

# STONY CORAL TISSUE LOSS DISEASE: US NATIONAL RESPONSE & PACIFIC PREPAREDNESS

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**Florida Sea Grant**

**NOAA Coral Reef Conservation Program**



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Local Threat Reduction: Response Planning Frameworks



# Outline

- Stony Coral Tissue Loss Disease Overview
- U.S. National Response
- Pacific Preparedness & Transmission Prevention
- Integrating Response Planning Frameworks
- Resources



Photo: Leslie Henderson, NOAA



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**“...SCTLD is likely to become the most lethal coral disease ever recorded because of its high prevalence, the high number of susceptible species, its transmissibility, and the high levels of mortality exhibited by affected corals.”**

**Alvarez-Filip et al. (2019)**



Photos: Florida DEP & FWC



# SCTLD Impacts

- 50% decline in overall coral cover in Southeast Florida
- 50% loss of coral cover at U.S. Virgin Islands outbreak site
- 62% decline in overall coral cover in Turks & Caicos
- 46% decline in overall coral cover Cozumel

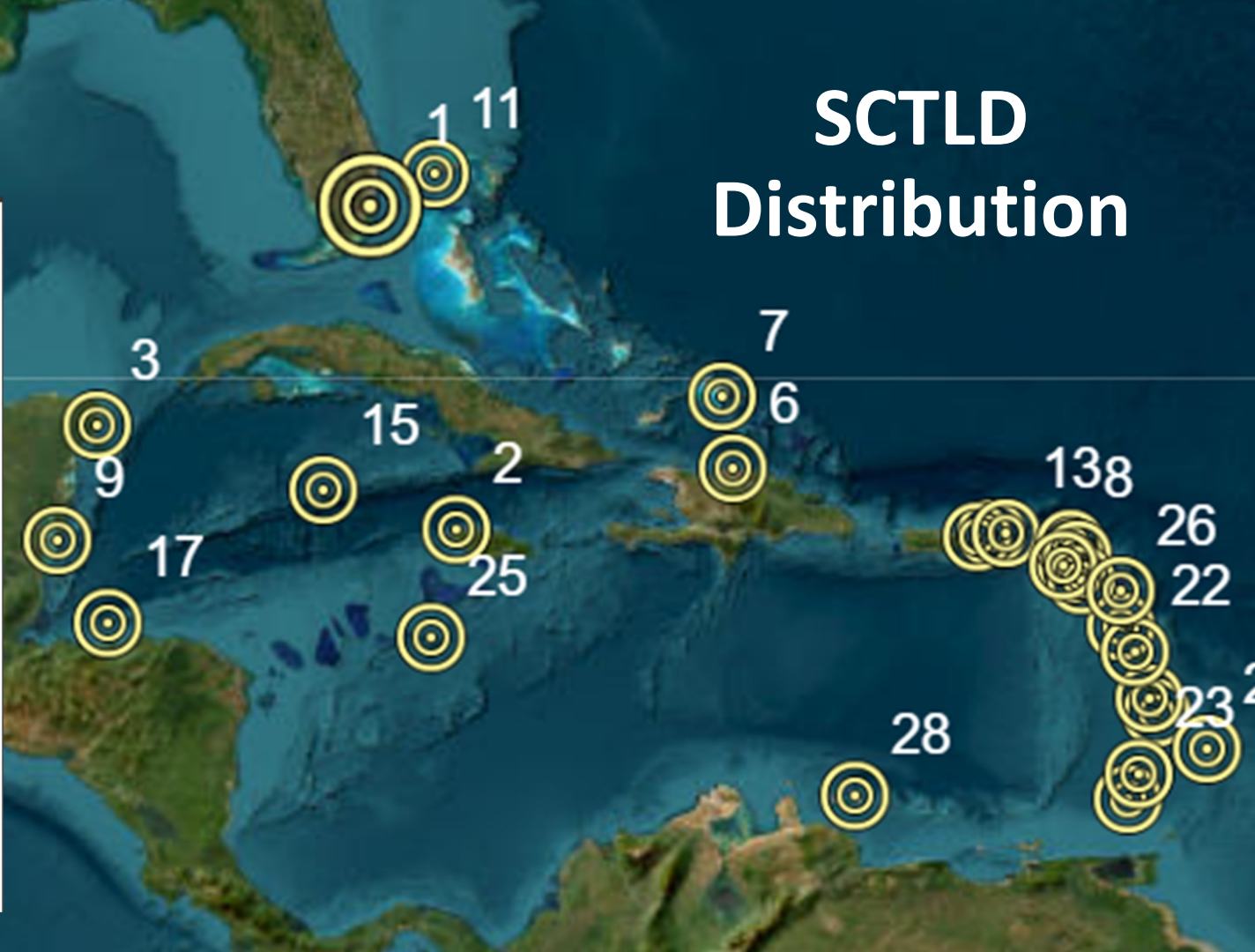


Source: Estrada-Saldivar et al., 2021



# SCTLD Distribution

SCTLD Epidemics: Dates & Locations			
Year	Date	Location	Map ID
2014	Nov 18	Florida	1
2017	Dec	Jamaica	2
2018	July 3	Mexico	3
	Nov 22	Sint Maarten	4
	Jan 29	U.S. Virgin Islands	5
	Mar 3	Dominican Republic	6
2019	early Mar	Turks and Caicos Islands	7
	June 5	Saint-Martin	8
	June 21	Belize	9
	Aug 13	Sint Eustatius	10
	Dec	The Bahamas	11
	Dec 23	Puerto Rico	12
2020	May 17	British Virgin Islands	13
	June 9	Guadeloupe	14
	June 29	Cayman Islands	15
	Aug 9	St. Lucia	16
	Sept 25	Honduras	17
	Oct 24	Martinique	18
2021	Jan 17	St. Kitts & Nevis	19
	Apr 15	Saba	20
	May 18	Saint Barthélemy	21
	May 21	Dominica	22
2022	Feb 14	St. Vincent & the Grenadines	23
	Mar 2	Grenada	24
	Apr 13	Colombia	25
	July 26	Antigua and Barbuda	26
	Nov 18	Barbados	27
2023	Feb 10	Bonaire	28



