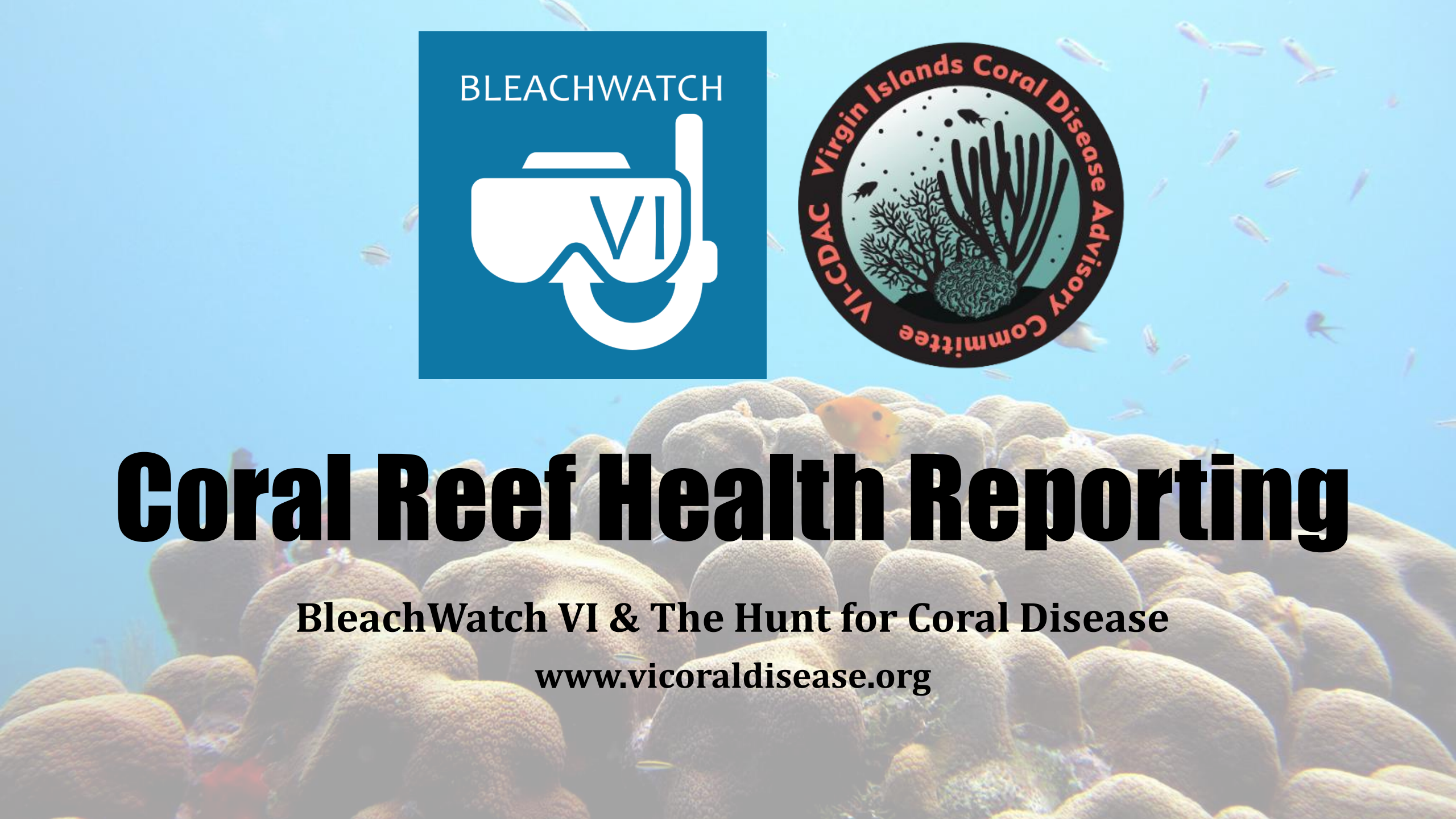


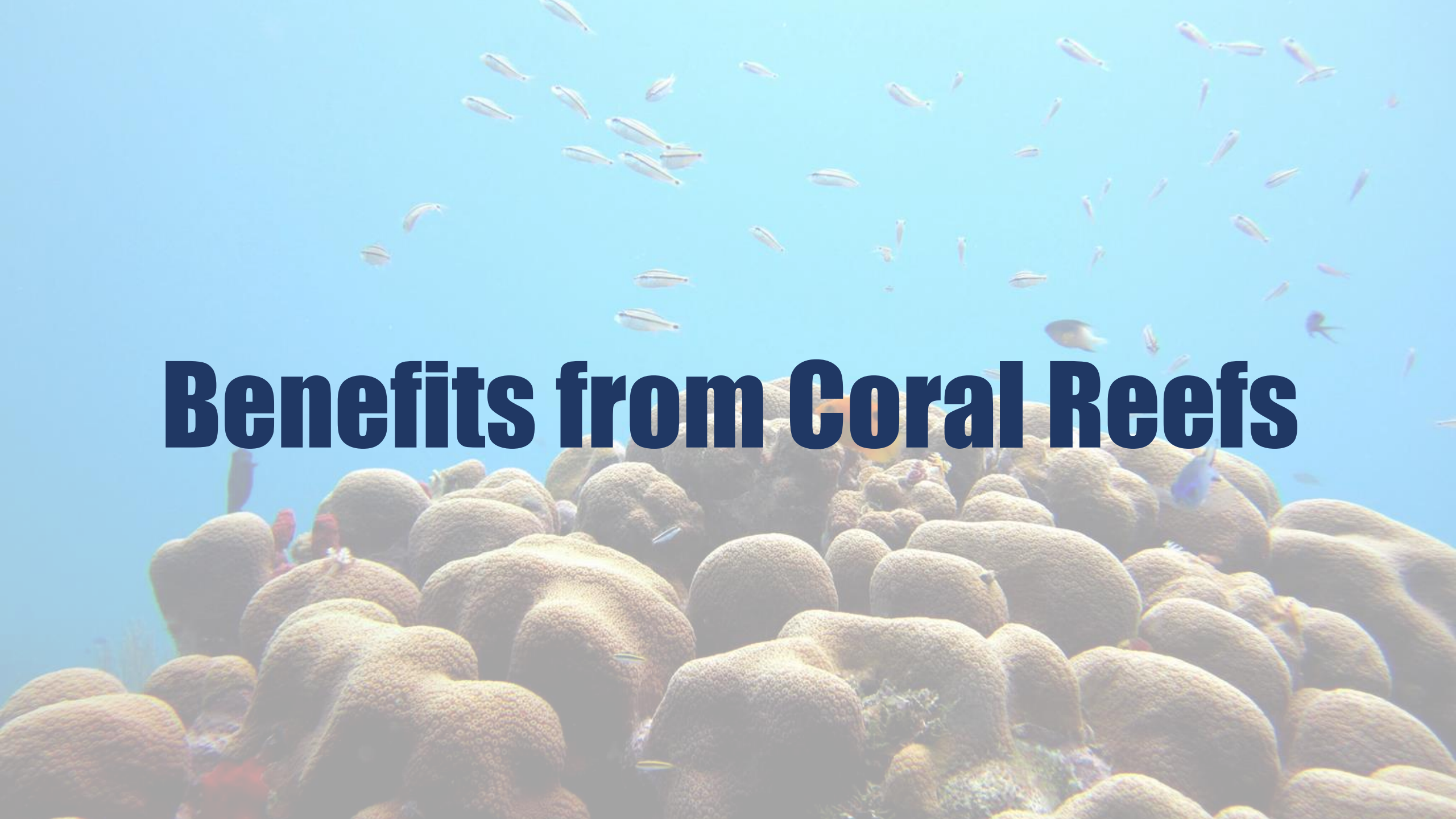
Coral Reef Health Reporting

BleachWatch VI & The Hunt for Coral Disease

www.vicoraldisease.org

Overview

- Why are coral reefs important?
- Why are coral reefs threatened?
- What is a coral?
- What is coral bleaching?
- What is coral disease?
- How can you help?
- Report what you see!



Benefits from Coral Reefs

Coral Reefs are Integral to the U.S. Virgin Islands


Photo by Lee Foster

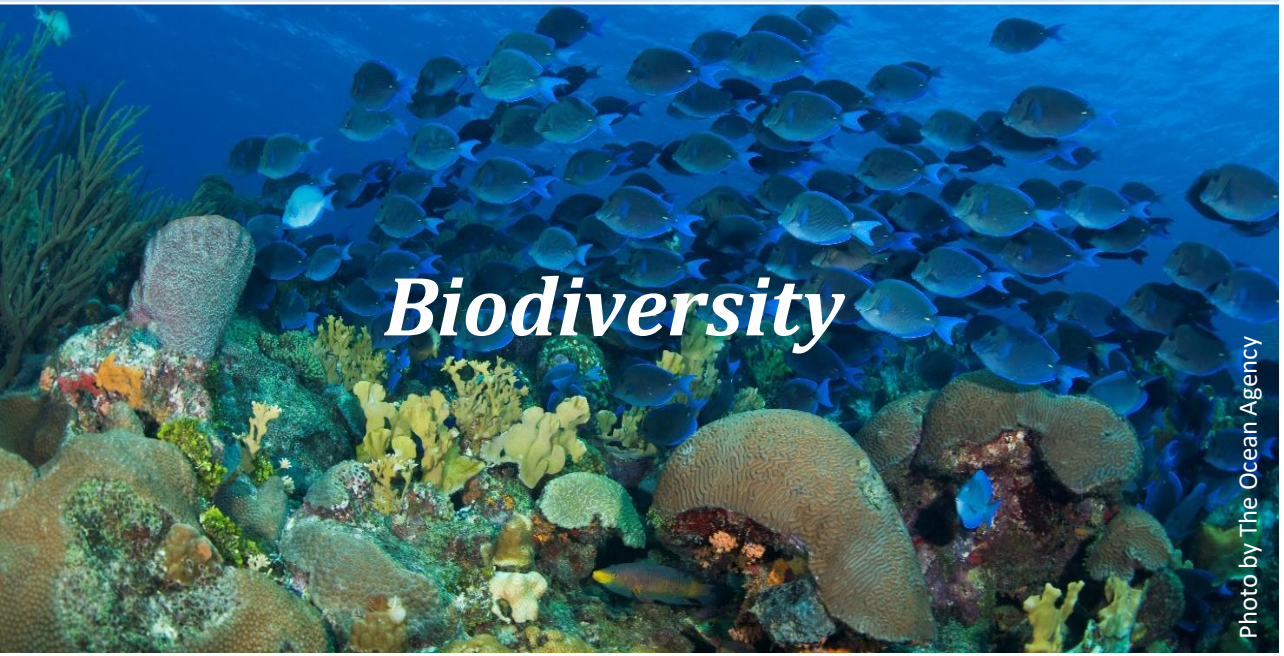

Photo by Vance Evans


Photo by Bevan Springer


Photo by Sydney Solis


Photo by Shore Thing USVI

Why are coral reefs important?



