# Stony Coral Tissue Loss Disease (SCTLD) and the possible risks to Hawai‘i

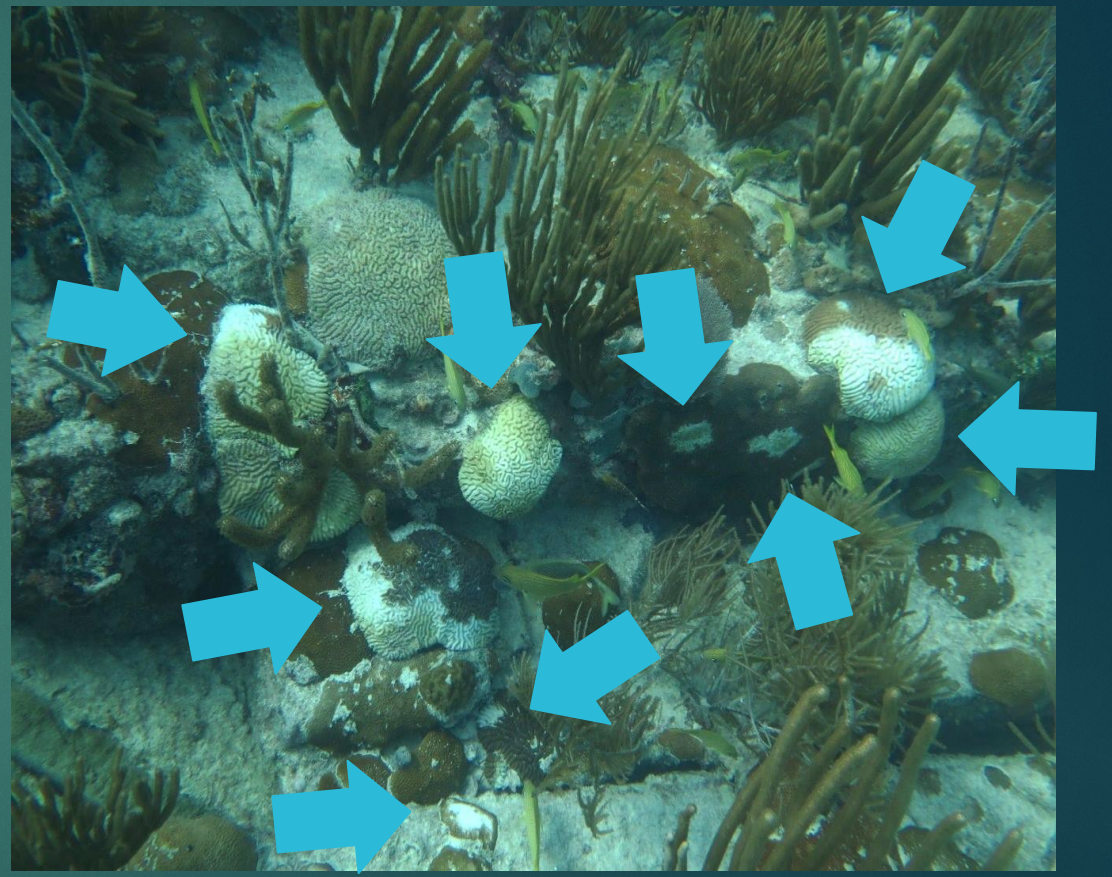
ALIEN AQUATIC ORGANISM TASK FORCE

OCT 20TH, 2022

Hawai‘i Division of Aquatic Resources

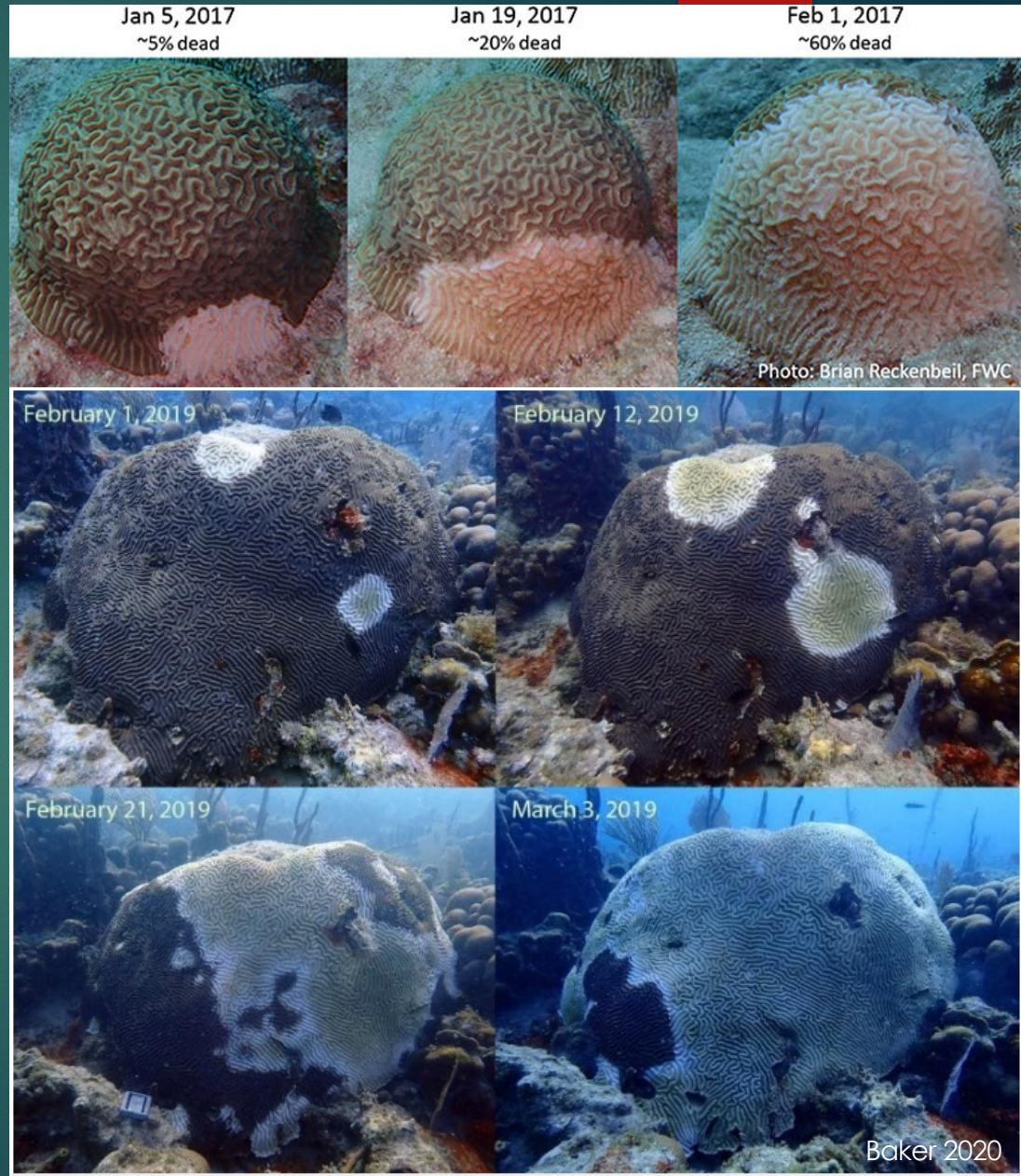
# SCTLD: The Most Lethal Coral Disease

- High rate of mortality
- High prevalence
- Effects multiple coral taxa, life stages and sizes
- Spreads quickly along reefs, to adjacent reefs, and across large distances
- Persistent over time
- Many unknowns



# Effects of SCTLD

- Different from bleaching – SCTLD is death of the coral itself
- Coral is likely to perish in weeks or months if there is no intervention
- Signs of disease vary between taxa but start as tissue loss
- Tissue loss occurs rapidly at a rate of up to 40 $cm^2$ / day
- No causative pathogen has been identified yet



