ AGRRA website has reporting platform 	<p>Opportunities:</p> <ul style="list-style-type: none"> ▪ AGGRA: Provides a portal for national reporting of SCTL at international level. Can act as a template for national mechanisms
Identify key messages for other thematic areas: Monitoring, Treatment, <i>Ex Situ</i> Conservation and Policy and Regulation, for integration into communication strategies	Regional / Per Country	Short Term		<p>Opportunities:</p> <p>This has been done in the US, and may be transferable to the region</p>

CROSS CUTTING	LEVEL	TIMEFRAME	CURRENT ACTIONS	OPPORTUNITIES / CHALLENGES
Review marine environment crisis management actions in other parts of the world	Regional	Short Term / Medium Term		
Access resources and assistance from US agencies dealing with SCTL	Regional	Short Term / Medium Term		

Each group presented its results for discussion and feedback from the other participants. The exercise was wrapped up in the plenary by asking the participants for key specific recommendations for the region in addressing the Stony Coral Tissue Loss Disease. These included:

1. Fully engage CCAD in addressing the threat to the region's reefs
 - Produce a Reef Restoration Network (RNN) policy brief on SCTLD for engaging Government support
 - Ensure the CCAD Biodiversity and Oceans Technical Committee is engaged and kept fully informed and updated on SCTLD by the RNN
 - Request a 20-minute slot at the next CCAD Head of States meeting for presentation of the SCTLD issue by RNN scientists
2. Engage regional funders towards supporting development and implementation of a regional Action Plan for addressing SCTLD
 - Produce an RNN policy brief on SCTLD for engaging potential funders
 - Request a joint meeting with MAR Fund and MarR2R to develop bullet points to form the base of an SCTLD action plan at regional level
3. Act locally, but capitalize on regional opportunities - when the people in the MAR countries talk as a region, it gives strength to their voice
 - Continue to provide and use platforms such as the Joint Session on SCTLD to share experiences, look for and act on synergies, and seek funding support at the regional level
 - Strengthen communication and collaboration within the MAR
4. Standardized monitoring across the MAR region
 - Standardized use of the bar drop methodology (Mcfield, 1999) in October and November 2019
 - Use of the roving diver survey method at each site to look for signs of SCTLD.
5. Continue trialing treatments and coral rescue initiatives, with effective communication of results
 - Continue trialing treatments, including cement and selective removal (culling) of affected corals or pieces of corals (for the pillar coral and smaller massive species).
 - Investigate potential for in-water rescue table nurseries, away from coral reefs and away from SCTLD presence in countries with limited resources for establishing terrestrial facilities.

6. Review marine environment crisis management actions from the Caribbean (eg. coral bleaching, lionfish invasion, sargassum influx) and in other parts of the world for examples of actions that can be taken, and lessons learnt

7. Use resources and assistance from US agencies dealing with SCTL, including, but not limited to:
 - Atlantic and Gulf Rapid Reef Assessment Program
 - MPACConnect
 - Gulf and Caribbean Fisheries Institute
 - Reef Resilience Network

8. Engage stakeholders such as tour operators, tour guides and divers in reporting observations, with capacity building for effective partnership through:
 - Building awareness of the disease, species affected, recognition of symptoms, actions to help prevent spread of the disease and potential impacts
 - Requesting assistance in identifying areas of unusually high coral mortality
 - Identifying champions for each dive area who are willing to dedicate more time towards monitoring for the disease
 - Providing a reporting platform for information on sites, coral species affected and submission of photographs
 - Providing rapid response with expert verification if SCTL is suspected

An additional consideration is for the need to establish a core group of entities/regional partners that will take the lead on ensuring these recommendations are integrated into regional and national plans. There may also be the need for a follow-up meetings of key partners to ensure continued communication and collaboration for action as the disease moves south through the region.