Threats to Coral Reefs

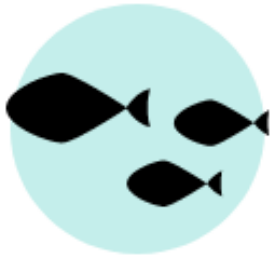
THREATS TO CORAL REEFS

RECREATION

Some divers and snorkelers touch or kick corals, causing damage. Boat groundings and anchoring cause lasting damage to coral reefs.

HURRICANES

Powerful storms, like hurricanes, cause big waves and swells. Warming oceans lead to stronger and more frequent storms.



OVERFISHING

Heavy fishing pressure leads to the loss of keystone herbivorous species, like parrotfish, on coral reefs.

LAND-BASED POLLUTION

Runoff from roads and hillsides leads to excess sediments in the water that can smother coral reefs.

CLIMATE CHANGE

Increasing ocean temperatures cause more frequent bleaching events. Increased acidification weakens coral structures.

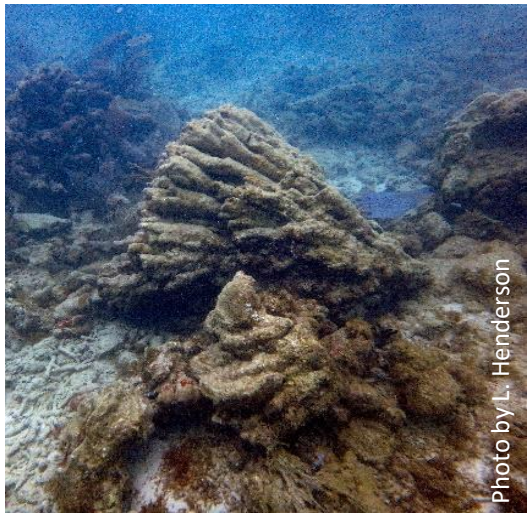


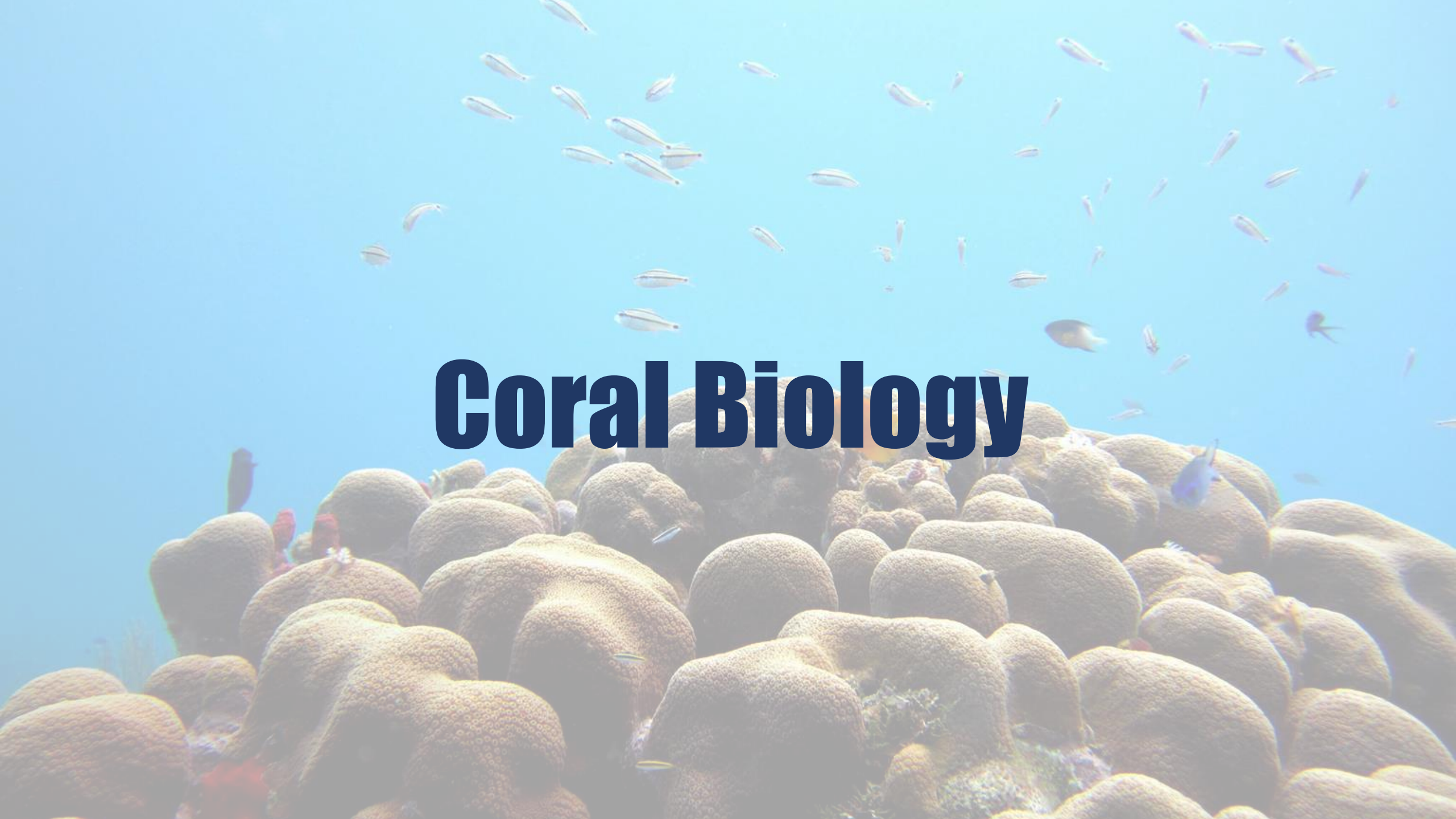
Photo by L. Henderson

Why are coral reefs in danger?

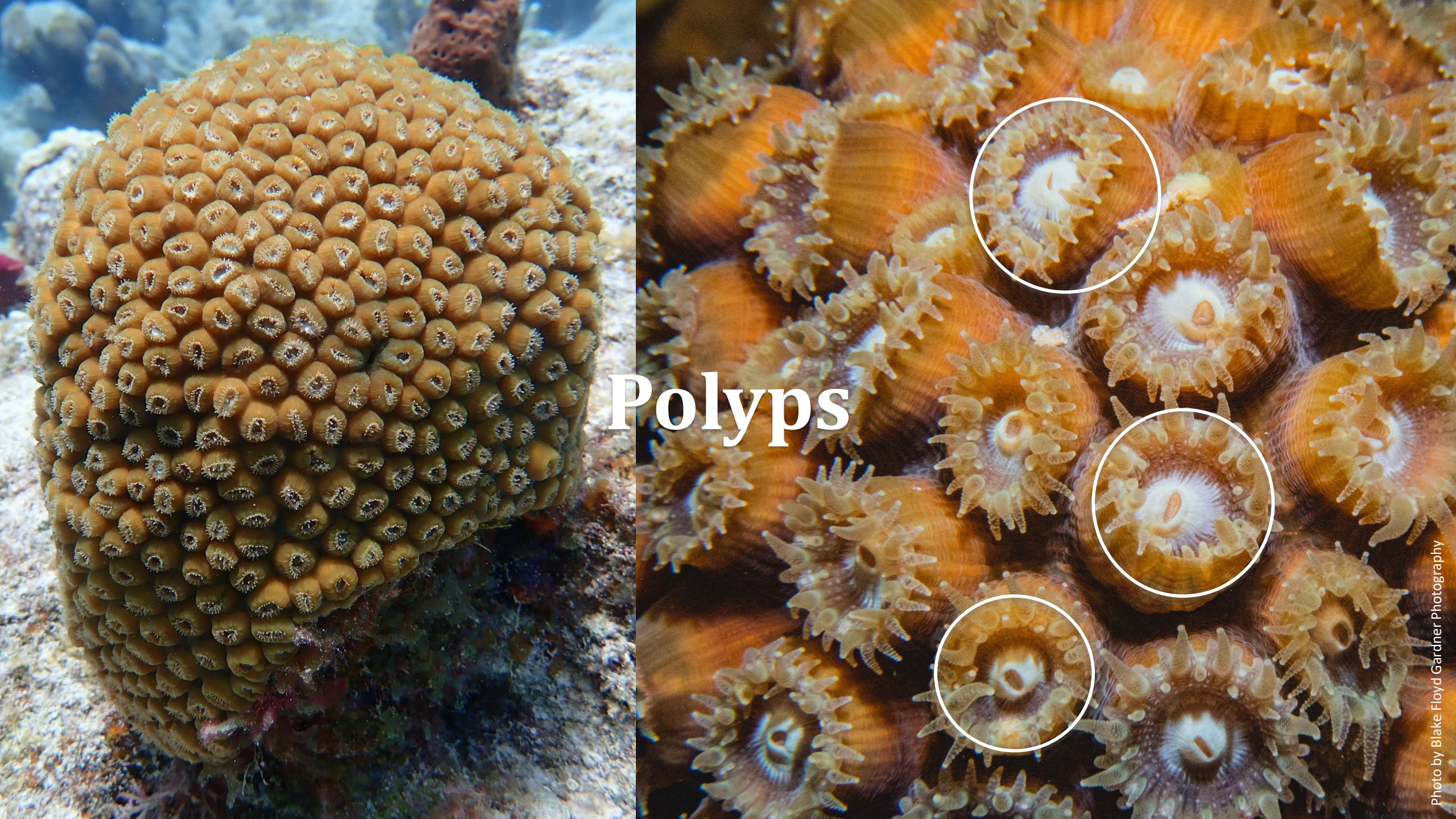
Bleaching

Disease

A four meter Pillar Coral (Dendrogyra cylindrus) affected by the Stony Coral Tissue Loss Disease. Colombia reef, Cozumel, Mexio. Photos: Lorenzo Alvarez-Filip / barcolab.org