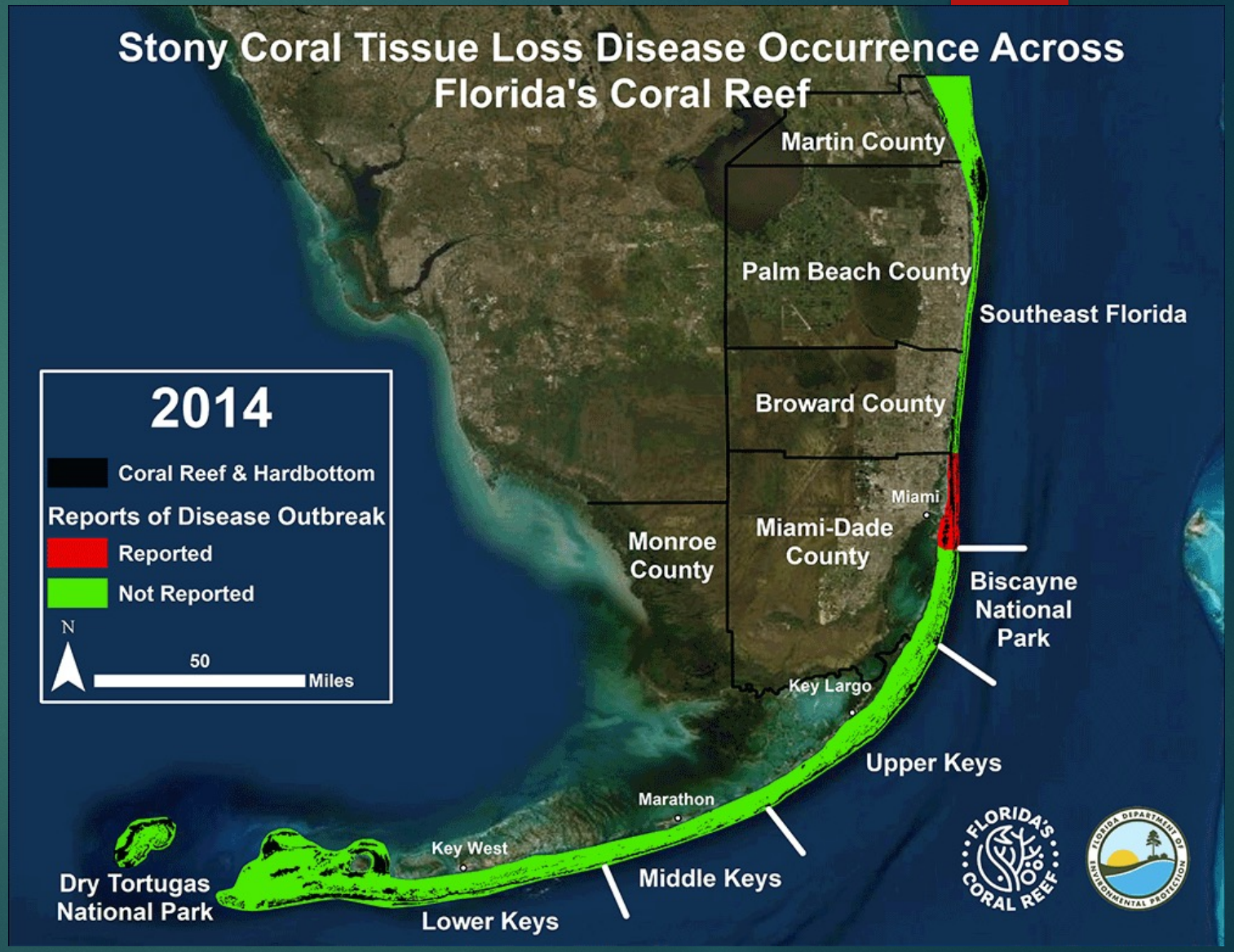
# Susceptibility of Corals to SCTLD

- Not all corals equally effected by SCTLD
- Mortality rates can be up to 94% depending on species
- Some Pacific corals from Panama have been studied – no Hawaiian corals yet
- Latest updates on susceptible corals available via AGGRA