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Reef Resilience Network (2018). Case Definition: Stony Coral Tissue Loss Disease <http://reefresilience.org/wp-content/uploads/SCTLD-Case-Definition.pdf>

Atlantic and Gulf Rapid Reef Assessment
<https://www.agrra.org/coral-disease-outbreak/>

ANNEX ONE: PARTICIPANTS

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ANNEX TWO: WORKING GROUP OUTPUTS

GROUP WORK OBJECTIVES

- Gathering information on SCTL D to feed into regional and national planning
- Sharing information on current status of SCTL D and implications for the MAR
- Identify required interventions for addressing SCTL D in the region

Each group assessed one of the following topics:

- Monitoring
- Treatment
- Ex-situ conservation
- Policy and Regulation
- Communication and Outreach

Participants provided input on the following for their respective topics:

- current actions / lessons learned
- proposed actions
- opportunities
- challenges, barriers

THEMATIC AREA	CURRENT ACTIONS / LESSONS LEARNED	PROPOSED ACTIONS	OPPORTUNITIES	CHALLENGES / BARRIERS
BELIZE				
MAR-WIDE				

1. MONITORING



PARTICIPANTS

- Melina Soto (Mexico)
- Myles Phillips (Belize)
- Celso Cawich (Belize)
- Nadia Bood (Belize)
- Everette Anderson (Belize)
- Celso Sho (Belize)
- Anya Barona (Belize)
- Ana Giro (Guatemala)

Different monitoring protocols are being used across the region.

Belize

- **Wildlife Conservation Society:** Glovers Reef Marine Reserve: Monitoring for SCTLD is not being conducted so far in – it will be started on 12th – 13th October, on the east and south of the Atoll, with the west being included in November. Monitoring protocols include bar drop and roving diver at 8 sites over the 2 months, and 20 sites in April. Monitoring includes basic water quality parameters – temperature, dissolved oxygen, pH, salinity. WCS is hoping SCTLD will not appear in Glover’s Reef Atoll before a plan can be developed for addressing it. Using MPACConnect guidelines.
- **World Wildlife Fund:** WWF is providing AGGRA training for the Belize Fisheries Department WWF is also implementing climate change monitoring activities, monitoring temperature along the MAR with loggers in marine protected areas.
- **Coastal Zone Management Authority and Institute:** CZMAI has a water quality monitoring programme in place in the central Belize region, including the Belize River, around Belize City and south to Gales Point Bar Mouth, monitoring for coliforms, pH, temperature, DO, NO₃, phosphates) with YSI. CZMAI now has its own lab for water analysis.
- **Sarteneja Alliance for Conservation and Development:** SACD monitoring water quality in the Northern Belize Coastal Complex seascape, including the New River, Corozal Bay Wildlife Sanctuary, Bacalar Chico Marine Reserve and most recently Hol Chan Marine Reserve, using YSI. Basic parameters and contamination monitoring in partnership with ECOSUR (Mexico).
- **University of Belize – Environmental Research Institute:** ERI monitors 9 permanent sites for coral reef health in Turneffe Atoll using MBRS-SMP protocol, 50 colonies at each sites, tagged and with pictures. Monitoring occurred in July, to be repeated 3 months later, using the same protocols (bar drop + pictures). ERI will be going back to the sites in November and then February. There has been no sign of disease so far.

- **San Pedro Tour Operator Association (SPTOA):** Partnering with SACD to implement water quality monitoring in Corozal Bay, Hol Chan Marine Reserve and Caye Caulker, expanding next year. SPTOA dive centers are being asked to report suspected cases of SCTL D.

MAR Region

- Guatemala is monitoring 10 sites using AGRRA, with 6 benthic transects+ 2 coral transects. Photomosaics are also being used at 10 sites + 2. No disease so far, but there is recognition of the need for a plan, with training to identify SCTL D and how to address it

COMMENTS:

- Training is critical—once a site is fully infected it is hard to miss, it is easy to see white areas on a colony but it may not be SCTL D - tissue loss disease isn't always obvious. Training shouldn't just be lecture based but should also be in-water training.
- In Belize, there should be trained experts like Lisa Carne and Nicole Craig who can be called on for verification of SCTL D before making alarm calls. Belize is currently doing bleaching surveys across marine protected areas to cover as much ground as possible. This can be used as an opportunity to take pictures of any suspect corals and send them to the experts for verification – SCTL D is easily mistaken as white plague.
- There is a lot of communication about the disease in Belize. The Belize Fisheries Department has sent out press releases and information to relevant Ministries (such as the Ministry of Tourism), and has ensured that everyone knows how to report the disease. This is also shared publically on the Fisheries and tourism websites, and images and videos are already being sent to key stakeholders. If people suspect SCTL D, they are asked to send photos in for confirmation. The Belize Port Authority has also been engaged, as they are responsible for the cruise and cargo ship regulations, including ballast management.
- In-water training – there is interest in the development of /or adoption of a video to send to dive shops. In the US, there is a day-long workshop through Sea Grant in Florida to build stakeholder capacity for monitoring detection. This may be a good model to replicate in the region.