Coral Biology


Polyps
Photo by Blake Floyd Gardner Photography


Colony

Photo by Blake Floyd Gardner Photography

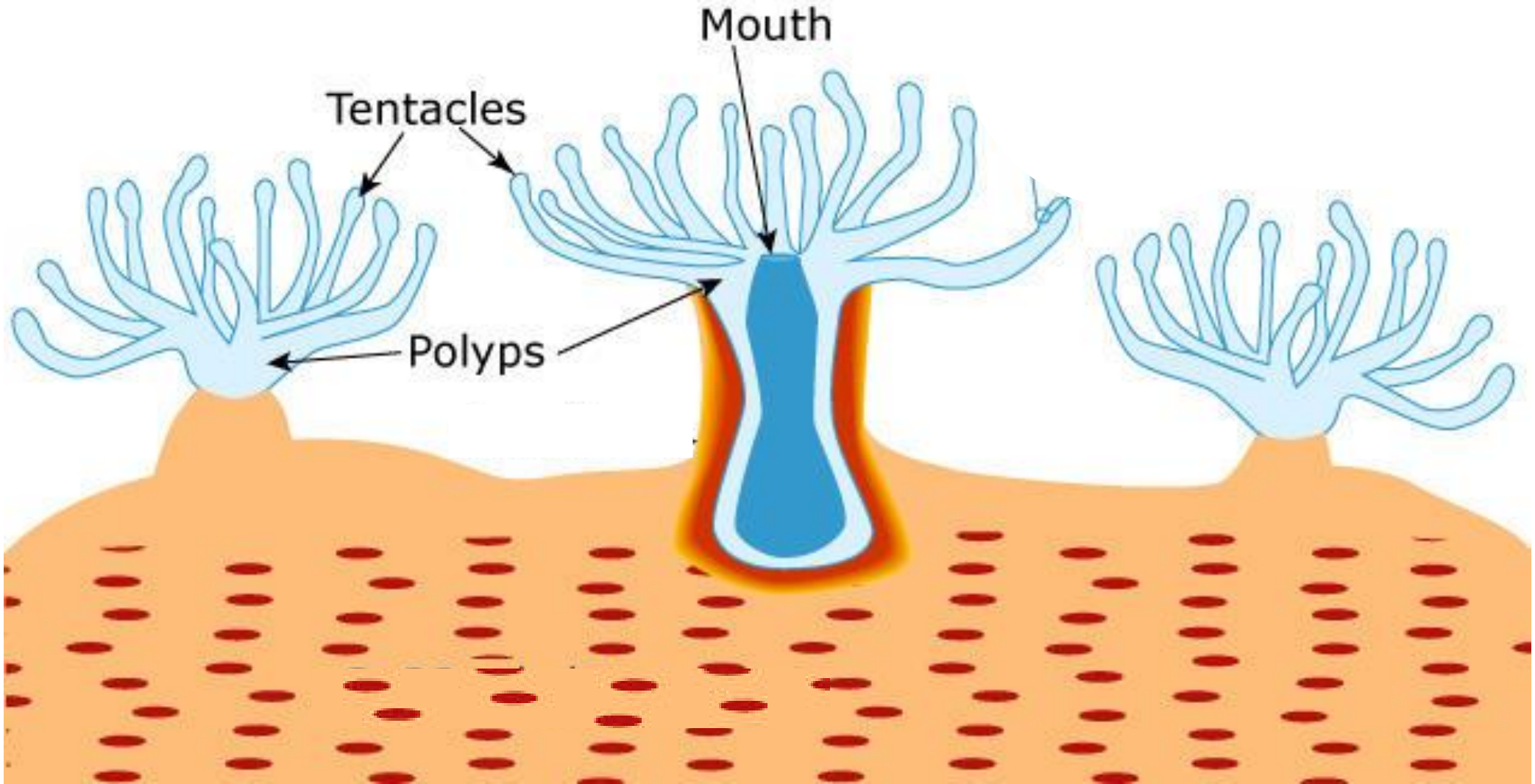
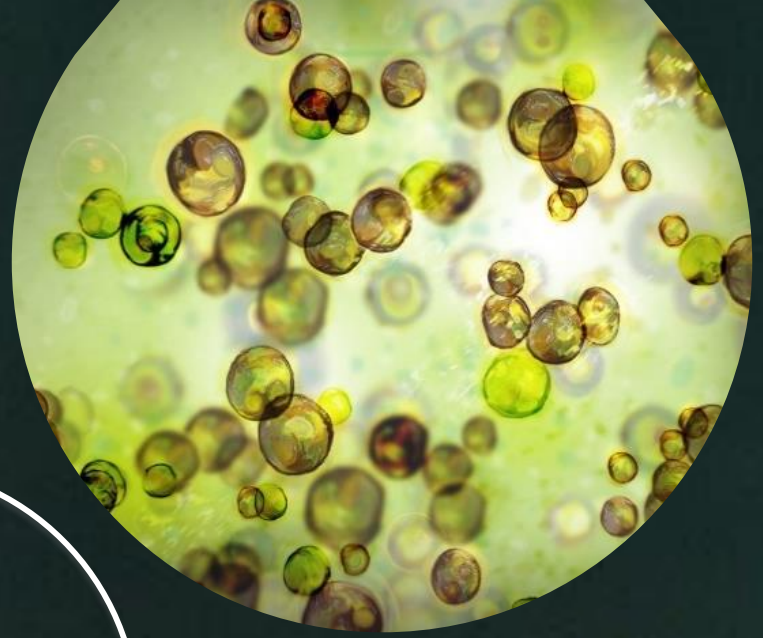

Mouth
Tentacles
Polyps

Photo by Hugh Whyte

zooxanthellae!



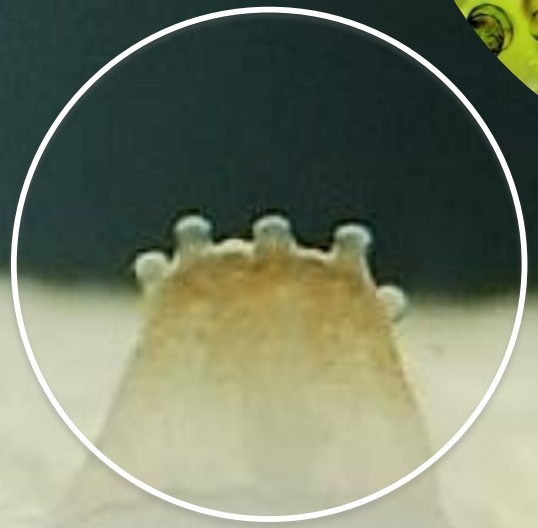
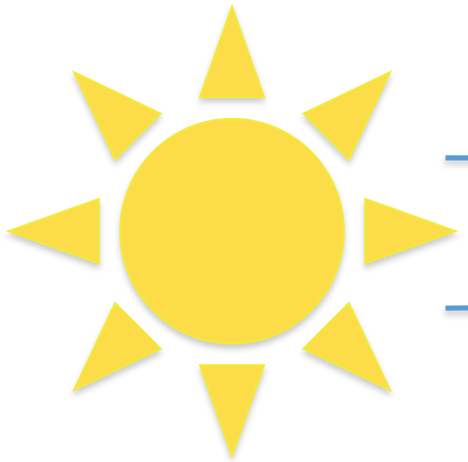
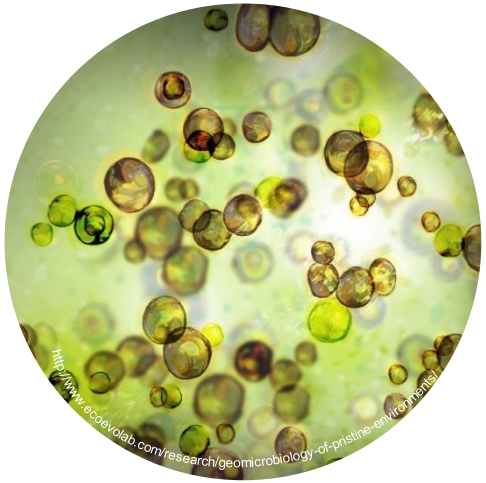


Photo by A. Lillis

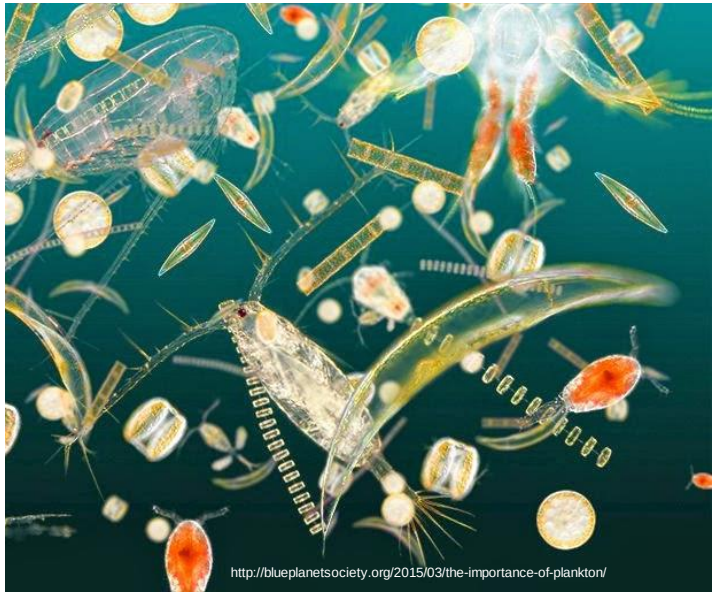
Symbiotic Relationship





zooxanthellae

polyps



Coral Bleaching

HEALTHY CORAL

1 Coral and algae depend on each other to survive.

Corals have a symbiotic relationship with microscopic algae called zooxanthellae that live in their tissues. These algae are the coral's primary food source and give them their color.

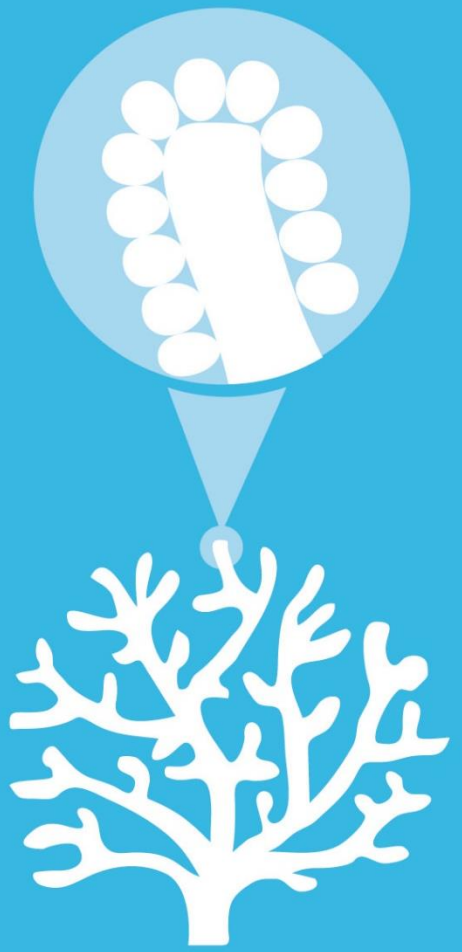
STRESSED CORAL

2 If stressed, algae leaves the coral.

When the symbiotic relationship becomes stressed due to increased ocean temperature or pollution, the algae leave the coral's tissue.

