Stony Coral Tissue Loss Disease: U.S. National Response & Pacific Preparedness

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NOAA Coral Reef Conservation Program
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Photo: Joe Townsend

Presentation Overview

Stony Coral Tissue Loss Disease Overview

Photo: Leslie Henderson, NOAA

Photo: Jordan Sneider

Photo: Karen Kneely, NSU

“...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

Impacts

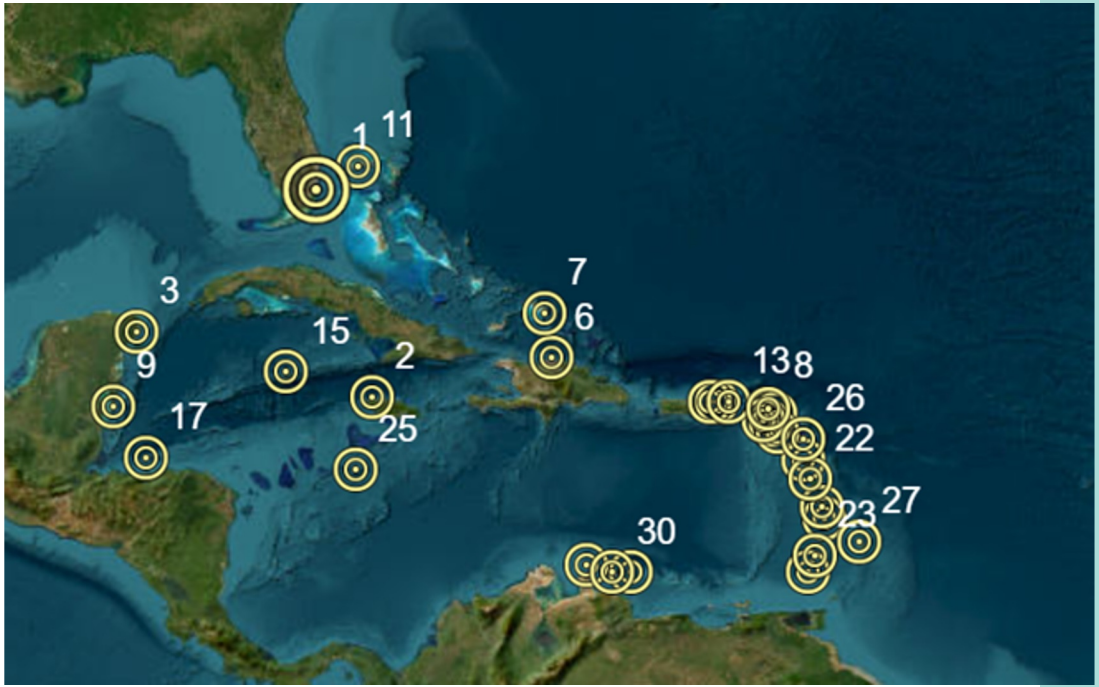
- 50% decline in overall coral cover in Southeast Florida
- 50% loss of coral cover at U.S. Virgin Islands outbreak site
- ~90% decline of highly susceptible species in some areas
- Loss of ~ half of stony corals in the Caribbean

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
2019	Jan 29	U.S. Virgin Islands	5
	Mar 3	Dominican Republic	6
	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
	April 1	Aruba	29
	April 4	Curaçao	30