2. TREATMENT



PARTICIPANTS

- Valerie Paul (Smithsonian)
- Henry Brown (Belize)
- Kirah Forman (Belize)
- Leandra Cho-Ricketts (Belize)
- Jennifer Chapman (Belize)
- Alicia Eck-Nunez (Belize)
- Lisa Carne (Belize)
- Tripp Funderburk (Honduras)
- Gabriela Nava (Mexico)

A number of key questions were posed to start the session:

- What was the source?
- Dredging?
- Emergency ballast water exchange.
- Once it's in the area, it will be endemic forever. There is no way to get rid of it. In the first sites to have the disease, the disease is still present. Doesn't completely kill out all the corals, species dependent.
- *Dendroyra cylindrus* has no natural resistance.
- *Orbicella faveolata* and *Montastraea cavernosa* etc. seem to have some innate natural resistance.

CURRENT

There is less being implemented in Belize than in Mexico.

Belize

- In northern Belize, chlorine-cocoa butter covered with clay/epoxy has been used on pillar corals - (natural remedies mixed with amoxicillin) – but it didn't work. On the first attempt, the barrier applied was less than 3" and wasn't effective. In the second attempt, the barrier did go to 3", but it still didn't work... a wider barrier will be tried next time.
- It is difficult to ensure that divers don't spread the disease while trying to apply the treatment when there are rougher conditions.
- It is recommended that gear should be soaked in bleach after diving in diseased sites. They are not sure if this works, but it is considered a good practice.

MAR Region

- Natural remedies (pepper, garlic, etc.) have been used.
- Honduras is using shea butter (used as dye), which is cheaper.
- Cement is used in the region for restoration – it is thought that this could be used in treatment as well, and is also a cheap option.

- Strategic removal of affected fragments - either taking off part of the coral (e.g. pillar) or removing a small colony of massive coral – has also been used. This has been shown to work - Dr. Paul is sure that healthy tissue on a diseased colony (if far enough from the lesion) does not have the vector/ is not infected.
- Chlorine antibiotic mixture has been shown to work on some species but not on others.

PROPOSED

Belize

- Organizations in Belize are planning a combination of methods, including strategic removal of coral, and about to try CoreRx – the ethanol and acrylic acid kills bacteria, but it is thought to probably not be so toxic that it would affect larvae etc., as these potentially lethal effects are temporary.
- Cement has been used on lesions, but is unpopular in Florida because of its environmental impact. It is uncertain whether cement would work. There is also uncertainty as to how far from the lesion the infected tissue spreads, and therefore how much of the area needs to be treated.
- Lessons have been learned on working cement underwater... it has taken trial and error to figure out the right consistency – it's not a recipe, and the cement quality varies by brand. It is more of an ability to check the consistency and timing during application (thicker if you're doing fewer applications but thinner if you're doing more, as it will thicken while you work). The cement layer needs to be thick enough to have an impact. Practice should be done with dead coral before attempting this on live corals.
- Probiotics are a potential for future, as are microbial based solutions.

OPPORTUNITIES

Belize

- Probiotics: There are issues around the survival of the applied bacteria. Ideally the bacteria will persist, but at the moment, the infected area would probably require retreatment. Questions were also asked about how to apply the probiotics in the field.
- EcoPro Solutions Ltd. in Orange Walk has two products: one is of a microbial nature and the other is mineral-based. Both could help promote healthy bacterial growth, and are supposed to be environmentally friendly.
- There have been discussions on where to place in-water rescue nurseries - possibly at a distance from the reef or over seagrass, as seagrass may have natural antibiotic properties. The back reef sites in Bacalar Chico Marine Reserve that have the disease, however, are surrounded by seagrass. These sites are also near channels that open to the fore reef. It may be advisable to try establishing nurseries away from the reef. It was done in sand areas in Mexico to give corals a chance. There is funding for this in Belize.

MAR Region

- Organizations on the Honduras Mosquito Coast use batana oil, used to maintain dark colouring in hair a potentially cheaper alternative to shea butter, at \$20/liter. Premixed epoxy is used to make the application process easier.

