

How do you recognize and describe Stony Coral Tissue Loss Disease (SCTLD) lesions?

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Field Diagnosis

Step 1: Identify abnormal corals

- Is there recent tissue loss?
- What species are affected?
- How common is it?
- Is it spreading?
- Is it killing coral colonies?
- Are there unusual environmental factors at the site?
- Can you attribute visual signs to presumed cause ?

Differentiating SCTLD from other syndromes

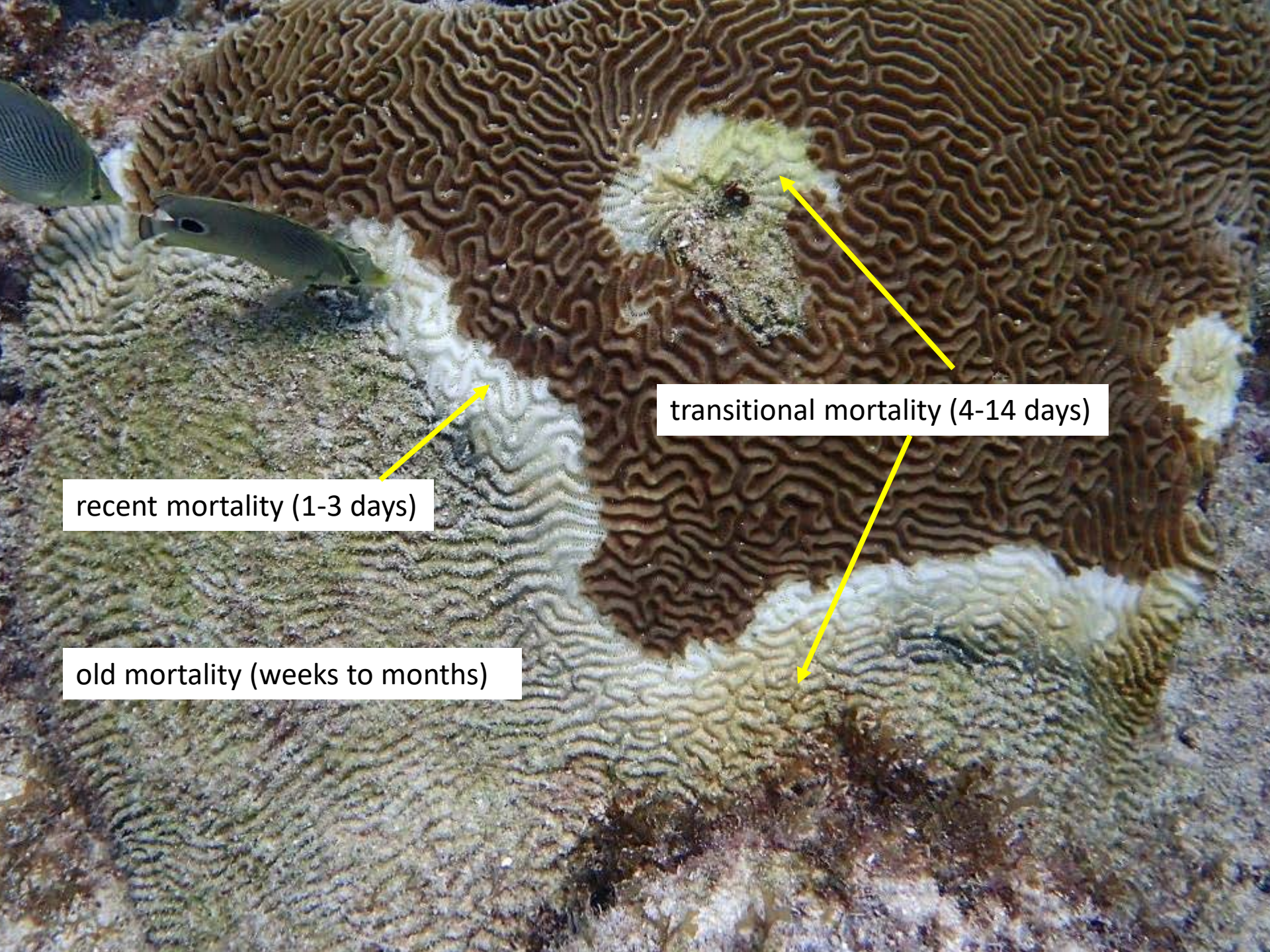
- Identify presence/prevalence of tissue loss
- Determine if lesions are signs of disease or other factors (predation, overgrowth, competition, physical damage etc.)
- If it appears to be a disease, characterize lesion characteristics and potential type of disease
- Evaluate coral community: species present, species with tissue loss, prevalence of affected corals
- Estimate time of emergence based on presence of recently dead corals

When did the tissue loss occur

Old mortality
6mo-1 yr

Recent mortality





recent mortality (1-3 days)

old mortality (weeks to months)

transitional mortality (4-14 days)

Recent tissue loss:

White on coral colony

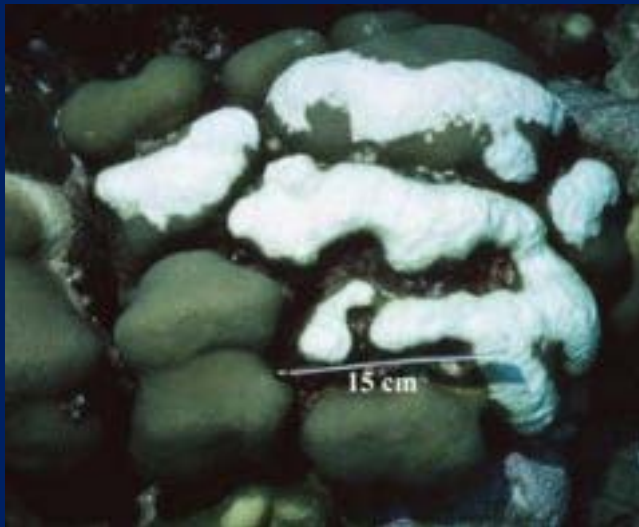
tissue present



denuded skeleton

Feature to look for:

- Skeletal damage
- Presence of predators
- Presence of competitors
- Rate of tissue loss
- Pattern of tissue loss
- Tissue sloughing