# Potential Sources of SCTLD

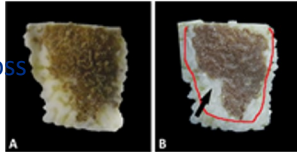


## Bacteria

Corals with SCTLD respond to antibiotic treatments

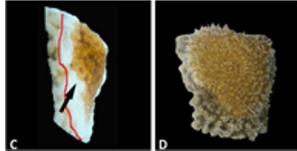
*Dendrogyra cylindrus* recovery

A. Tissue loss



B. Immediately following amoxicillin application

C. 12 days after amoxicillin treatment



D. Full recovery

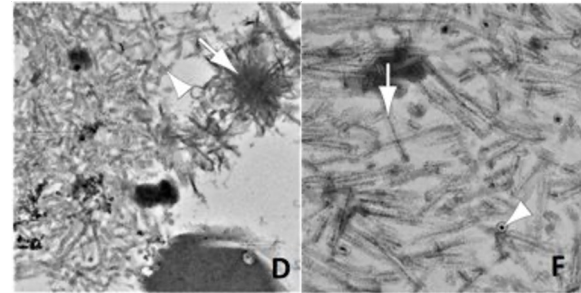
Miller and Woodley, 2020



## Viruses

Viral-like particles have been observed in infected samples through TEM

*Dendrogyra*



Work, 2021

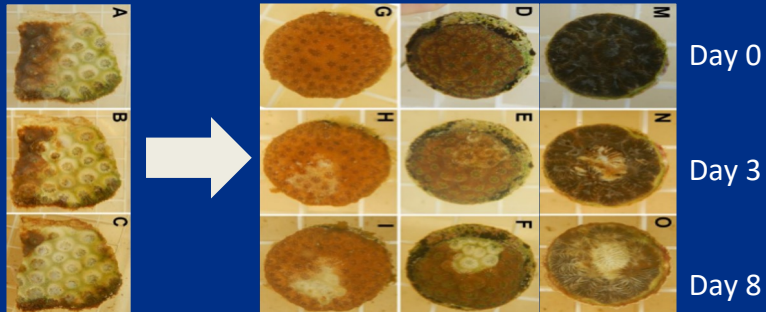


# Potential Vectors of SCTLD



## Direct Contact

SCTLD can spread through contact with an infected coral or sediment