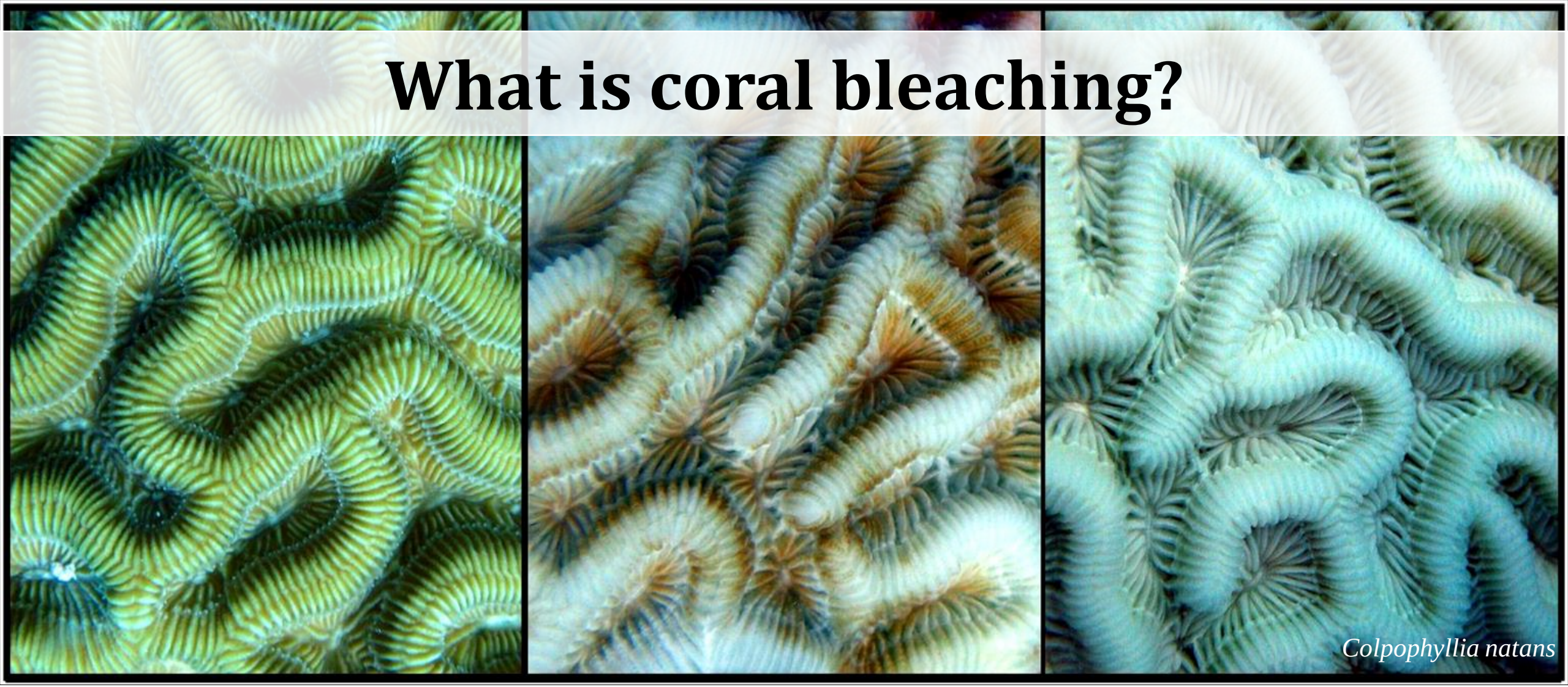
BLEACHED CORAL

3 Coral is left bleached and vulnerable.



Without the algae, the coral loses its major source of food, turns white or very pale, and is more susceptible to disease.

What is coral bleaching?