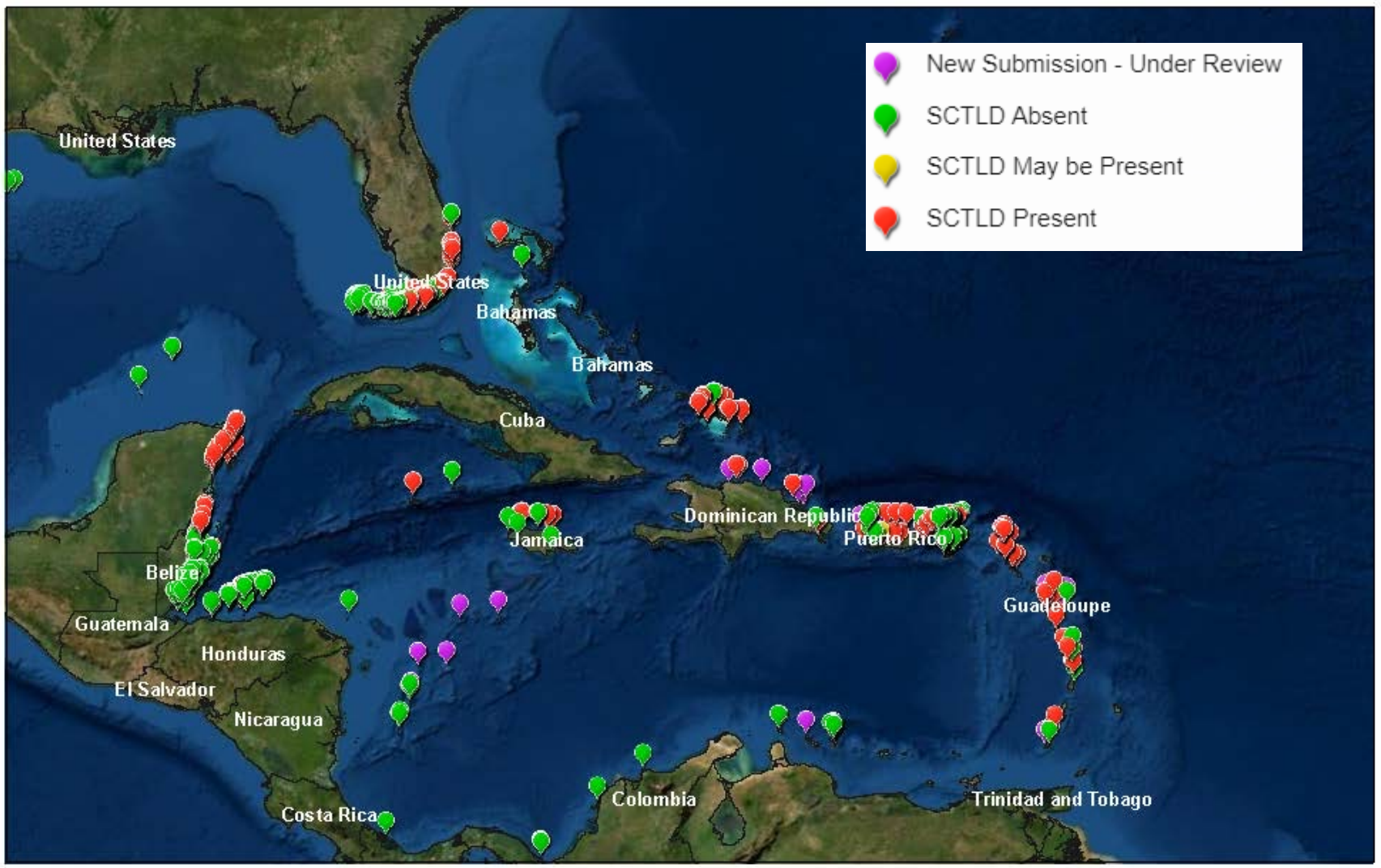
| High | Medium | Presumed | Low |
|---|---|---|---|
| Colpophyllia natans (boulder brain coral) | Orbicella annularis (lobed star coral) | Agaricia agaricites (lettuce coral) | Porites astreoides (mustard hill coral) |
| Dendrogyra cylindrus (pillar coral) | Orbicella faveolata (mountainous star coral) | Agaricia spp. (plate/saucer corals) | Porites porites (finger coral) |
| Dichocoenia stokesii (elliptical star coral) | Orbicella franksi (boulder star coral) | Mycetophyllia spp. (cactus coral) | Porites divaricata (thin finger coral) |
| Diploria labyrinthiformis (grooved brain coral) | Montastraea cavernosa (large-cup star coral) | Madracis arenterna (pencil coral) | Porites furcata (branched finger coral |
| Eusmilia fastigiata (smooth flower coral) | Solenastrea bournoni (smooth star coral) | Favia fragum (golfball coral) | Acropora palmata (elkhorn coral) |
| Meandrina meandrites (maze coral) | Stephanocoenia intersepta (blushing star coral) | Helioseris cucullata (sunray lettuce coral) | Acropora cervicornis (staghorn coral) |
| Pseudodiploria strigosa (symmetrical brain coral) | Siderastrea siderea (starlet coral) | Mussa angulosa (spiny flower coral) | Oculina spp. (bush corals) |
| Pseudodiploria clivosa (knobby brain coral) | | Scolymia spp. (disc coral) | Cladocoraarbuscula (tube coral) |
| | | Isophyllia spp. (sinuous cactus coral; rough star coral) | |