predation



disease

1. Is coral loss due to other (non-disease) factors?



Sponge bioerosion/overgrowth



Competition/overgrowth



Galls/tumors/tube dwellers



Abrasion



Aggression

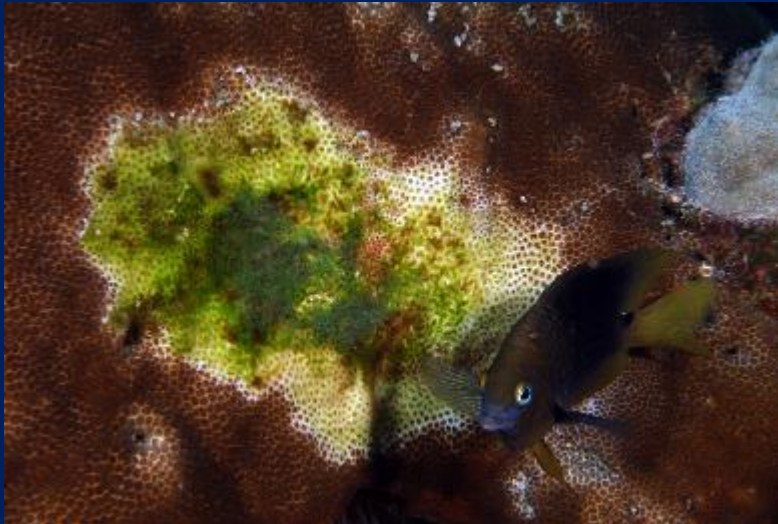
Exclude other causes of mortality



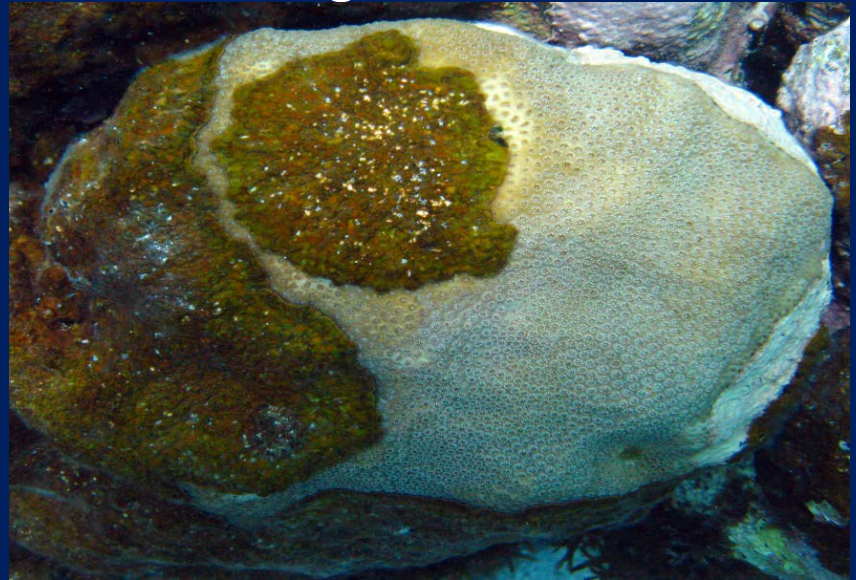
Sediment damage



Algal abrasion/



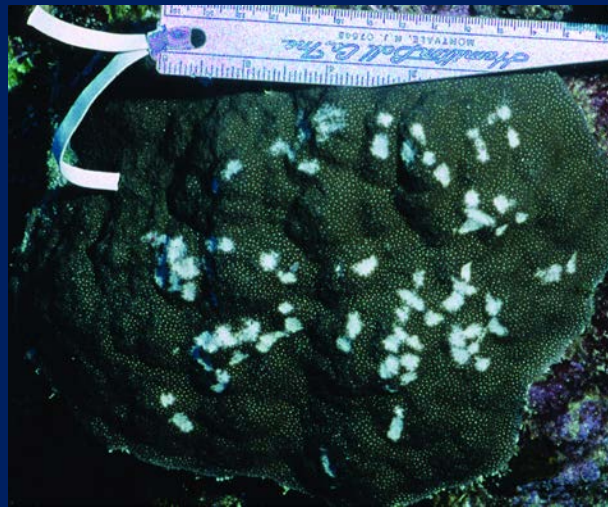
Damselfish algal garden



Algal overgrowth

Other causes: Predation

1. Is a predator present ?
2. Is there a loss of underlying skeleton?
3. What are the patterns of tissue loss?



Hermodice predation

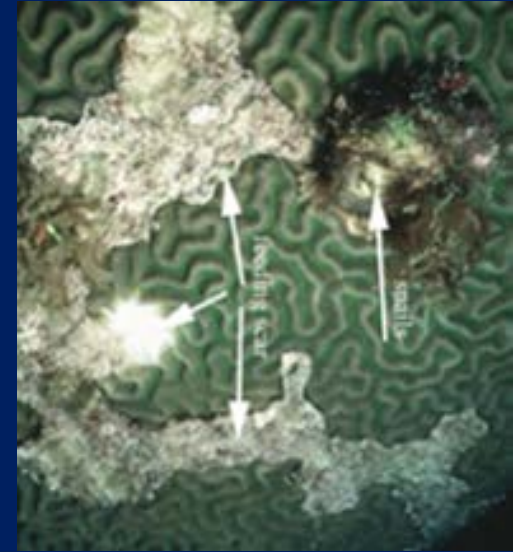
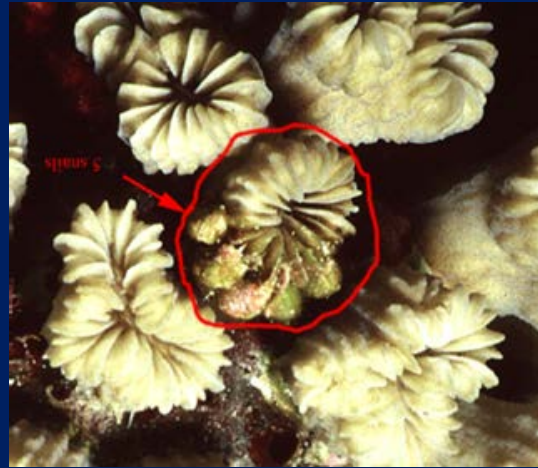
- Fireworms consume branch tips, projections or knobs; also seen on necrotic/diseased tissue
- Tissue adjacent to exposed skeleton appears normal
- Most feeding at night – fireworms often not seen near injury
- Fireworms often associated with diseased corals