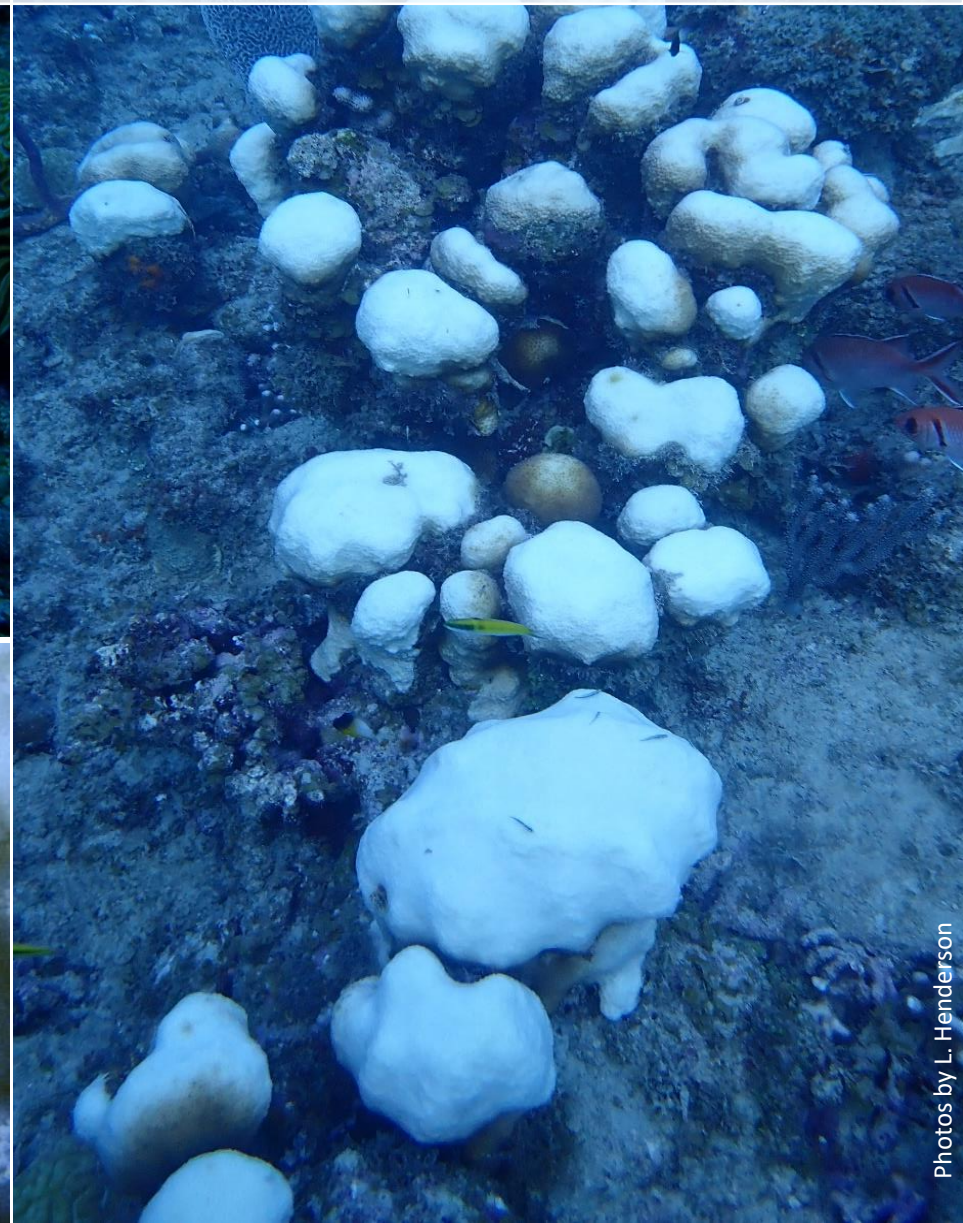


Healthy

Paling

Bleached

Examples of Bleaching/Paling

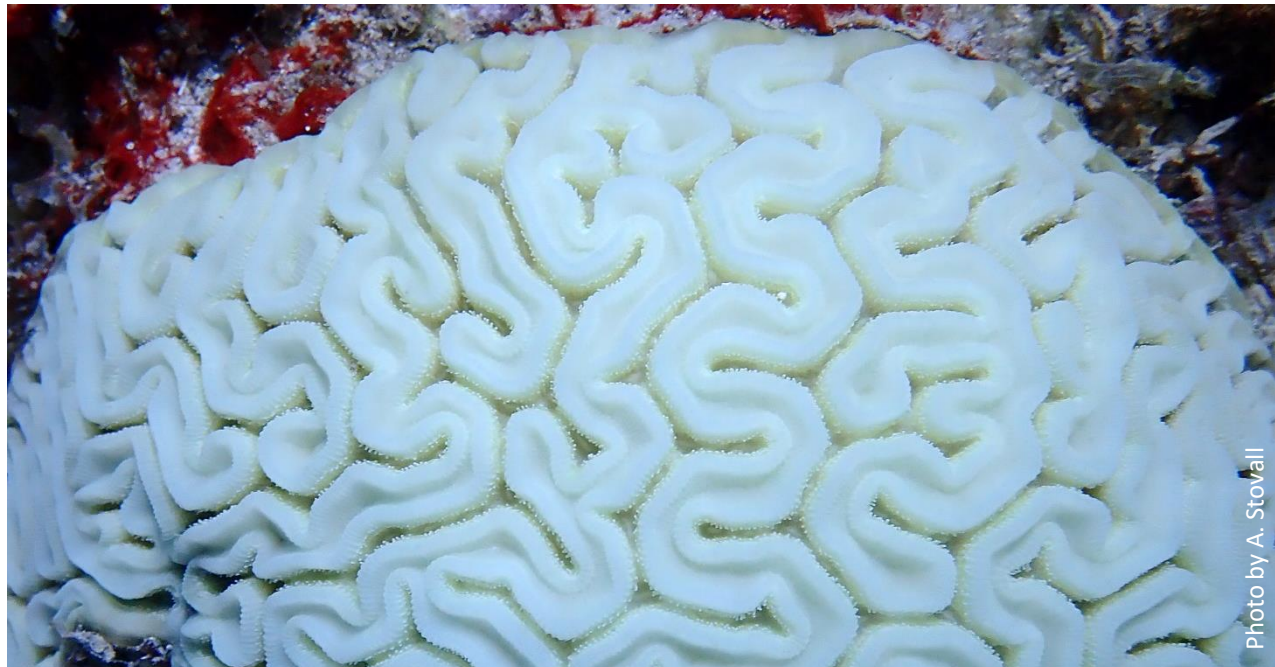


Photos by L. Henderson

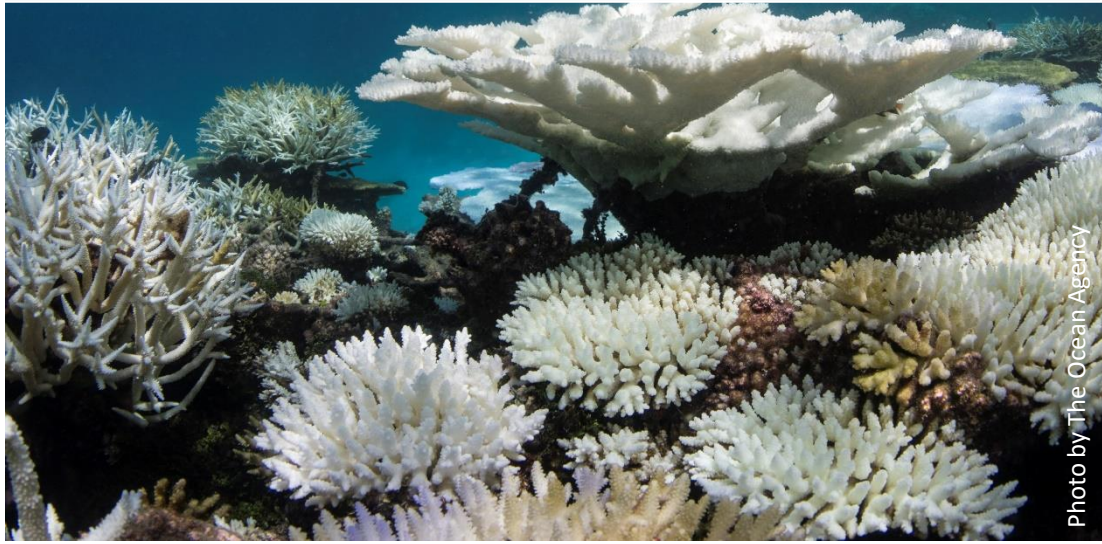
Tissue Loss vs. Bleaching

No Polyps/Tissue = Tissue Loss

With Polyps/Tissue = Bleaching



Mass Bleaching Events



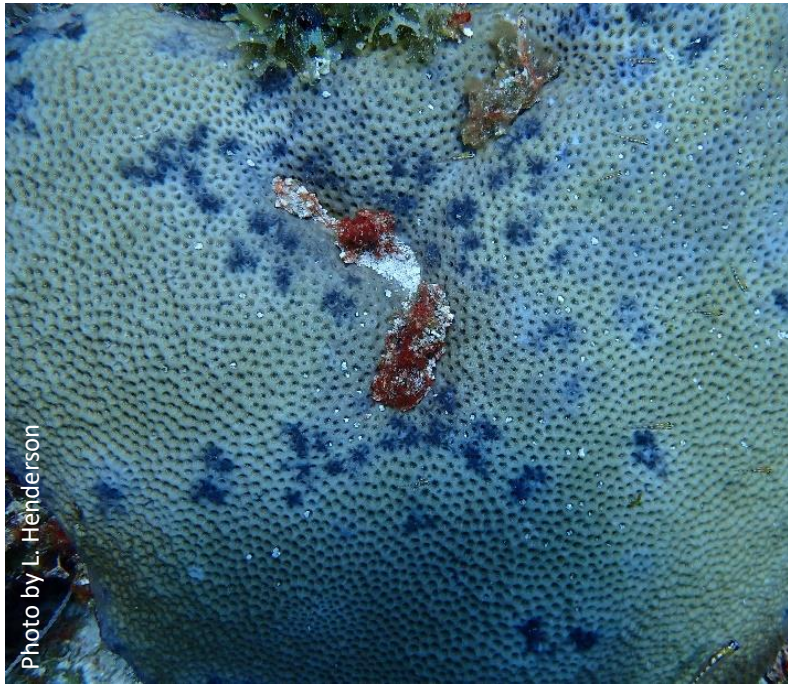
Coral Disease

Coral Disease 101

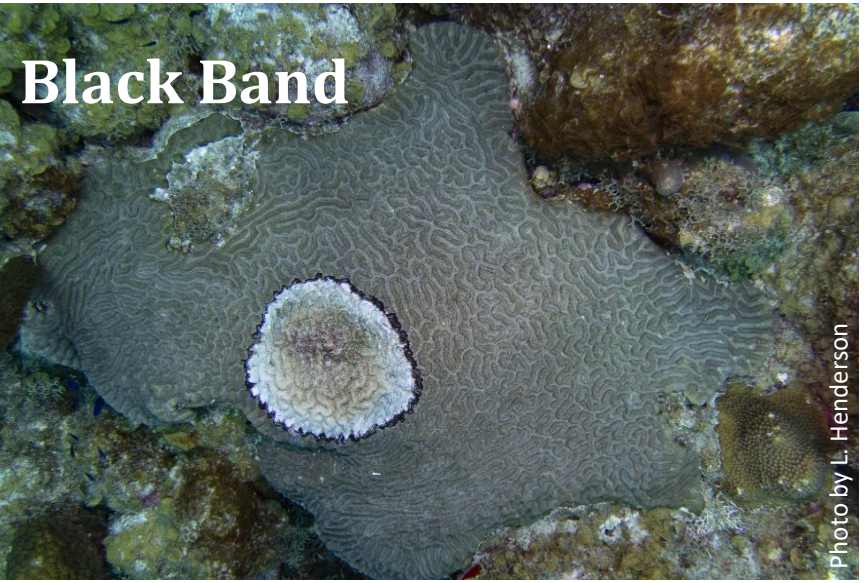
- Coral diseases are a natural part of the coral ecosystem
- The study of coral diseases dates back to the 1970s and, since then, the Caribbean has become a hotspot for coral disease
- The recent (within the last 50 years) emergence of coral diseases throughout the Caribbean appears to be unprecedented over a millennial time scale (>3800 yr)
- Coral diseases have the ability to dramatically impact reefs and significantly contribute to reef deterioration
- We still do not know much about many diseases; most diseases are named based on their outward presentation on affected corals

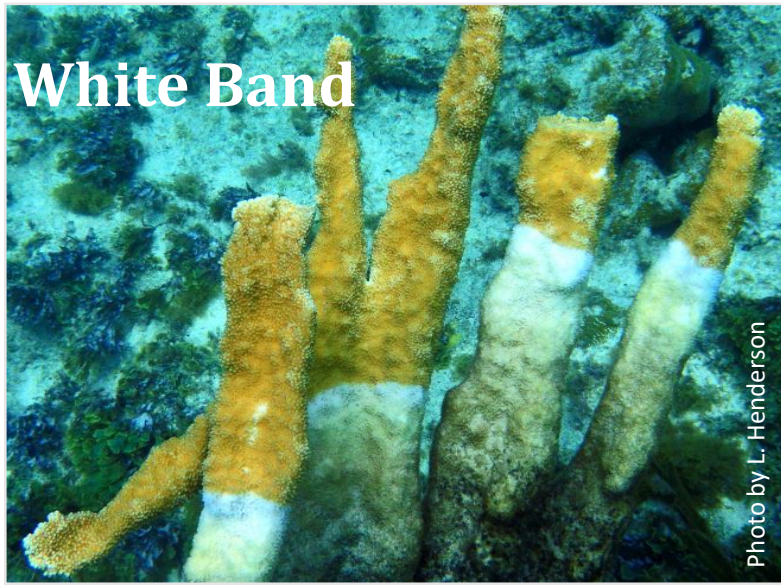
Traditional Criteria Used to Separate Diseases

- Color of affected tissue (lighter/darker/discoloration)
- Presence & color of visible microbial band or mat
- Shape of the lesion
- Pattern of tissue loss
- Rate of tissue loss
- Presence of bleached areas
- Species affected



Common Hard Coral Diseases

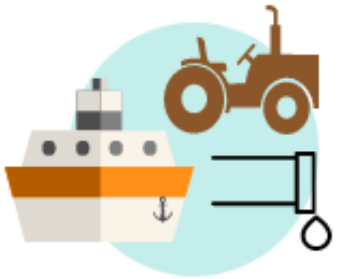




CAUSES OF CORAL DISEASE OUTBREAKS

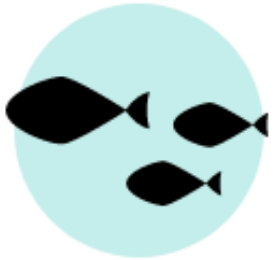
SEDIMENTATION

Extant bacteria often reside in sediment layers on the seafloor. Large vessels and strong storms can disrupt settled sediments, introducing new or high levels of existing bacteria that cause disease.



HUMAN ACTIVITIES

Dredging, contamination by moving vessels exchanging ballast water, and runoff from changes in land use can throw coral ecosystems out of balance and cause surges in disease.



OVERFISHING

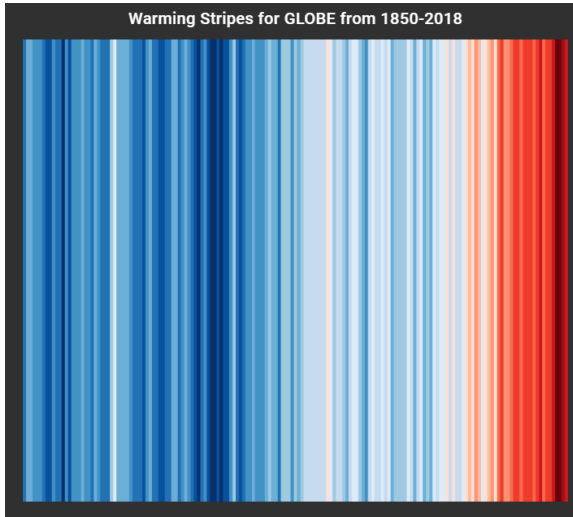
Overfishing can disrupt coral reef ecosystems and cause unbalanced levels of algae, bacteria, coral and fish, putting corals at risk of contracting disease.

LAND-BASED POLLUTION

Runoff of toxic chemicals and pollutants can have devastating impact on coral reefs, threatening corals' immune systems, making them more vulnerable to disease.

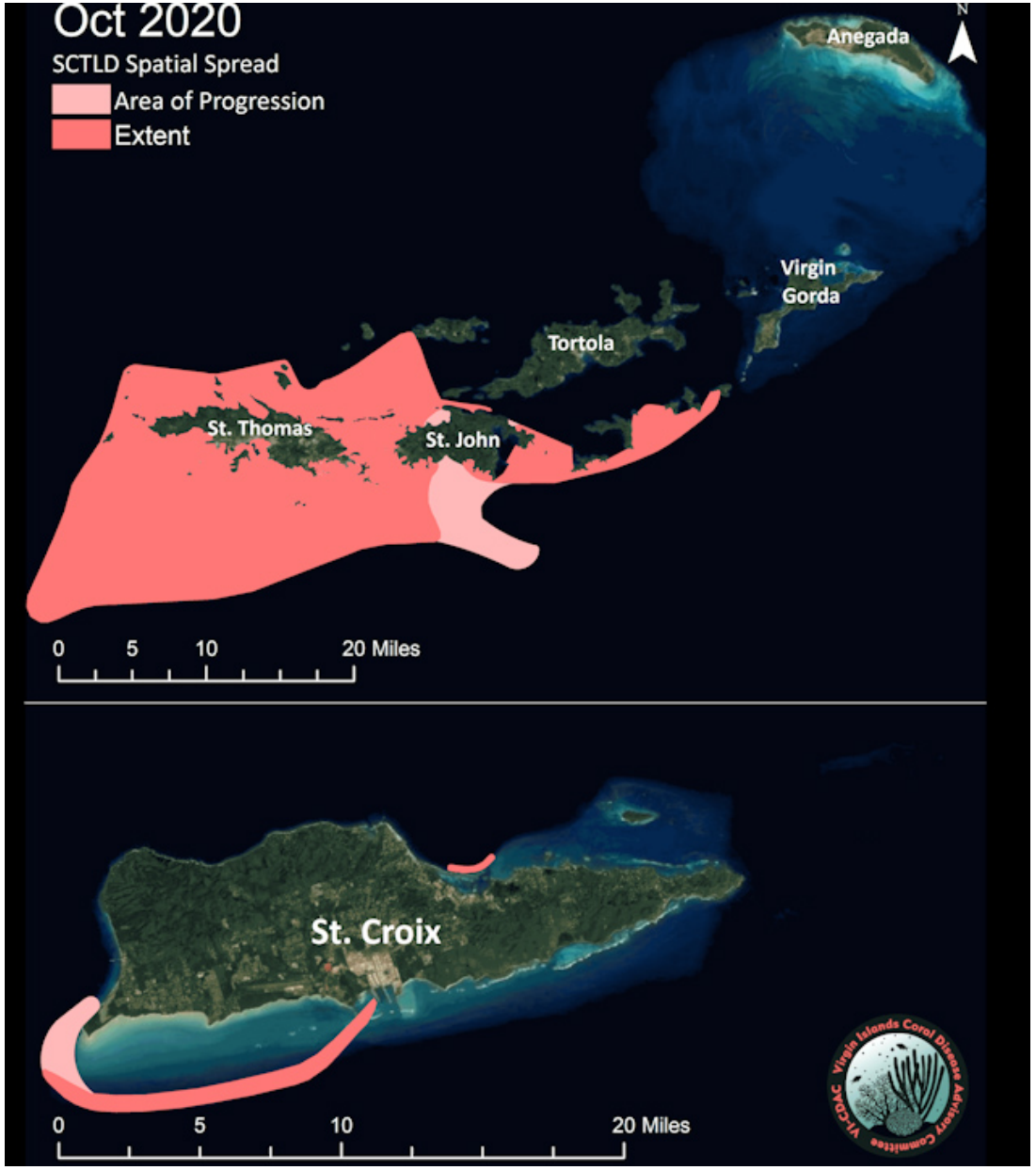
CLIMATE CHANGE

Increasing ocean temperatures cause corals to bleach, , threatening their immune systems and making them more susceptible to disease.