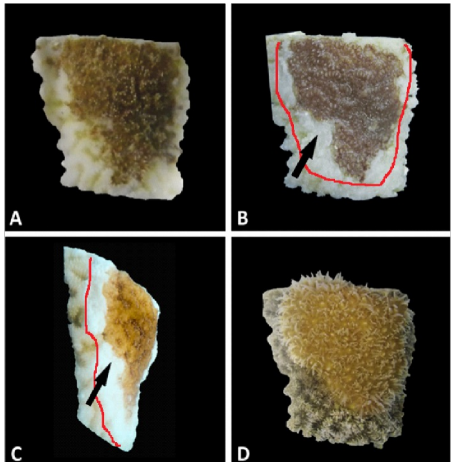
Potential Sources of SCTLD

Bacteria

Corals with SCTLD respond to antibiotic treatments

Dendrogyra cylindrus recovery

A. Tissue loss



B. Immediately following amoxicillin application

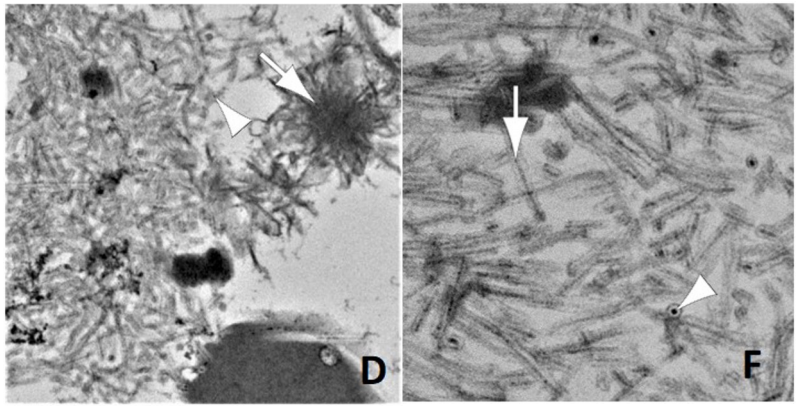
C. 12 days after amoxicillin treatment

D. Full recovery

Miller & Woodley, 2020

Viruses

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

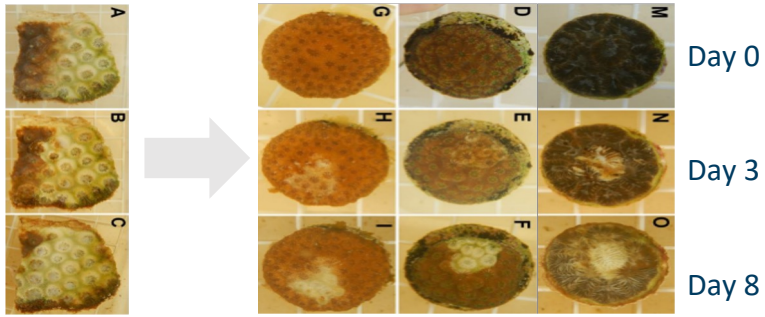


Work, 2021

Potential Vectors

Direct Contact

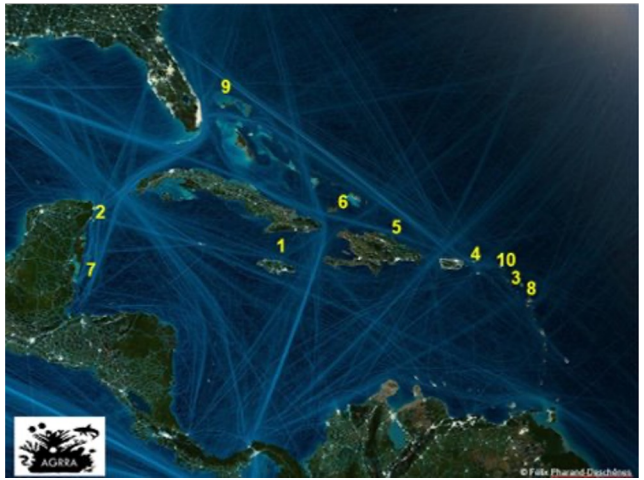
SCTLD can spread through contact with an infected coral or sediment