# Emergence of SCTLD

- First identified as mysterious coral disease outbreak near Miami, Florida in fall of 2014
- Has since spread throughout Florida Reef Tract and has reached the Keys and Dry Tortugas National Park



# Today




Jamaica, Mexico, St. Maarten, St. Thomas, Dominican Republic, Turks and Caicos Islands, Saint-Martin, Belize, St. Eustatius, St. John, Puerto Rico, Grand Bahamas, Grand Cayman, US and British Virgin Islands, Cayman Islands, Guadeloupe, St. Lucia, Honduras, Martinique, and Dominica

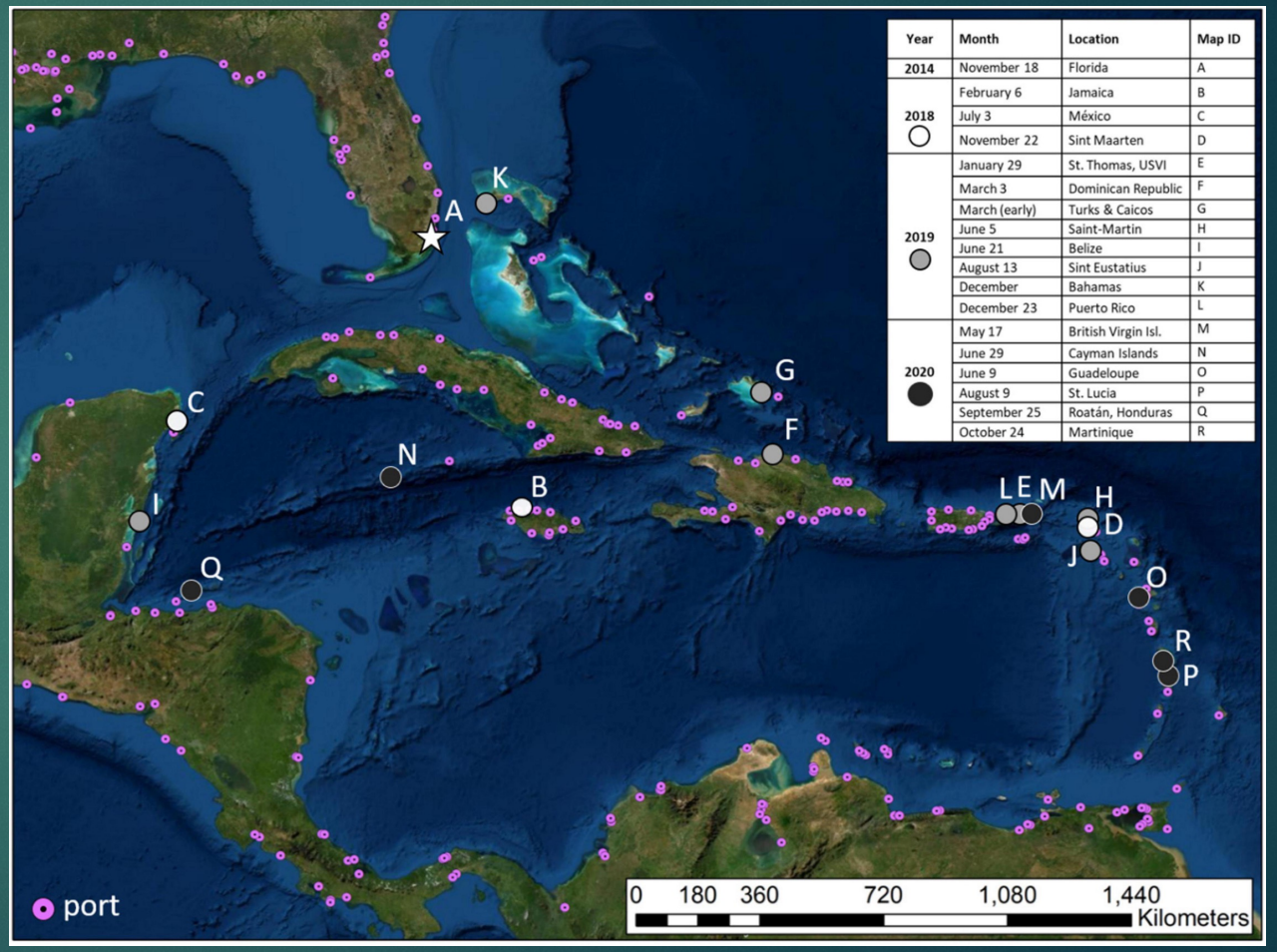
# Vectors of SCTLD Spread

- Direct contact between corals
- Contact between corals and other intermediary species
- Local water movement and ocean currents
- Reef sediments
- Equipment contaminated with SCTLD
- Ballast water
- Hull fouling?



# SCTLD and Ballast Water

- Novel emergence of SCTLD in ports indicate ballast water may be one source of spread
- Ballast water has been previously known to spread disease
- UV sterilization does not eliminate SCTLD pathogen from water