Snail predation

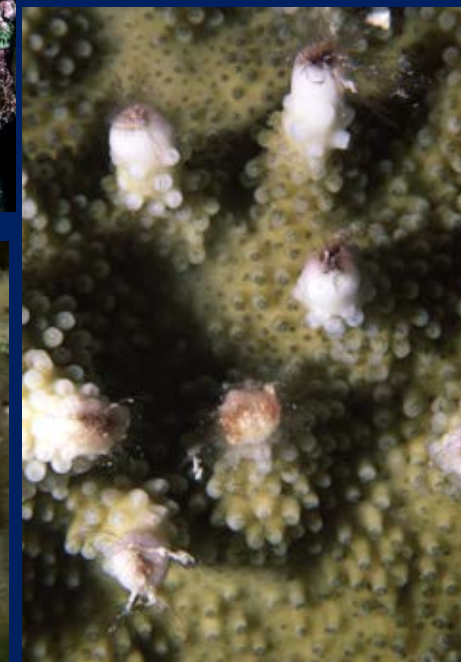
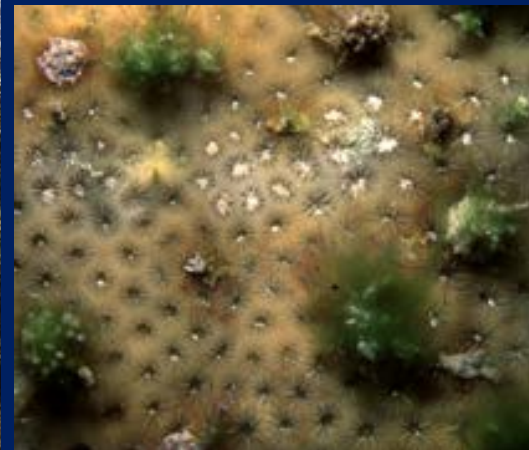
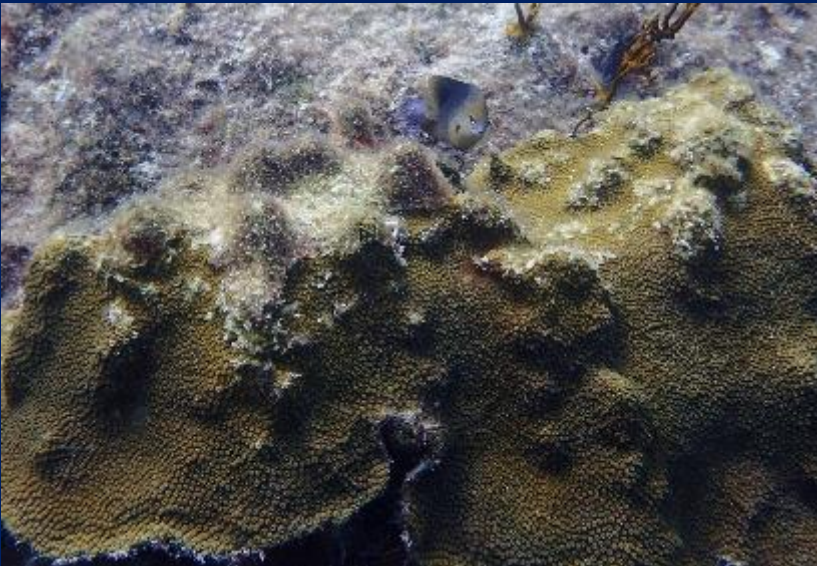
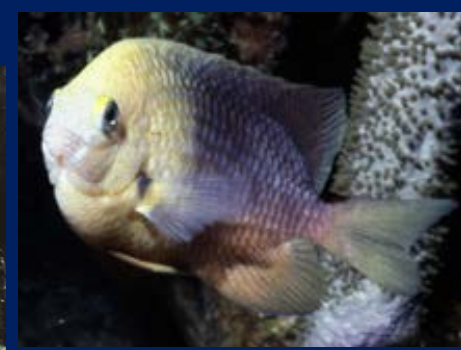
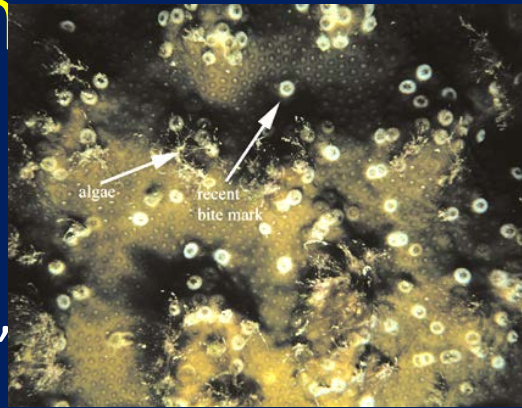
Coralliophila galea

- Snails on or around lesion; often retreat to base of coral (or underside)
- Aggregate (2-50+ snails)
- Create characteristic scallop-shaped injury or a “trail” that extends across colony
- Tissue adjacent to exposed skeleton non-necrotic
- Snails often associated with diseased tissue
- Occur on most species of stony corals
- May be cryptic (algal covered shells)

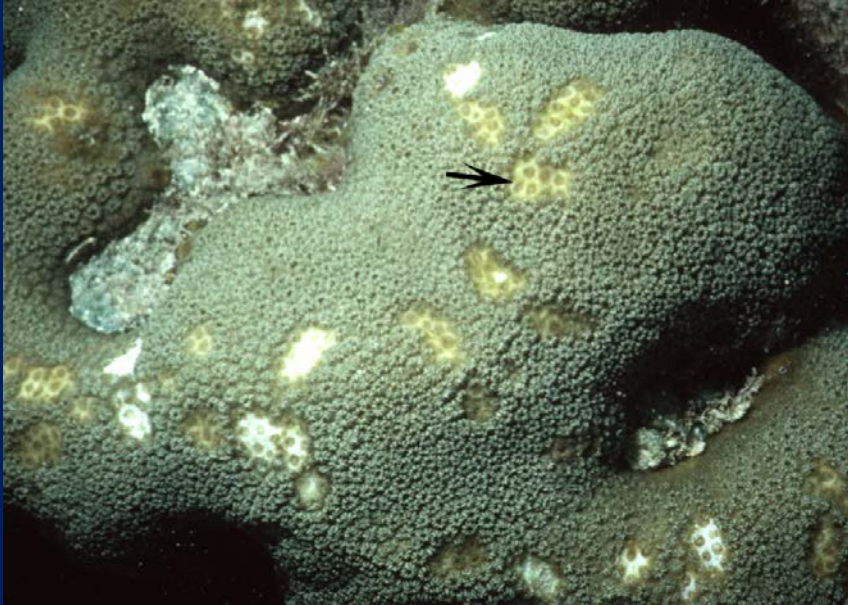


Damselfish predation

- Threespot and yellowtail damselfish create lesions & algal lawns
- Referred to as “ridge mortality” on brain corals
- Lesions colonized by algae
- coral may produce chimneys or galls to contain algae



Parrotfish White Spot Biting (PWSB)



spot biting

- one or more fish
- many species of scarids
- scraping behavior
- tissue regenerates in weeks
- recent and old lesions on coral