Stony Coral Tissue Loss Disease (SCTLD)

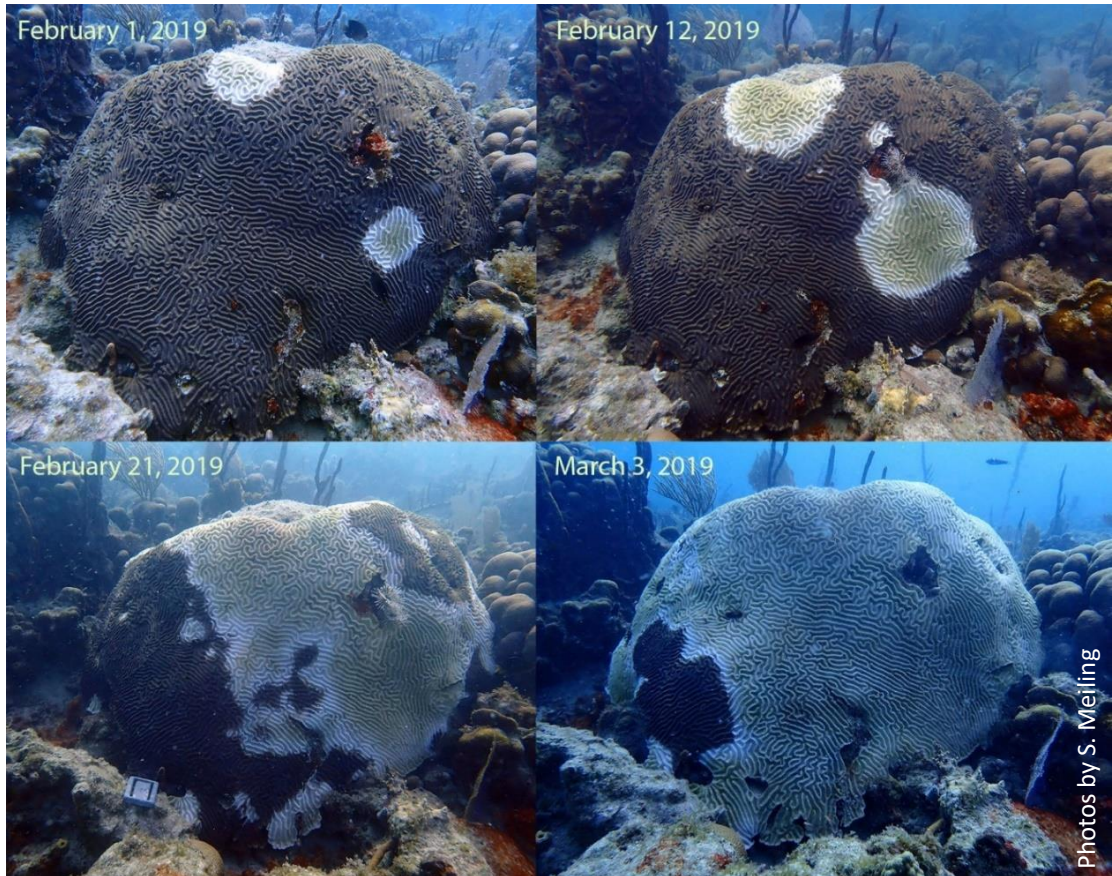
Stony Coral Tissue Loss Disease in the USVI



Video by M. Brandt

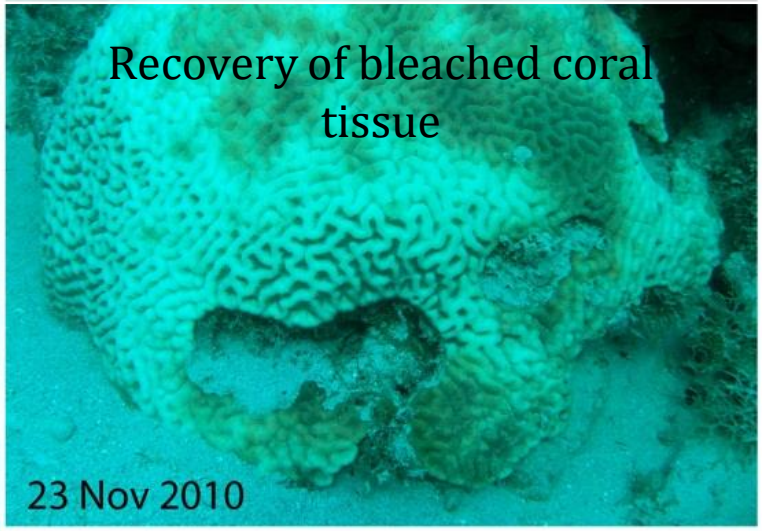
Characteristics of SCTLD

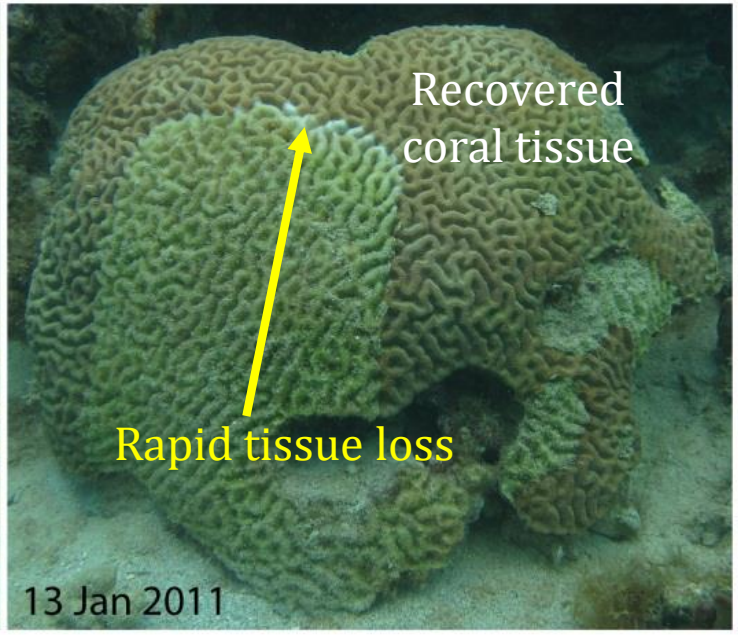
- Highly infectious, transmissible through water
- Appears as multifocal, fast moving lesions
- Affects 26 species of hard (Stony) corals
- Rapid spread at individual coral and reef level
- > 90% mortality rate of infected corals



Tissue Loss vs. Bleaching

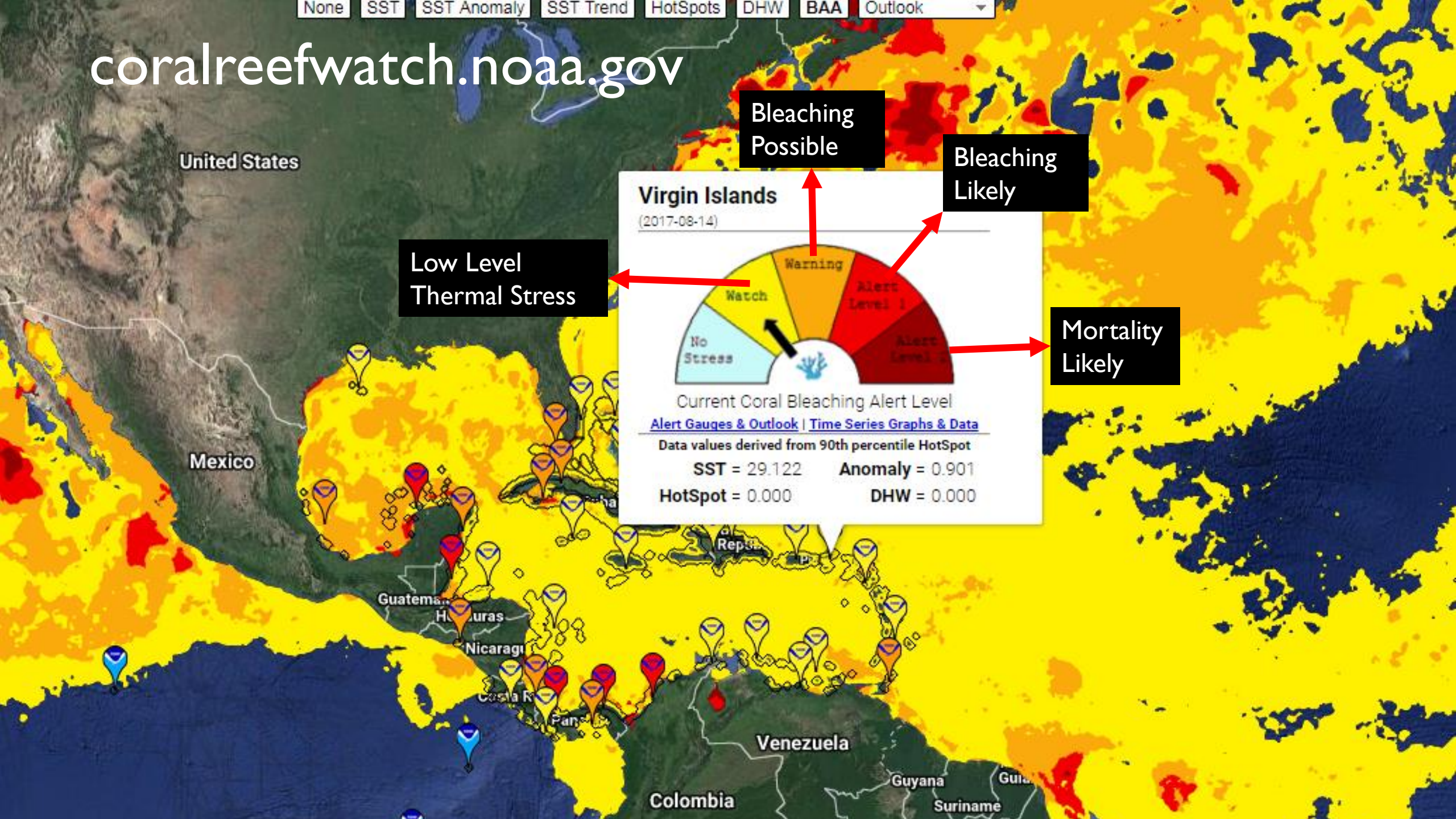
A coral can recover from bleaching, it does not recover from tissue loss.