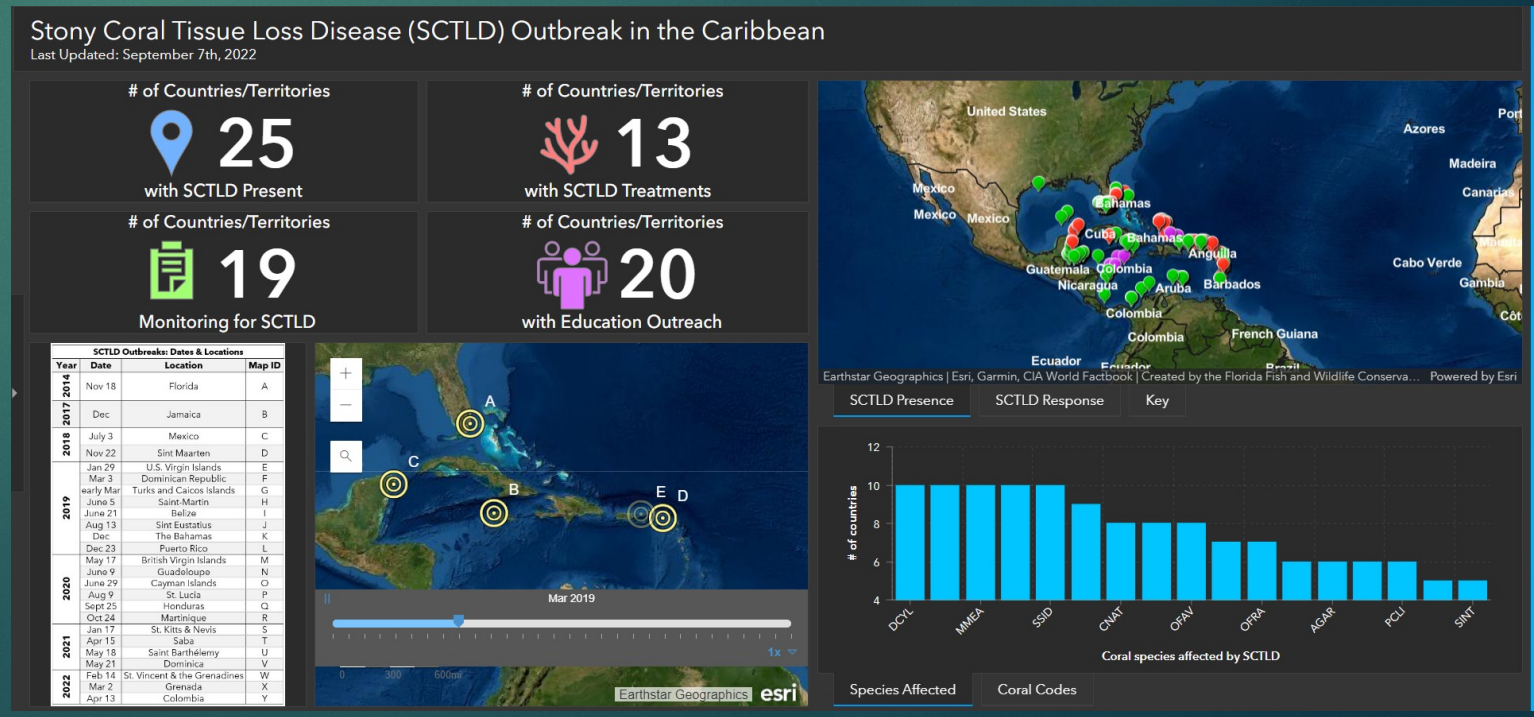

Rosenau et al. 2021

# Prevention of SCTLD

- Decontamination of dive gear, research equipment, etc.
- Monitoring and surveillance for SCTLD – catch it early
- Regulation of vessel traffic – ballast water & potentially hull fouling

# Collaboration Against SCTLD

- Huge international collaborative effort between U.S. States and Territories and other Caribbean countries
- 100s of scientists conducting research on prevention, intervention and progression of the disease