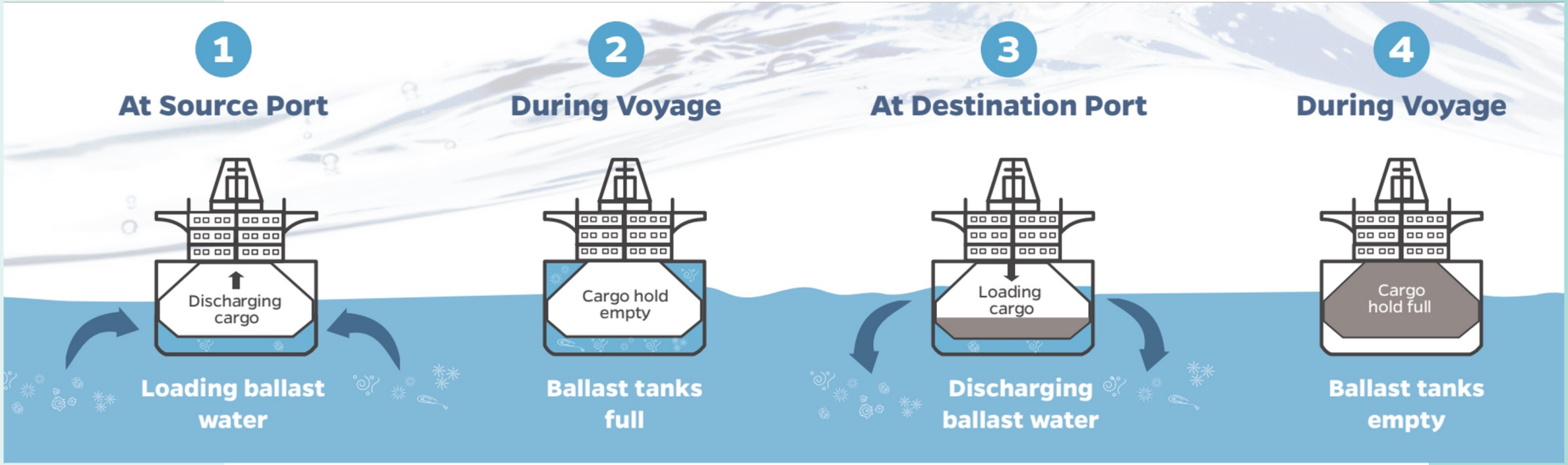
Ushijima & Paul; unpublished

Water Movement

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



Ballast Water Transmission



U.S. National Response


Photo: Leslie Henderson, NOAA


Photo: Jordan Sneider


Photo: Karen Kneely, NSU

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?

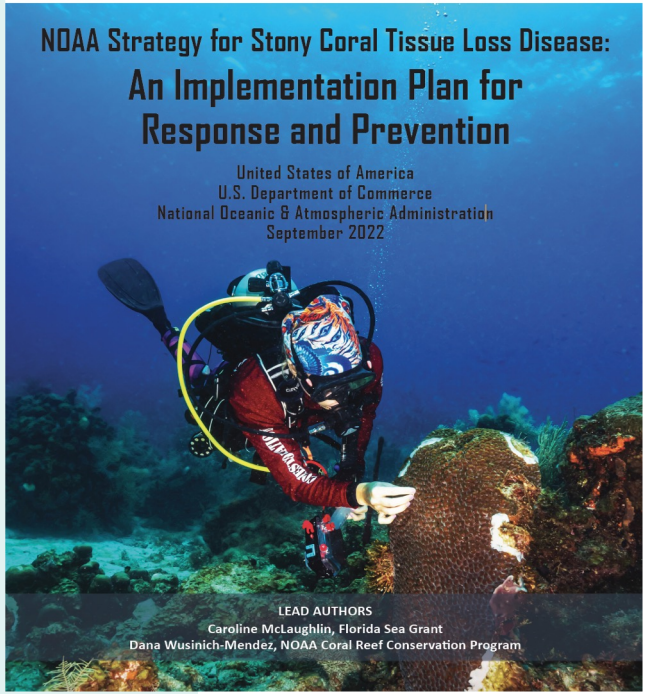
Support: Communications & outreach, regulatory, & data management

Photo: U.S. National Park Service

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

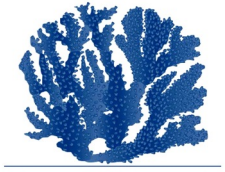
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

NOAA CORAL REEF CONSERVATION PROGRAM



- 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

NATIONAL MARINE
SANCTUARIES

THE BUREAU OF
STATISTICS AND PLANS
Government of Guam

Sea Grant
Florida

RESOLUTION: National Action for Coral Disease Outbreak Prevention, Rescue, & Recovery

The U.S. Coral Reef Task Force recognizes the continued, severe threat posed by SCTLD and other significant coral disease outbreaks to the long-term health and vitality of America's coral reefs. The viability of coral reef ecosystems requires continued and enhanced response, prevention, and preparedness efforts.