3. EX-SITU CONSERVATION



EX-SITU CONSERVATION

- Claudia Padilla (Mexico)
- Linda Searle (Belize)
- Victor Faux (Belize)
- Marcio Aronne (Honduras)
- Ian Drsydale (Honduras)
- Sameira Zambrano (DR)

CURRENT ACTIONS

- Action Plan.
- theory development in Caribbean islands.
- Mexico wants to establish a Genetic Bank using live tissue and cryo-preservation, and is currently looking for financing.
- Mexico is focusing on *Orbicella faveolata* and *Dendroyra cylindrus*; the Dominican Republic has a pilot Project focusing on *Dendroyra cylindrus*, *Diploria labyrinthiformis* and *Colpophyllia natans*.
- In Belize, Guatemala and Honduras, no actions have been taken towards the establishment of ex-situ banks, with limited in-country knowledge.
- A number of lessons learned were identified:
 - Strong protocols are needed to manage live specimens that we want to preserve for conservation.
- Need to act quickly.
- There should be duplication within facilities, and genetic banks in more than one facility, in case of failure in one lab.
- In the USA, organizations are collaborating with aquariums, which have experience in maintaining marine conditions and are willing to partner, reducing costs.

PROPOSED STRATEGIES

- Engage the CCAD at regional level to improve support at national level.
- Action plan should be developed at national level with common objectives across the region.
- Training and programme exchanges on how to rescue corals, quarantine protocols, how to maintain in aquaria, and cryo-preservation are considered very important.
- There is a need to it explore and experiment with other preservation techniques.
- Programs need to build their sustainability, with greater inclusion of private sector through fundraising activities.

4. POLICY AND REGULATION



PARTICIPANTS

- Carlos Rodriguez (MAR2R)
- Christian Alva (Mexico)
- John Burgos (Belize)
- Denise Garcia (Belize)
- Azelea Gillett (Belize)
- Roberto Pott (Belize)
- Dave Gulko (Hawaii)

CURRENT ACTIONS

Belize

- A national assessment of policies and regulations is currently being carried out for the Belize Fisheries Department.

PROPOSED STRATEGIES

Belize

- Belize needs to update and adopt the policy of coral restoration and disease.
- There should be planning in place for risk management and disaster response for different emergency situations (e.g. SCTLD, sargassum, hurricanes and earthquakes). Funds should be identified that can be leveraged for rapid response in these emergency situations.

MAR Region

- A Regional Environmental Observatory should be established for managing information.
- There is a need to create regional groups and look for international funding (MARFUND, WWF) to address SCTLD in the region, with improved communication and coordination between institutions and at all levels.
- One problem is the different languages for technical terms. The solution may be to adopt the blue economy languages. There also needs to be a common vocabulary for reef restoration. For example, what is a 'fragment'? How big should it be to qualify? What is the definition for a colony?

5. COMMUNICATION



PARTICIPANTS

- Patricia Kramer
- Dominique Lizama (Belize)
- Emma Doyle (GCFI)
- Claudio Gonzalez (MAR Fund)
- Guillermo Galvez (Guatemala)
- Michelle Fernandez (Honduras)

CURRENT ACTIONS

PROPOSED STRATEGIES

- There needs to be a common objective tied to how to solve the problem.
- Messaging needs to be the same, and based on knowing the audience (what to say and who to say it to).
- Messaging also needs to be focused on what people care about. Policy makers care about economics and cost. Tourists care about- visiting sites and are often interested in how they can help. Fishers care about their livelihoods, which could be impacted, so they need to pay attention to the disease.
- Work has been done with engaging divers, scientists, etc. The gaps are policy makers, donors, the maritime sector, fishers, boats moving in and out, and tourists for improved awareness, so that they can help with the work. Youth should be integrated into communication strategies, as a voice that can spread information within their communities, and as a mechanism to reach out to policy makers.
- SCTL D should be incorporated into the Regional Coral Restoration Network Plan and communication strategies based on SCTL D perception surveys.

RECOMMENDATIONS

Claudia: Wrapped up the session with a request for key recommendations.

Carlos Rodriguez

- Ask for time to talk (20 minutes) at CCAD heads of state meeting.
- Short presentation by scientists at CCAD meeting.
- Ensure Biodiversity and Oceans is informed and kept updated – technical body that advises ministries.
- Produce policy brief for government support and funding opportunities.