Ushijima & Paul; unpublished



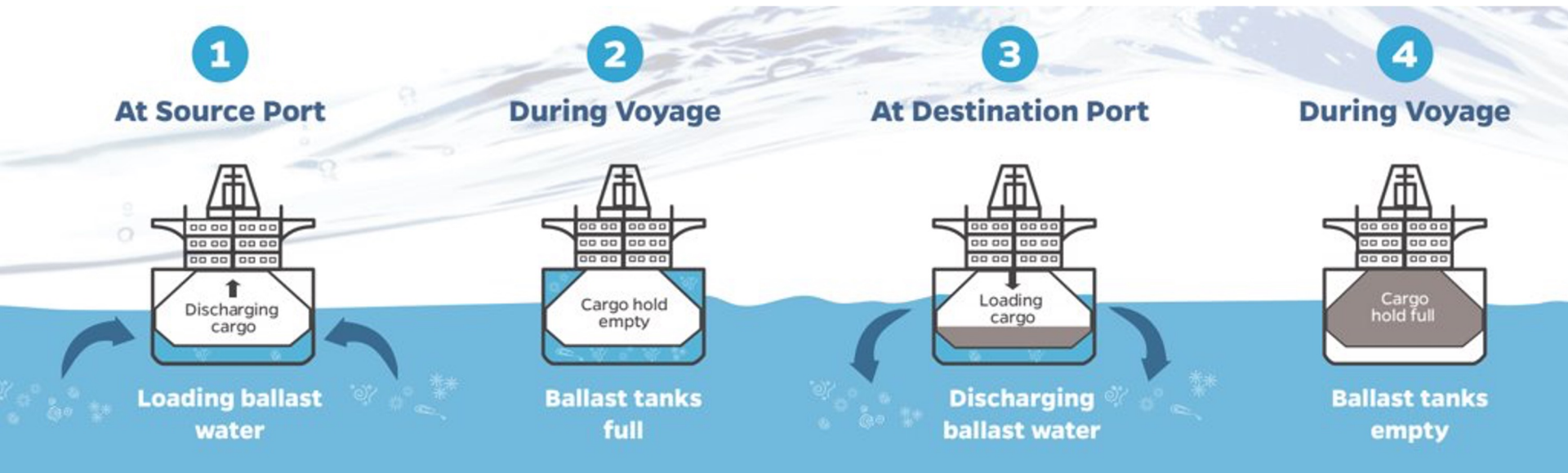
## Water Movement

Currents explain small-scale spread, but cannot explain it at larger scales





# Ballast Water Transmission



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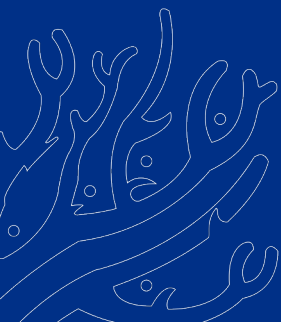
Photo: Leslie Henderson, NOAA



# Key Response Activities

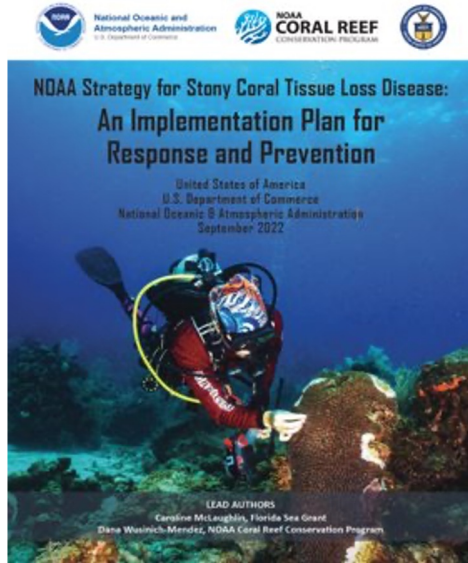
- Surveillance: Know what to look for and where to look for it.
- Intervention: Disease treatments
- Rescue & Propagation: Dual goal of genetic preservation and broodstock for restoration corals.
- Restoration Research/Planning: What comes next?
- Support: Communications & outreach, regulatory, & data management