- Over 2000 corals rescued in Florida and sent across the US
- Resources available to the Pacific if SCTLD arrives



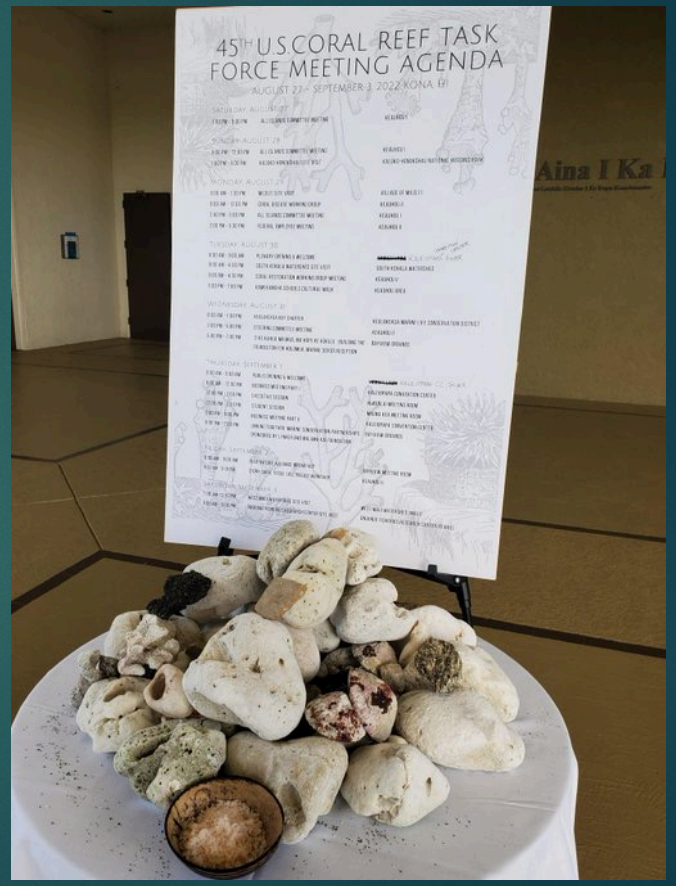
# Intervention Against SCTLD

- Many treatments have been tried – amputation, culling, chlorine, probiotics, antibiotics, and coral removal/rescue
- Most effective so far are antibiotic application and coral rescue, though studies are ongoing
- Antibiotics are costly, don't prevent disease, and may have future side effects
- Coral rescue is very labor intensive