Photo: Ann Tihansky, DOI

RESOLUTION: National Action for Coral Disease Outbreak Prevention, Rescue, & Recovery

The two greatest priorities for interagency coordination and urgent action are:

Preventing coral disease transmission, including the spread of SCTLD to unaffected U.S. coral reefs in the Pacific

Augmenting disease-related coral rescue and restoration efforts aimed at recovering the community structure and ecological function of impacted reefs, particularly along SCTLD-affected reefs in the U.S. Atlantic-Caribbean

SCTLD Caribbean Cooperation Team

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

Smithsonian Institution

The Nature Conservancy

Caribbean Environment Programme

AGRRA

NOAA Coral Reef Conservation Program

Gulf and Caribbean Fisheries Institute, Inc.

Association of Zoos & Aquariums

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

Pacific Preparedness & Transmission Prevention

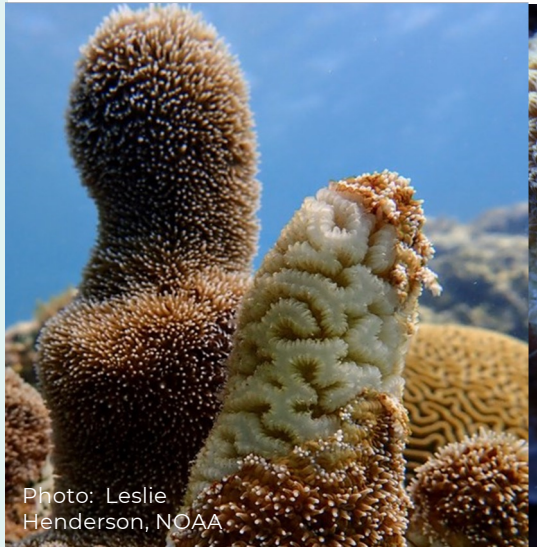


Photo: Leslie Henderson, NOAA

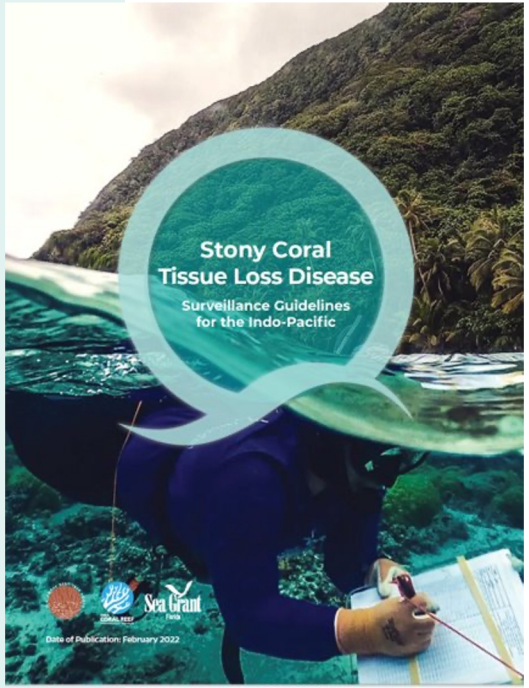

Photo: Jordan Sneider


Photo: Karen Kneely, NSU

Pacific Preparedness

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

SCTLD Surveillance Guidelines



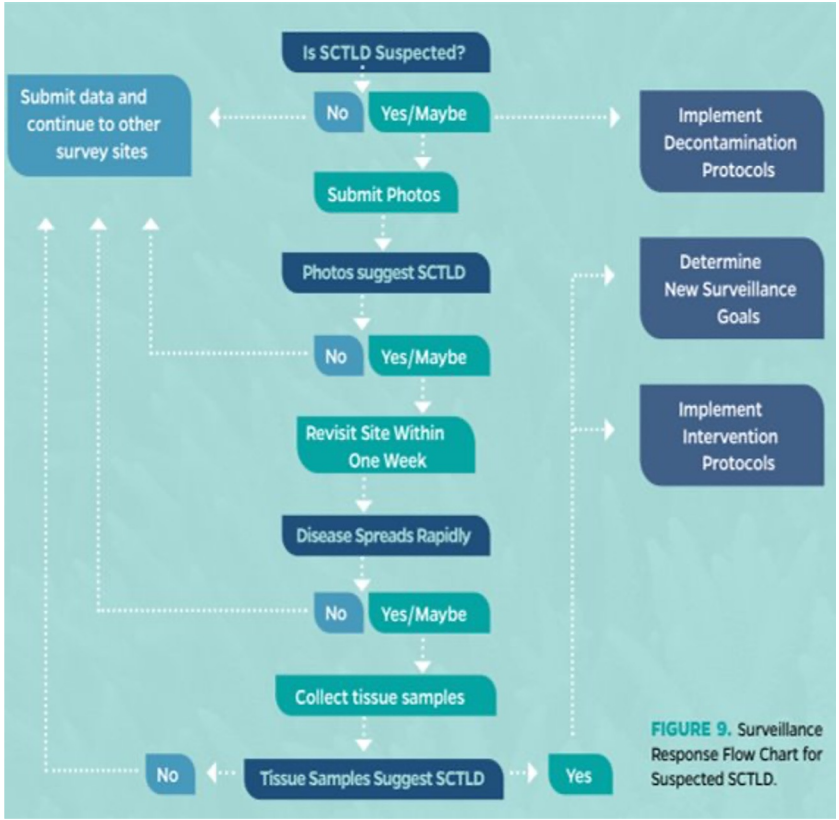
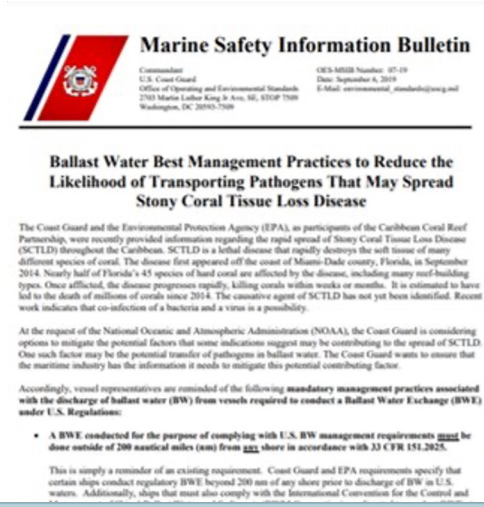


FIGURE 9. Surveillance Response Flow Chart for Suspected SCTLD.

Preventing Disease Transmission

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



Marine Safety Information Bulletin

Commandant
U.S. Coast Guard
Office of Operating and Environmental Standards