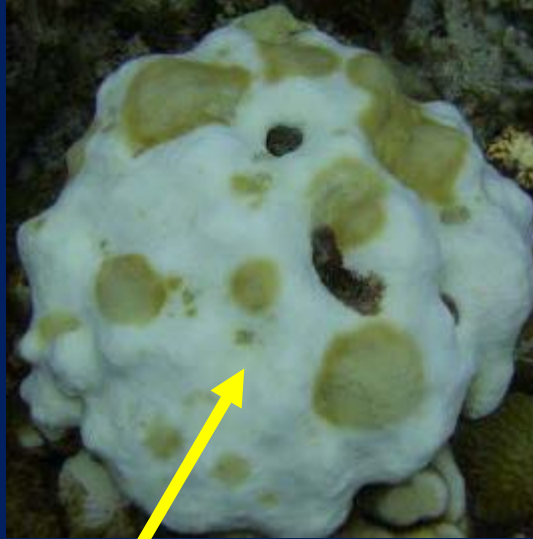
focused biting

- one or more fish
- only *Sparisoma viride*
- excavating behavior
- tissue may regenerate
- lesions expand outward

Step 2: Evaluate disease signs



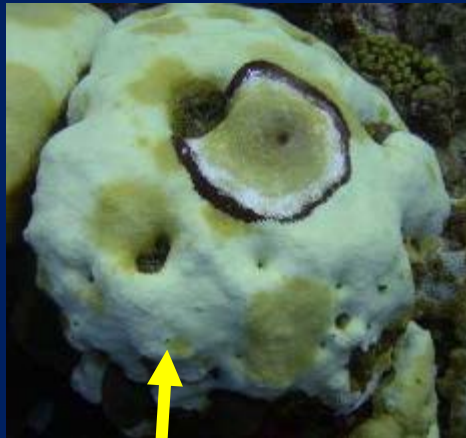
1. Abnormal (darker or lighter) coloration



2. Presence of a pigmented band



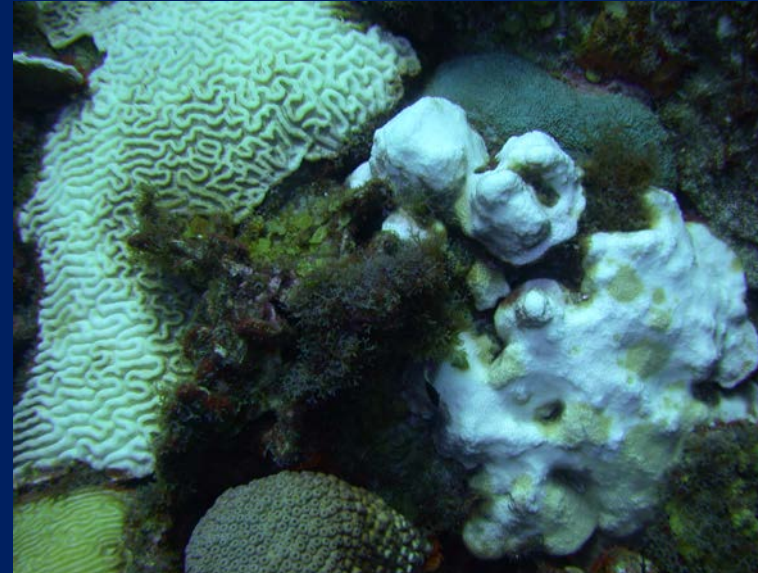
3. Recent tissue loss



4. Unusual pattern of growth

A coral may exhibit multiple signs

1. Abnormal coloration



Bleaching: tissue present



Bleaching-associated mortality

Caribbean yellow blotch disease (CYBD)