Photo: U.S. National Park Service





# NOAA Strategy for Stony Coral Tissue Loss Disease: An Implementation Plan for Response and Prevention



- Build on goals and priorities identified in NOAA's SCTLD Strategy
- Outline a 5-year course of action
- Match agency capacity with response needs
- Highlight key actions to address threats over the long-term



# U.S. Coral Reef Task Force Coral Disease Working Group



U.S. All Islands  
Coral Reef  
Committee



Smithsonian



NOAA  
**CORAL REEF**  
CONSERVATION PROGRAM



**COASTAL RESOURCES  
MANAGEMENT**



**CRAG**



**NATIONAL  
PARK  
SERVICE**



**NATIONAL MARINE  
SANCTUARIES**



**THE BUREAU OF  
STATISTICS AND PLANS**  
Government of Guam



**USGS**  
*science for a changing world*

**Sea Grant**  
Florida



**ICRI**  
INTERNATIONAL  
CORAL REEF INITIATIVE

# SCTLD Caribbean Cooperation Team

- Partnerships to track disease and distribute information and tools
- Build capacity for SCTLD detection and response
- Identify resources



# Caribbean Cooperation Team Members

- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados\*
- Belize\*
- Colombia\*
- Cuba\*
- Dominica
- Dominican Republic\*
- France/French Caribbean\*
- Grenada\*
- Guatemala
- Honduras\*
- Jamaica\*
- Mexico\*
- Netherlands/Dutch Caribbean\*
- Portugal
- Puerto Rico\*
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Trinidad and Tobago
- U.K./U.K. Overseas Territories\*
- U.S. Virgin Islands\*
- Venezuela



\*Indicates ICRI member

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# Pacific Preparedness

- Preparedness workshops & sampling trainings
- Establishment of a Pacific coral disease network
- Intervention toolkit & sampling kits
- Surveillance guidelines



# SCTLD Surveillance Guidelines

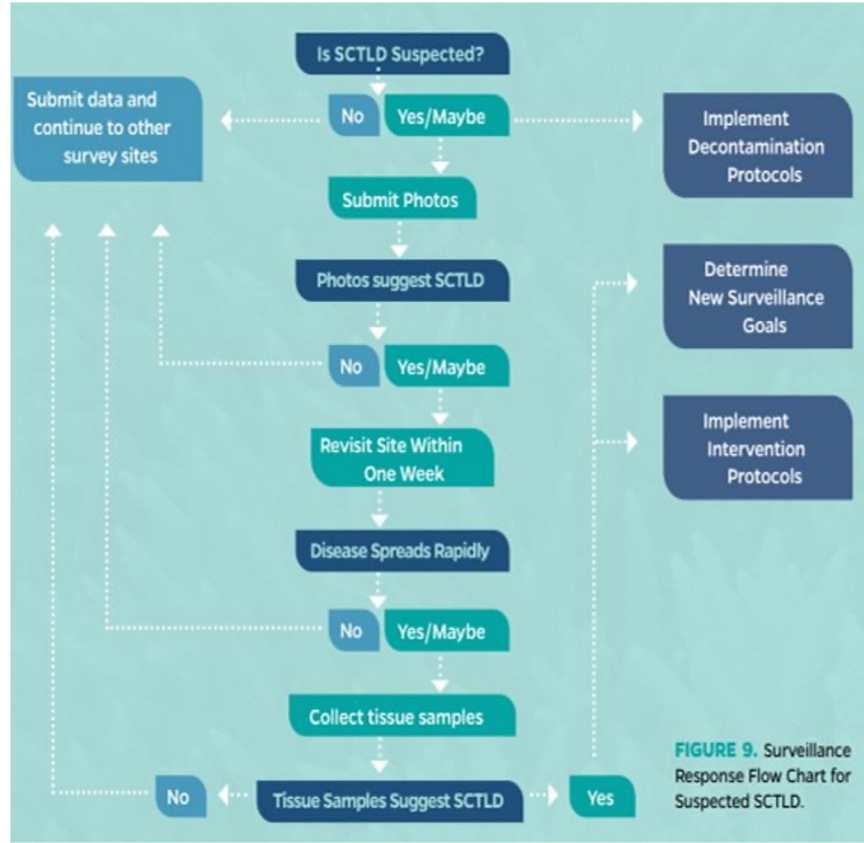


FIGURE 9. Surveillance Response Flow Chart for Suspected SCTLD.