- Joint meeting with Mar Fund and MarR2R to develop bullet points to form base of an action plan at regional level.

Dave Gulko

- MAR countries aren't the first experiencing crisis issues in the marine environment – look at other countries for examples of actions that can be taken to crisis events.

Patricia Kramer

- When people in the MAR talk as a region, they are very strong and have demonstrated the ability to make a difference through scaling up. Act locally, but capitalize on regional opportunities.
- The region is very interconnected - continue to have platforms such as this and looking at synergies. The MAR can set examples for other areas.

Emma Doyle

- Use resources from the US – everyone is very willing to help. Reach out to stakeholders, such as tour guides / divers. MPACConnect has new template action plan for monitoring and response to SCTLTD – possible starting point to help managers with national and regional action planning.

ANNEX THREE: AGENDA

Mesoamerican Reef Health and Management: Responding to the Stony Coral Tissue Loss Disease Crisis

**Joint Session
October, 8th, 2019
Belize, city**

(Belize Marine Fund and Reef Rescue Initiative)

Introduction

The Mesoamerican Reef extends more than 1,000 km from the northern tip of Mexico's Yucatan Peninsula southwards through the clear waters of Belize, Guatemala, and on to the Bay Islands of Honduras. A dazzling array of different coral types forms this underwater wilderness and provides ecosystems that support hundreds of fish species, marine turtles, and sharks. Along the coastlines and cayes, mangroves provide habitat for fish and shorebirds as well as protect coastal areas from the damage associated with hurricanes and strong storms. These rich ecosystems also support coastal community livelihoods across the region through fishing and tourism.

Increasing water temperatures and sea levels driven by climate change, and anthropogenic impacts closer to home—unsustainable fishing practices, contamination from the watersheds and unsustainable coastal development—continue to threaten our fragile reef ecosystems. The reefs of the MAR are now also at risk from the recent arrival of the stony coral tissue loss disease (SCTLD). SCTLD is a new, lethal disease first reported in Florida in 2014. Whilst the cause of the disease is unknown, it affects more than 20 species of stony corals, particularly brain, pillar, star, and starlet corals. The disease spreads quickly, causing high coral mortality. Outbreaks of SCTLD have been noted in other parts of the Caribbean: Jamaica, St. Maarten and, most recently, in St. Thomas, US Virgin Islands and the Dominican Republic. In mid-2018, it was registered in the Mexican Caribbean and presence of the disease was confirmed in the Bacalar Chico Marine Reserve in Belize in June 2019.

MEETING PURPOSE

1. To discuss and share information on the current status of the Stony Coral Tissue Loss Disease (SCTLD) and its implications for Belize and the Mesoamerican Reef Region.
2. To identify required interventions for addressing SCTLD in Belize and the MAR.

8:00	Arrival of participants and morning coffee
8:30	Welcome and Opening Remarks, meeting objectives and agenda
8:45	Climate Change Impacts on Coral Reefs in the MAR: Nadia Bood/WWF
9:15	Reef Restoration Efforts in Belize and the Mesoamerican Region: <ol style="list-style-type: none"> 1. Lisa Carne/FoH; 2. Claudia Padilla/CRIP/INAPESCA; 3. Gabriela Nava/Oceanus
9:45	Q&A
10:00	Coffee Break
10:15	Stony Coral Tissue Loss Disease (SCTLD): Background and Treatment: Valerie Paul/Smithsonian Institute
11:00	Status of SCTLD in Belize: Nicole Craig/HRI
11:30	Management Experiences from the Field: Mexico (Part 1): Christian Alva/CONANP
12:00	Lunch
13:00	Management Experiences from the Field: Mexico (Part 2): Christian Alva/CONANP
13:30	Managing the Disease: <i>Ex Situ</i> Possibilities collaboration CICESE/INAPESCA/UNAM- Claudia Padilla-CRIP/INAPESCA
13:45	Managing the Disease: <i>Ex Situ</i> Possibilities: Jennifer Moore/NOAA
14:15	Spread of SCTLD in the Dominican Republic: Someira Zambrano/Reef Network/Dominican Republic
14:45	Communication around SCTLD: Patricia Kramer SI/AGGRA
15:15	Recap of All Presentations
15:30	Working Groups: Identifying Required Interventions for SCTLD Response in Belize and the MAR
16:45	Plenary Session
17:30	Session Ends