Live (pale/lemon yellow) tissue

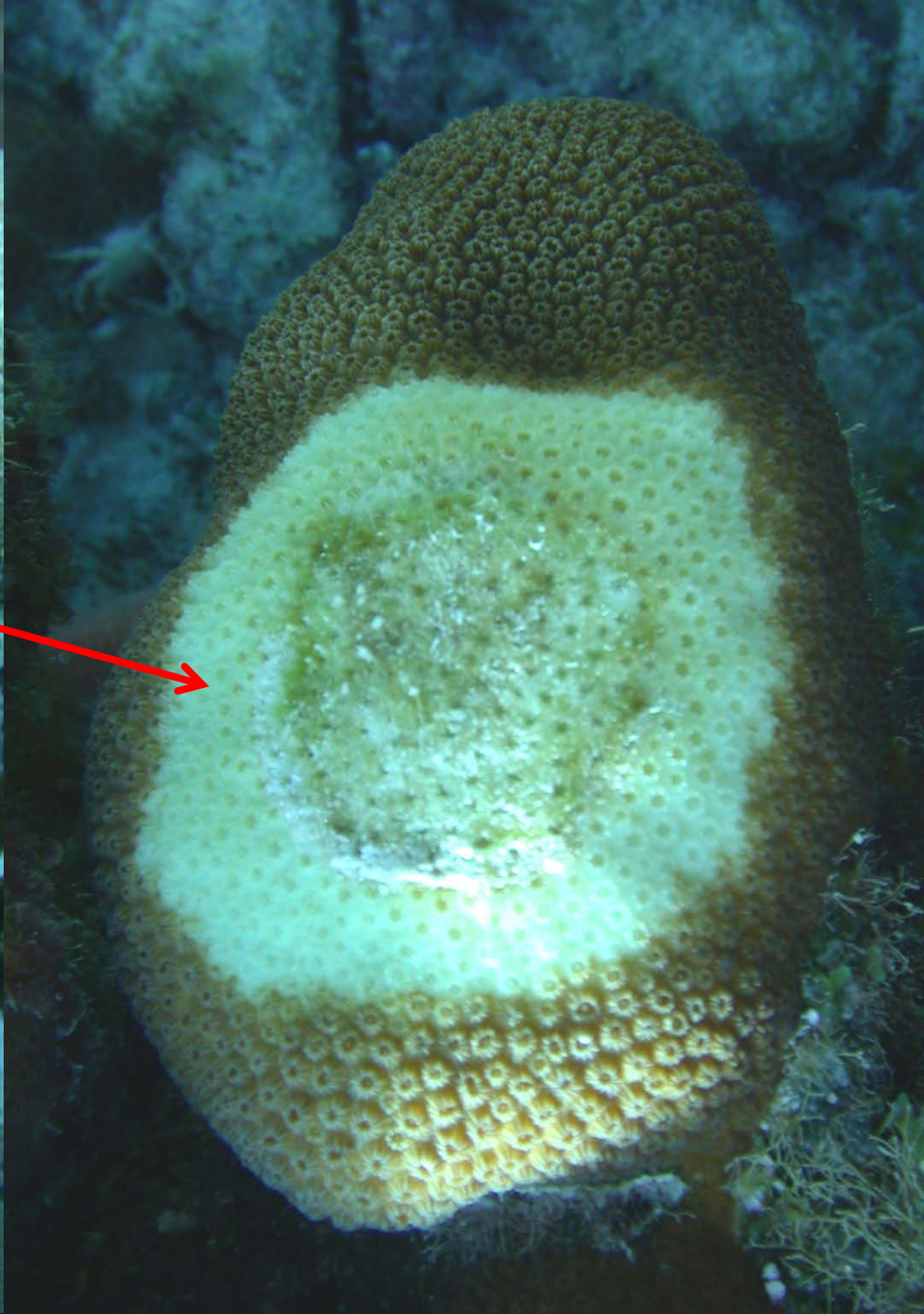
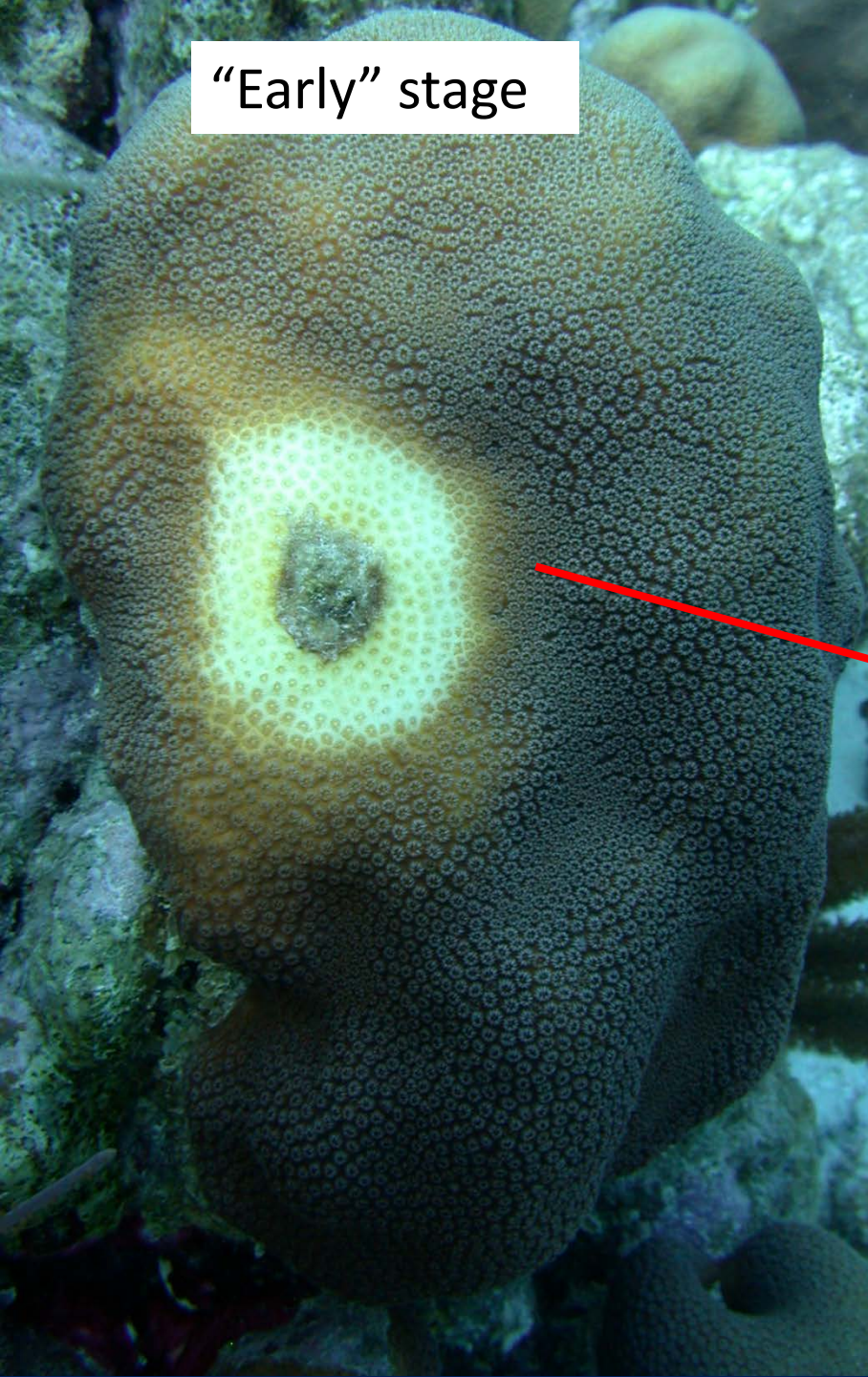
Primarily affects *Orbicella*