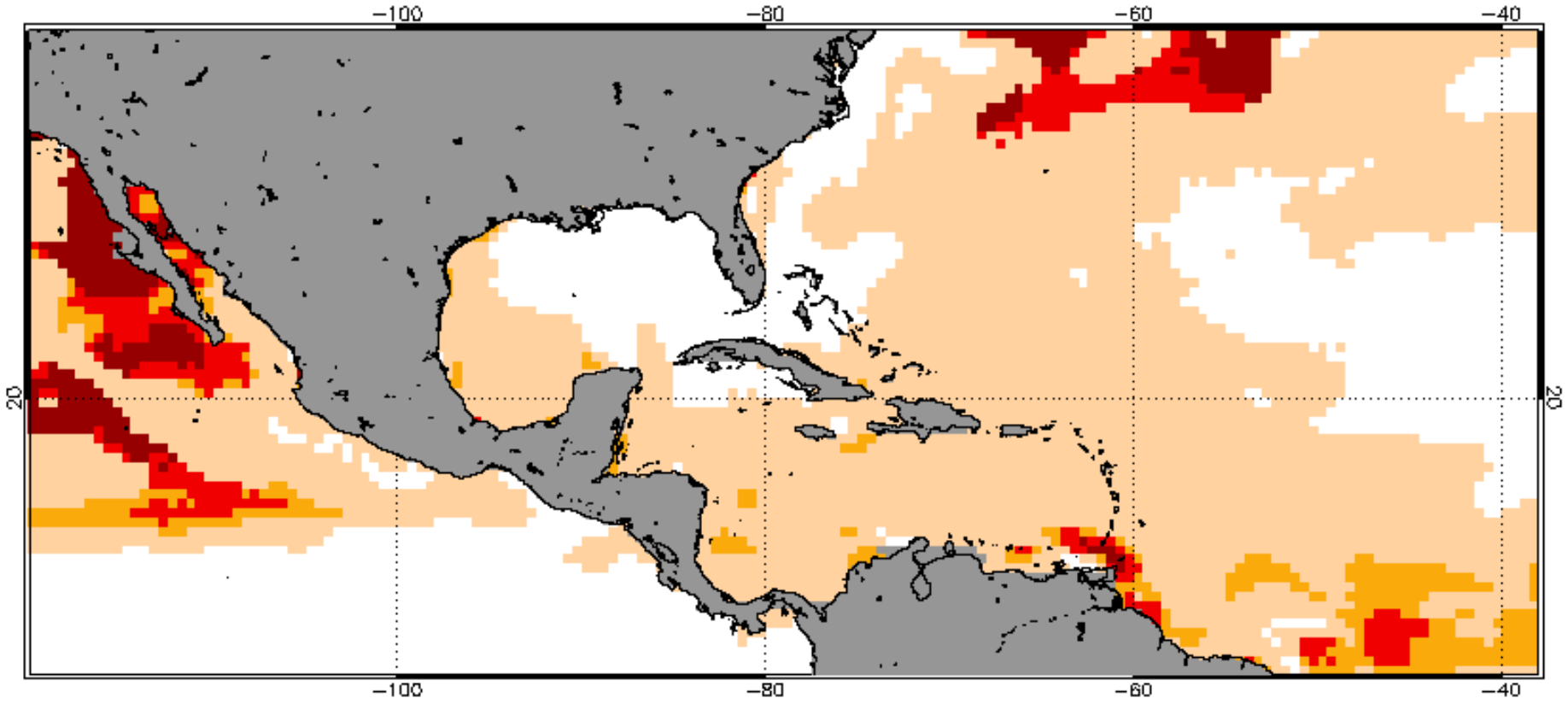


Slide by M. Brandt

Tracking Bleaching & Disease


None
SST
SST Anomaly
SST Trend
HotSpots
DHW
BAA
Outlook
coralreefwatch.noaa.gov
Bleaching Possible
Bleaching Likely
Low Level Thermal Stress
Mortality Likely
Virgin Islands
(2017-08-14)
No Stress
Watch
Warning
Alert Level 1
Alert Level 2
Current Coral Bleaching Alert Level
Alert Gauges & Outlook | Time Series Graphs & Data
Data values derived from 90th percentile HotSpot
SST = 29.122
Anomaly = 0.901
HotSpot = 0.000
DHW = 0.000
United States
Mexico
Venezuela
Colombia
Guyana
Suriname

2018 Sep 11 NOAA 90% Probability Coral Bleaching Heat Stress for Sep–Dec 2018
Experimental, v5.0, CFSv2–based, 28 to 112 Ensemble Members



No Stress	Watch	Warning	Alert Level 1	Alert Level 2
	Low level thermal stress	Bleaching Possible	Bleaching Likely	Mortality Likely

Reef damage and debris from after the 2017 hurricane season:

USVI Disease Response

Slide by M. Brandt

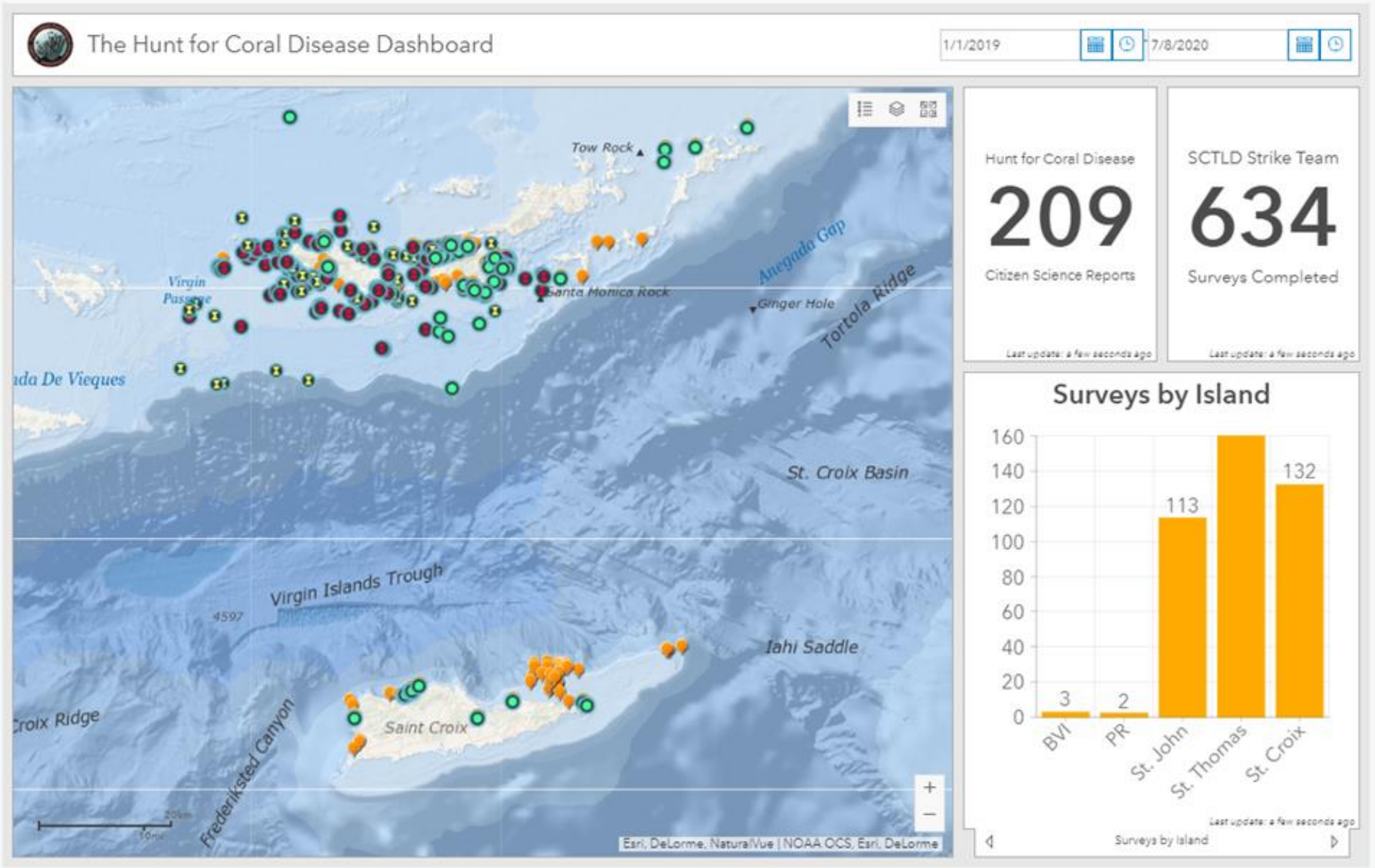
SCTLD Strike Teams

- Integral part of the Virgin Islands response to SCTLD
- Conduct reconnaissance missions to search for SCTLD presence
  - Roving diver surveys to record coral impairments and presence of highly susceptible species
- Perform interventions to treat SCTLD and reduce SCTLD load on reefs
  - Coral amputations, culling and antibiotic treatments


Photo by Blake Floyd Gardner Photography


Photo by N. Holloway

Coral Health Tracking



BLEACHWATCH VI

+

VI-CDAC Virgin Islands Coral Disease Advisory Committee

How You Can Help

Be a part of the solution

to save *our* **coral reefs**.

1

Fight Climate Change.

2

Reduce local stress on reefs.