# Preventing Disease Transmission

- Marine Safety Information Bulletin- ballast water BMP's
- U.S. Coast Guard SCTLDD Task Force
- Identification of high-risk ports and ships
- Increased compliance checks
- Analyzing vessel movement
- Alert system for vessels arriving from SCTLDD infected areas



## Ballast Water Best Management Practices to Reduce the Likelihood of Transporting Pathogens That May Spread Stony Coral Tissue Loss Disease

The Coast Guard and the Environmental Protection Agency (EPA), as participants of the Caribbean Coral Reef Partnership, were recently provided information regarding the rapid spread of Stony Coral Tissue Loss Disease (SCTLDD) throughout the Caribbean. SCTLDD is a lethal disease that rapidly destroys the soft tissue of many different species of coral. The disease first appeared off the coast of Miami-Dade county, Florida, in September 2014. Nearly half of Florida's 45 species of hard coral are affected by the disease, including many reef-building types. Once afflicted, the disease progresses rapidly, killing corals within weeks or months. It is estimated to have led to the death of millions of corals since 2014. The causative agent of SCTLDD has not yet been identified. Recent work indicates that co-infection of a bacteria and a virus is a possibility.

At the request of the National Oceanic and Atmospheric Administration (NOAA), the Coast Guard is considering options to mitigate the potential factors that some indications suggest may be contributing to the spread of SCTLDD. One such factor may be the potential transfer of pathogens in ballast water. The Coast Guard wants to ensure that the maritime industry has the information it needs to mitigate this potential contributing factor.

Accordingly, vessel representatives are reminded of the following mandatory management practices associated with the discharge of ballast water (BW) from vessels required to conduct a Ballast Water Exchange (BWE) under U.S. Regulations:

- A BWE conducted for the purpose of complying with U.S. BW management requirements must be done outside of 200 nautical miles (nm) from any shore in accordance with 33 CFR 151.2025.

This is simply a reminder of an existing requirement. Coast Guard and EPA requirements specify that certain ships conduct regulatory BWE beyond 200 nm of any shore prior to discharge of BW in U.S. waters. Additionally, ships that must also comply with the International Convention for the Control and Management of Shipboard Operations (MARPOL) Annex B, Regulation 1, are required to discharge BW at least 12 nautical miles from the nearest land.

## General Guidelines for Disinfection



- ✓ Inspect dive gear and equipment and remove debris
- ✓ Move from "cleanest" site first to "dirtiest" last
- ✓ Decontaminate dive gear at end of day
- ✓ Decontaminate dive gear between sites, countries, & sensitive areas
- ✓ Properly dispose of disinfectant & rinse waste into sink, tub, or shower

DO



# Proposed Emergency Rules in Hawai'i

- Emergency rules would:
  - Prohibit discharge of ballast water except in emergencies
  - Require vessels from an SCTL D-affected area to submit additional information on hull husbandry
  - Request vessels take extra precautions related to hull cleanliness and sediments



Photo: Hawai'i Department of Transportation



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# Florida's ~~SCTLD Response~~ Coral Reef Resilience Program

- Disturbance Response
  - Rapid mobilization of resources and personnel
  - Already utilized for *Diadema* die-off and coral bleaching
- Recovery
  - Threat reduction, focused on water quality
  - Ecosystem restoration
- Why it works...
  - Facilitates rapid information-sharing
  - Leverages an extensive network of experts
  - Offers opportunities to collaborate on large projects
  - Focuses on conservation *actions*



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# Resources

Photo: DRTO Cruise, 2021



Pacific Surveillance  
Guidelines



SCTLD Prospectus



Marine Safety  
Information Bulletin



Transmission Fact  
Sheet



NOAA SCTLD  
Implementation Plan



# Questions?

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