

# **Caribbean Cooperation on Response to Stony Coral Tissue Loss Disease Epidemic**

## **Cooperación del Caribe en Respuesta a la Epidemia de Enfermedad por Pérdida de Tejido de Coral Pedregoso**

## **Coopération des Caraïbes sur la Réponse à l'Épidémie de Perte de Tissu Corallien Stony**

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### **ABSTRACT**

Stony Coral Tissue Loss Disease, or SCTLD, affects approximately half of all known stony coral species in the Caribbean region. The SCTLD epidemic started in 2014 in Florida and this aggressive disease has now spread to at least seven Caribbean countries and territories including: Mexico, Jamaica, Sint Maarten, the Dominican Republic, the U.S. Virgin Islands, the Turks and Caicos Islands, Sint Eustatius and Belize. SCTLD poses a particularly significant threat to Caribbean reefs because of its large geographic range, extended duration, high rates of mortality, and large number of coral species affected. Florida's SCTLD Response Structure includes a Caribbean Cooperation Team that works to review new disease reports from the region and to disseminate information on SCTLD prevention, identification and response and assist Caribbean jurisdictions in their efforts to understand and address this disease.

### **Introduction**

First reported in Florida in 2014, SCTLD is no longer only a Florida problem. Unfortunately, other locations in the Caribbean are seeing similar signs of this coral disease and, as of November 8 2019, SCTLD has been confirmed in the Caribbean countries and territories of Jamaica, Mexico, Sint Maarten, the United States Virgin Islands (St. Thomas), the Dominican Republic, the Turks and Caicos Islands, Belize and Sint Eustatius. Table 1 lists the dates of confirmed reports in these locations.

### **Discussion**

The approach to coral disease response in Florida is potentially instructive for other countries and territories in the Caribbean. Many partners have been involved in the response to SCTLD in Florida and they have been working collaboratively to respond to the various aspects of the disease. The four lead agencies are the Florida Department of Environmental Protection, Florida Fish and Wildlife Commission, the National Oceanic and Atmospheric Administration and the National Park Service. There is additional participation from government agencies including the Environmental Protection Agency, the Smithsonian Institution, and the U.S. Geological Survey's National Wildlife Health Center. There has also been participation from all five counties in southeast Florida, which has been instrumental in garnering the attention and funding that the disease and its response require. There are many academic and research institutions, NGOs, non-profits, and aquaria participating in various aspects of disease response. These partners have shown great generosity and willingness to assist Caribbean coral reef managers by sharing their knowledge of SCTLD.

In order to coordinate the disease response in Florida, the SCTLD community has organized SCTLD response teams that focus on specific priority topics. There is a leadership body – the Executive Coordination Team – made up of representatives from the four lead agencies; a technical advisory body; and 10 specialist response teams that consist of a:

- Management Team to address resource gaps, funding opportunities and allocations, action plans and communications;
- Reconnaissance and Intervention Team to identify where the disease is occurring and to conduct and trial coral disease treatments;
- Coral Rescue Team which seeks to preserve genetic diversity by collecting colonies of susceptible species in advance of the disease margin, bring them out of the system and keep them in land-based facilities for future propagation and restoration efforts;
- Restoration Trials Team comprised of local restoration practitioners to answer key questions about restoration in the context of SCTLD;
- Research & Epidemiology Team working collaboratively to address research into coral disease in general and specifically about SCTLD;
- Regulatory Team that works to ensure that activities are in regulatory compliance and help streamline permitting



**Figure 1.** Status of SCTLD in the Caribbean as of November 8, 2019

processes;

- Data Management Team that works to understand the data needs and data production of each team, and helps those teams to synthesize and visualize data for response partners and other audiences.

A dedicated SCTLD Caribbean Cooperation Team exists, both for sharing technical knowledge and lessons learned with the Caribbean and to keep the lines of communication open as partners in the Caribbean respond to SCTLD. The existence of this team is an acknowledgement that while Florida has been dealing with SCTLD the longest and has collected a lot of data that they can share, there is also much to learn from others as they respond to SCTLD. There is particular interest from Florida in learning about new research, treatment trials and management successes and failures, as well the nature of disease expression on other coral reefs. [links with MPACConnect and peer-to-peer sharing across the region]

The objectives of the SCTLD Caribbean Cooperation Team are to:

- Maintain communications with regional networks and initiatives;
- Track the spread of SCTLD;
- Share reporting mechanisms for SCTLD;
- Share lessons learned from ongoing response efforts;
- Share key informational materials; and
- Identify resources to support capacity building, monitoring and response in the Caribbean region.

To date, key partners of the SCTLD Caribbean Cooperation Team include: NOAA's Coral Reef Conservation Program; the Gulf and Caribbean Fisheries Institute (GCFI); MPACConnect; Nova Southeastern University; the Atlantic and Gulf Rapid Reef Assessment Program (AGRRA); Healthy Reefs for Healthy People; The Nature Conservancy Reef Resilience Network; the Florida Keys National Marine Sanctuary; Florida Fish and Wildlife Commission, Sea Grant Florida, and the National Park Service. Efforts of the Caribbean Cooperation Team to date have included:

- Reviewing of new SCTLD reports and referrals to AGRRA's online reporting mechanism;
- Organizing and sharing resources to support SCTLD prevention, detection and response;
- Training on SCTLD identification, monitoring and intervention;
- Hosting of webinars with GCFI/MPA Connect and TNC Reef Resilience; and
- Tracking of intervention techniques and their efficacy.