Source: Reuters

# Current Hawai‘i Actions Against SCTLD

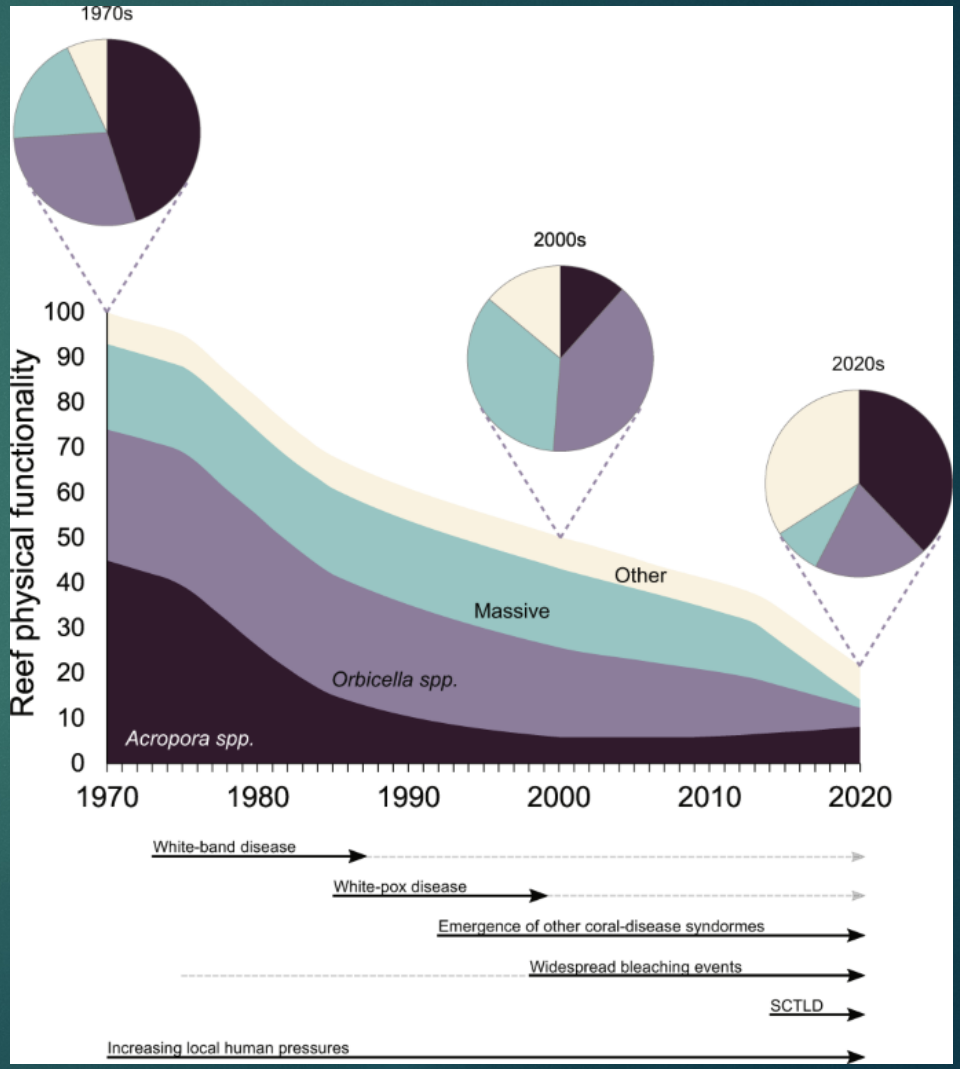
- Learning from Florida and the Caribbean to formulate a plan and prepare Hawai‘i
- Collaborating with Pacific territories on preparedness and prevention
- Increasing capacity for response
- DAR is exploring emergency rulemaking for vessels traveling to Hawai‘i from SCTLD-affected areas



# Reminder: Best Action is Prevention!

- Caribbean reefs have seen massive decline in coral populations, and dramatic shifts in reef structure
- Response has been expensive and extremely time consuming

**Physical functionality of Caribbean reefs based on temporal trends (Alvarez-Filip et al. 2021)**



# Prevention in Hawai‘i

- Total estimated value of the main Hawaiian Islands reefs is $33.6 billion
- Hawaiian reefs provide 7 million meals via nearshore fisheries
- Also provide cultural, social, recreational, biological and ecological value
- Intervention and restoration are expensive and do not guarantee reefs will recover

# Questions?

Contact Me:


Lizzy Monaghan

Aquatic Biologist IV, Division of Aquatic Resources

Ballast Water and Biofouling Coordinator

elizabeth.a.monaghan@hawaii.gov


Hawai'i Division of Aquatic Resources