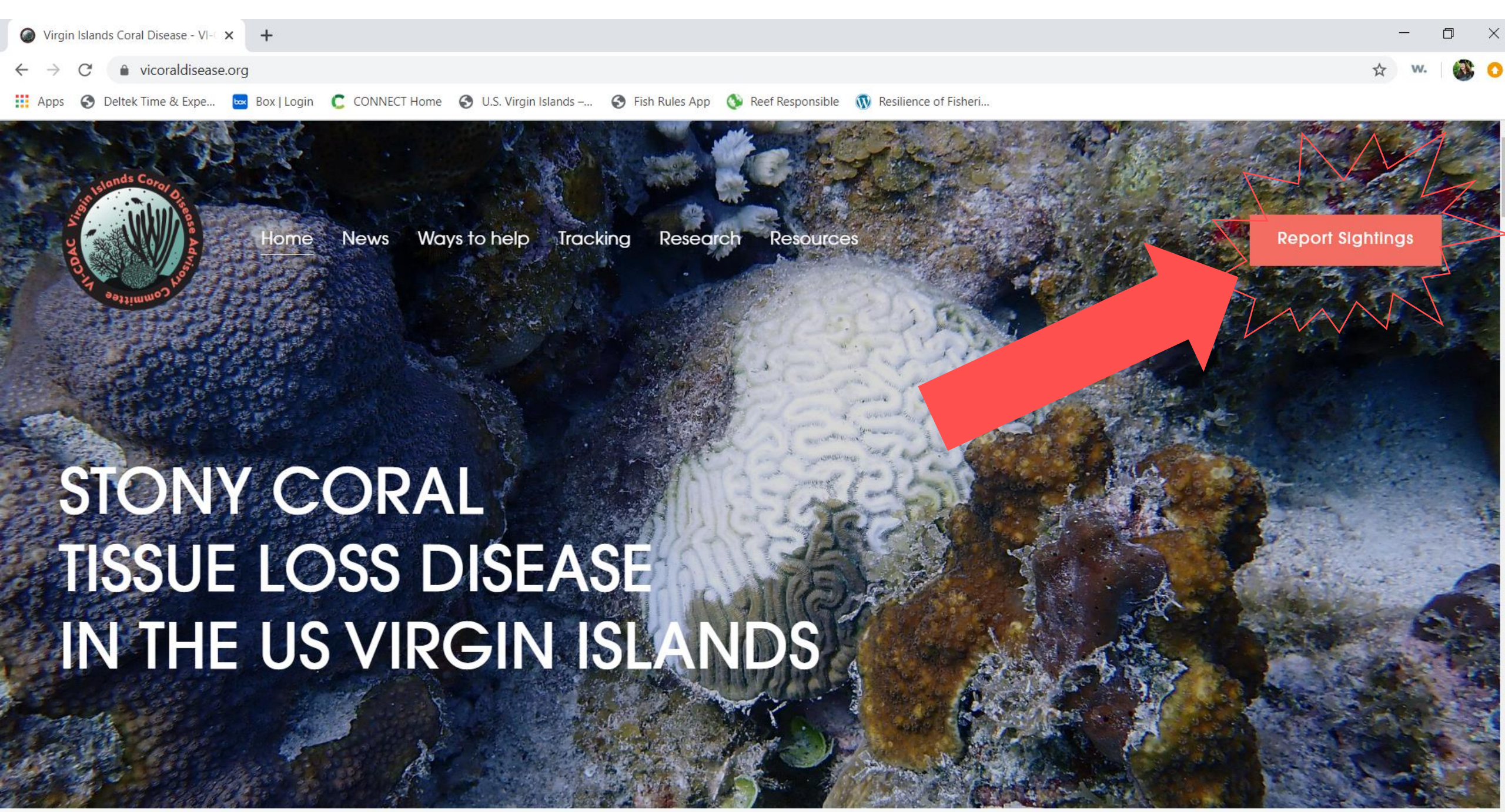
3

Volunteer!

We need YOUR eyes on the reef!

Submit reports about coral reef health

1. Submit reports and photos of weird or unhealthy corals and healthy reefs to www.vicoraldisease.org
2. Experts will check your photos and confirm whether disease or bleaching was present or not.
3. Your observation will then be posted on the map at vicoraldisease.org under “Tracking”
4. Trained divers are then sent to evaluate and possibly treat the affected coral reef areas.


Virgin Islands Coral Disease - VI-
vicoraldisease.org
Apps
Deltek Time & Expe...
Box | Login
CONNECT Home
U.S. Virgin Islands –...
Fish Rules App
Reef Responsible
Resilience of Fisheri...
VI-CDAC Virgin Islands Coral Disease Advisory Committee
Home
News
Ways to help
Tracking
Research
Resources
Report Sightings
STONY CORAL
TISSUE LOSS DISEASE
IN THE US VIRGIN ISLANDS

Virgin Islands Coral Disease - Vi | Coral Health Report

survey123.arcgis.com/share/9838819b5e1748448297255f6fd1a183

Apps | Deltek Time & Expe... | Box | Login | CONNECT Home | U.S. Virgin Islands –... | Fish Rules App | Reef Responsible | Resilience of Fisheri...

Coral Health Report

Help us map coral disease!
Fill out one form per dive site and include photos and descriptions of any white spots on coral or areas that look like they are unhealthy. Each submission can have up to three photos, if you have more you can submit another survey or provide a link to a shared folder in the notes!

Para instrucciones en español, haz clic aquí.

Closest Island

- STT
- STX
- STJ
- PR
- Other

Dive Date

6/11/2020

Name(s)*

Put down the names of any divers or snorkelers with you at this site!

Carrie Coral

Your Email*

We may use this in the future to let you know about Reef Resilience events!

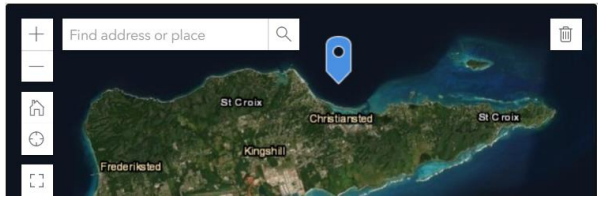
carrie.coral@gmail.com

Dive Site Name

The Ledge

Location of Dive*

Please mark the location of your dive!



Notes on Observations

Let us know any specifics about the area or what you saw! You can list species if you know them, or just tell us about the reef habitat at this location.

Disease identification: It is not necessary for you to be an expert to make a report. Identifying coral disease is very difficult. Many diseases look alike and are difficult to distinguish from predation or other afflictions. We only ask for your best description or photos. Your eyes on the reef are critical to this mission. We will follow up with you for more details if necessary.

I saw lots of maze corals, everything was healthy!
There were a couple corals with white, I took pictures and uploaded them below!

870

Photo 1

Press here to choose image file. (<10MB)

Photo 2

Press here to choose image file. (<10MB)

Photo 3

Press here to choose image file. (<10MB)

Site Health Ranking*

On the entire site, how would you rank the general health of the reef?

- Super Healthy - Lots of healthy corals!
- OK reef - No questionable corals
- Some weird stuff - handful of questionable corals
- Meh - less than 1/4 of corals look unhealthy
- Super Unhealthy - more than 1/4 of corals look unhealthy

What's the reef look like?*

- Healthy reef, lots of coral of all kinds
- Patchy reef, pockets of different corals
- Scattered reef, not much coral
- Only occassional corals present
- Hardbottom with no live coral

THANK YOU!

We will be reviewing all submissions with a team of highly trained and concerned coral scientists!

Submit

Powered by Survey123 for ArcGIS

Coral Reef Health Survey

Photo by S. Wolfe

How to Complete a Reef Health Report Survey

- **Materials:**
  - Data sheet printed on underwater paper
  - Slate or clipboard
  - Pencil
  - Underwater camera

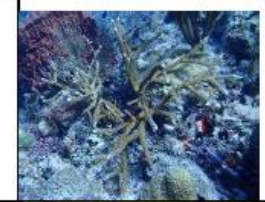
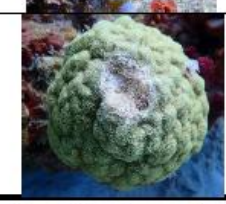
- **Methods:**
  - Fill out your name, the date and the dive site before you get in the water
  - Dive or snorkel for at least 20 minutes
  - Look around for healthy or unhealthy corals
  - Tally healthy and unhealthy corals in the proper row based on species

CORAL REEF HEALTH REPORT

NAME:	DATE:	DIVE SITE & ISLAND:

Tally number of healthy (no tissue loss or bleaching) and number of unhealthy (bleached, paling, diseased, predated, etc) corals in each category.

Coral Type	Bleached/Diseased Coral Example	Tally UNHEALTHY Colonies	Tally HEALTHY Colonies	Healthy Coral Example
Maze coral (*Meandrina meandrites*)				
Brain coral (*Diploria* spp., *Pseudodiploria* spp.)				
Elliptical star coral (*Dichocoenia stokesi*)				
Pillar coral (*Dendrogyra cylindrus*)				
Flower coral (*Eusmilia fastigiata*)				

Coral Type	Bleached/Diseased Coral Example	Tally UNHEALTHY Colonies	Tally HEALTHY Colonies	Healthy Coral Example
Star coral (*Orbicella* spp., *Montastrea cavernosa*)				
Starlet coral (*Siderastrea* spp.)				
Branching coral (*Acropora* spp.)				
Finger coral (*Porites* spp.)				
Mustard hill coral (*Porites astreoides*)				

Site Health Ranking (circle one):

Super Healthy	OK reef	Some weird stuff	Meh	Super Unhealthy

What does the reef look like? (circle one)

Healthy reef	Patchy reef	Scattered reef	Occassional corals	Hardbottom, no live corals

ADDITIONAL NOTES

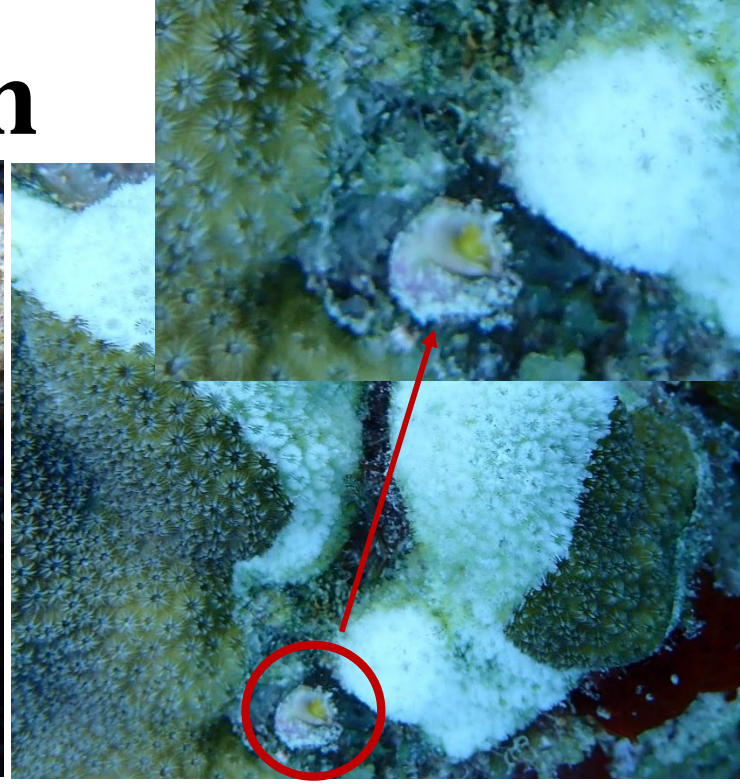
What to look for: Bleaching/Paling

- Coral tissue is still present
- Typically occurs during warmer months, or just following (think September to January)
- Can be a response to too warm water OR a response to illness or injury

Photos by L. Henderson

What to look for: Disease & Predation

- Disease
  - Consistent disease margin
  - Discoloration associated with disease margin: Black Band, Yellow Band
  - Typically moves from the base of the colony upwards
- Predation
  - Irregular border of tissue loss
  - Associated predator(s): snails, fireworms, damselfish, parrotfish, clinoid sponges
  - Can occur on any part of the colony



What to look for: SCTLD

- Big white patches on stony corals
- Maze/Brains/Pillars First!
    - Maze, brain, large-cup star and pillar corals are most severely affected so they show signs

What to look for: healthy coral too!