Capacity building efforts contributed to by the Caribbean Cooperation Team have brought valuable coral disease expertise to outreach activities and the development of training materials for the Caribbean.

Through the process of encouraging the reporting of suspected SCTLD cases to the AGRRA platform it has been interesting to note that not all the cases of disease that have been reported are SCTLD. Thanks to regional capacity building and outreach efforts many local partners are now on high alert and there is an increase in local reporting of suspected coral disease. From the point of view of technical advisors, it is a stepwise process to observe and understand whether or not the suspected reports are actually SCTLD. For up-to-minute reporting, Figure 1 shows stages of reporting and review: green = no SCTLD, yellow = need additional information to make a determination, orange = new report still under review, red = confirmed SCTLD.

Tracking of SCTLD in the Caribbean is important to generate insight into possible transmission pathways. Currently, various avenues are being examined. The pattern of SCTLD spread by water raises the possibility of links with the shipping industry, including tankers and cruise ships. Managers note that the exchange of ballast and other water away from coral reefs is likely to help prevent the spread of SCTLD. We also highlight that there is an opportunity for Caribbean marine natural resource managers to raise the issue of SCTLD with their colleagues in shipping and port sectors at the 2020 meeting of Regional Maritime Administrators and with the Florida-Caribbean Cruise Association.

Resources have been brought to enable exchange visits and workshops that have significantly built capacity for SCTLD response and management in the Caribbean, including the first SCTLD . Training for Mexican MPA Managers held in Key Largo, Florida in December 2018, SCTLD Identification Training in Belize in April 2019, a SCTLD Learning Exchange with the USVI in Key West/ Miami, Florida in May 2019, and a SCTLD Learning Exchange for Caribbean Marine Resource in sharing best practices and advances in SCTLD science Managers in Key West, Florida in August 2019. These Caribbean cooperation activities have proven useful .in sharing best practices and advances in SCTLD science. in sharing best practices and advances in SCTLD science.

The Caribbean Cooperation Team continues to gather information on response to SCTLD in the Caribbean and updates on intervention measures against SCTLD. To date, some 1,600 corals have been treated with antibiotics using the Base2B medium, with a reported 85% success rate on lesions and a 98% survival rate of treated colonies. The team highlights that the development of colony level treatments, potentially using probiotics, is a priority. In the meantime, the Caribbean Cooperation Team is tracking trials of different treatment protocols throughout the region and sharing important results.

Several Caribbean government agencies, however, are grappling with Florida's recommendation to treat diseased corals quickly and aggressively with topical antibiotics, due to the cost, labour required, geographic extent of the problem and concerns to provide these agencies with the most up to date data so they can make informed decisions, the Caribbean Cooperation Team most recently shared the results of a 2-week study that indicated that the application

of CoreRX Base2B alone to diseased lesions resulted in 62% coral mortality versus 30% coral mortality for lesions treated with toxicity of antibiotics. However, the success rate recorded with these treatments indicates that the use of antibiotics is currently the most effective treatment method. In order of SCTLD-affected coral reef sites and coral colonies for treatment - large coral colonies close to others of the same species are priorities for treatment, and colonies with a large amount of remaining tissue and a small number of active lesions are considered more treatable. Site treated with Ocean Alchemists Base2B and amoxycillin. The team stresses that selection criteria must guide the prioritization selection criteria should also take into consideration the regulatory framework governing the management of the affected sites. For example, sites within an MPA may respond more positively to treatment since they may not be affected by additional stressors such as fishing pressure.

We note that there is the potential for the use of existing coral reef monitoring data to help guide responses to SCTLD in the Caribbean. Existing AGRRA information about coral coverage and coral colony size can help to guide local monitoring and treatment efforts, therefore improving the Caribbean's ability to efficiently respond to the disease.

Continued efforts that are currently envisaged by the Caribbean Cooperation Team include:

- Developing an intervention action planning template;
- Assisting with the distribution of Base2B, in collaboration with Ocean Alchemists;
- Promoting common coral disease monitoring protocols via AGRRA;
- Providing information on ballast water management options to prevent disease spread;
- Supporting international coral rescue efforts; and
- Facilitating opportunities for collection and study of diseased coral specimens.

## Conclusion

The SCTLD Caribbean Cooperation Team invites participants at GCFI72 to engage with the team, take the opportunity to learn from existing knowledge and to share their experiences in responding to SCTLD. Other potential partners are invited to ally with the SCTLD Caribbean Cooperation Team and join forces to build an effective regional response.

**Table 1:** Occurrence of SCTLD in the Caribbean

Date of Confirmed Occurrence	Location
February 6, 2018	White River, north coast Jamaica
July 3, 2018	Puerto Morelos, Quintana Roo, Mexico
November 22, 2018	Sint Maarten
January 1, 2019	Flat Cay, St Thomas, USVI
March 3, 2019	Cayo Arena, NW Dominican Republic
March 10, 2019	South Caicos, Turks and Caicos Islands
June 21, 2019	Bacalar Chico, northern Belize
August 13, 2019	Northern Reserve, Sint Eustatius