2703 Martin Luther King Jr Ave, SE, STOP 7509
Washington, DC 20593-7509

CES-MSIB Number: 07-19
Date: September 6, 2019
E-Mail: environmental_standards@uscg.mil

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 (SCTLD) throughout the Caribbean. SCTLD 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 SCTLD 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 SCTLD. 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

Proposed Emergency Ballast Water Management Rules in Hawai'i

Photo: Hawai'i Department of Transportation

- Emergency rules would:
  - Prohibit discharge of ballast water in State Waters, except in an emergency.
  - Require vessels traveling from an SCTLD-affected area to submit additional information on hull husbandry.
  - Request vessels take extra precautions related to hull cleanliness and sediments.

Integrating Response Planning Frameworks


Photo: Leslie Henderson, NOAA


Photo: Jordan Sneider


Photo: Karen Kneely, NSU

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*

Resources

Photo: Leslie Henderson, NOAA

Photo: Jordan Sneider

Photo: Karen Kneely, NSU

Resources

Photo: DRTO Cruise, 2021

- Pacific Surveillance Guidelines
- SCTLD Prospectus
- Marine Safety Information Bulletin
- Transmission Fact Sheet
- NOAA SCTLD Implementation Plan

— LEARN MORE —

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Thank you.

Sea Grant
FLORIDA

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

NOAA
CORAL REEF
CONSERVATION PROGRAM

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National Disease Response Coordinator, 31269