Rare cases on *Pseudodiploria* and *Mcav*

recent tissue loss



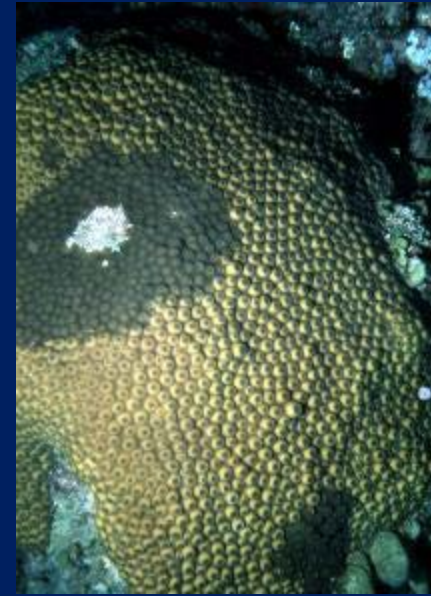
“Early” stage



“Later” stage



Dark spots disease (DSD)

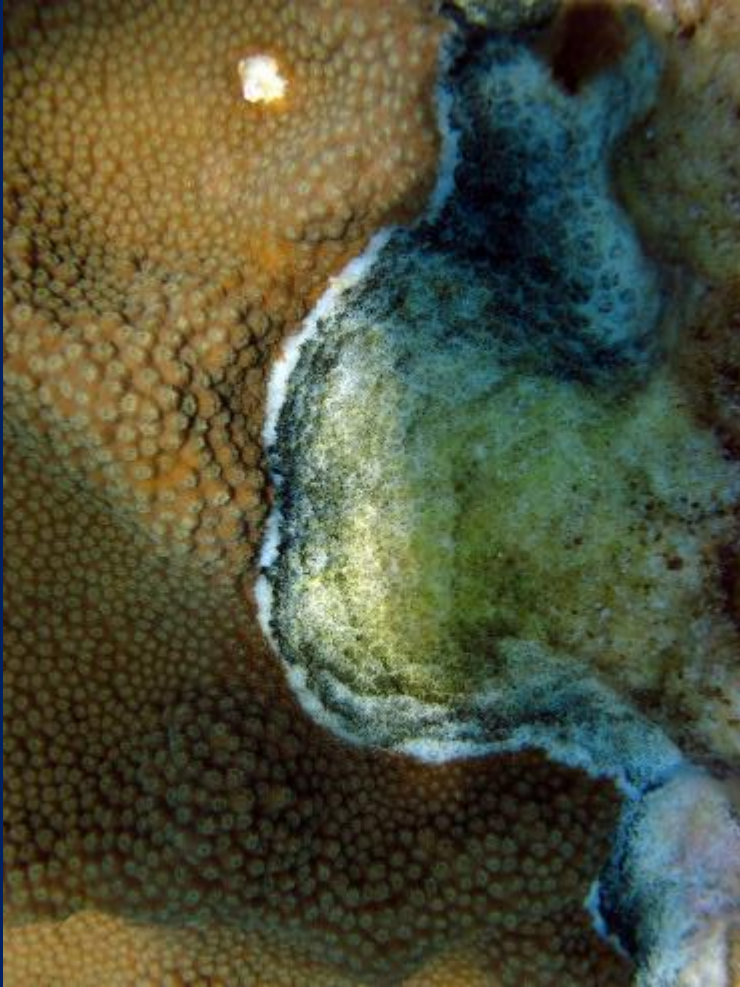


Affects:
Siderastrea
Stephanocoenia
Agaricia
Orbicella
Montastrea



Often associated with recent tissue loss

2) Pigmented material overlying tissue/skeleton

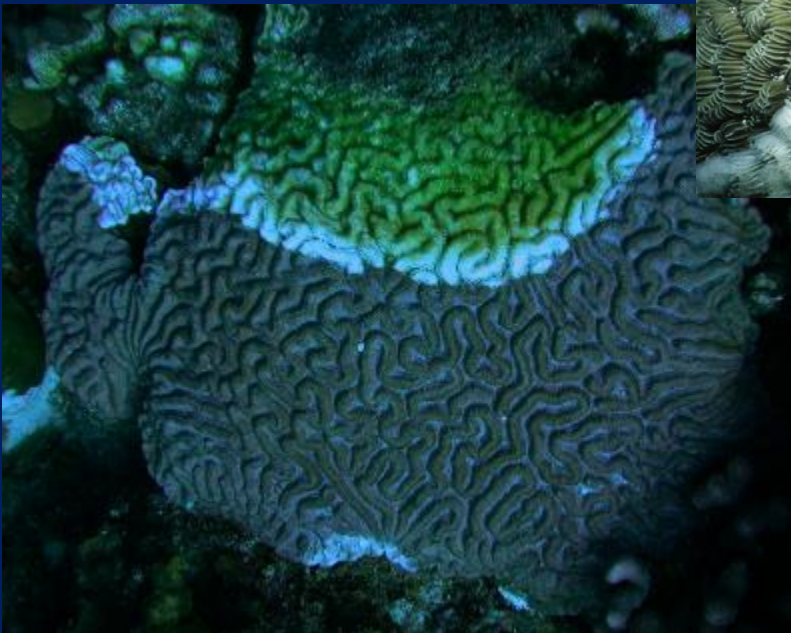
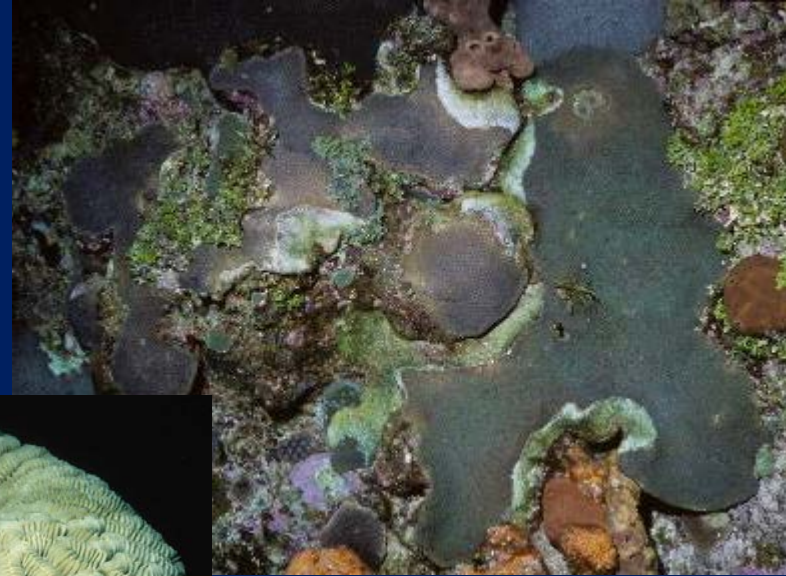


Caribbean Ciliate Infection (CCI)



Black Band Disease (BBD)

3) Tissue loss without obvious band



White
plague

Affects 28+ species

Stony coral tissue loss disease

25+ susceptible species



Characteristics of SCTLD

- Primarily affects boulder, plating and encrusting corals.
- Does not affect *Acropora* or *Porites*

1. Distinct pattern of spread among species
2. Presence of colonies with unusual bleaching/paling
3. Lesions occur in multiple locations on colonies
4. Patterns of tissue loss highly variable among same species
5. Affected corals have prominent areas of recently denuded (white) skeleton as a result of rapid rates of tissue loss
6. High prevalence of affected corals once disease is established
7. High rates of colony mortality in early susceptible species
8. Disease active throughout the year and for multiple years in individual reefs
9. Disease often highly virulent during winter months; declines during peak temperatures especially when colonies paling or bleaching

Early susceptible species



Colpophyllia natans
boulder brain coral



Eusmilia fastigiata, flower coral



Psuedodiploria strigosa
smooth brain coral



Meandrina meandrites
maze coral



Psuedodiploria clivosa
knobby brain coral

1. Distinct pattern of spread among species



Dendrogyra cylindrus
pillar coral



Dichocoenia stokesii
elliptical star coral



Diploria labyrinthiformis
grooved brain coral

Intermediate susceptible species



Orbicella spp.
Mountainous star coral,
Lobed star coral



Solenastrea bournoni,
coral



Montastrea cavernosa,
Large-cup star coral



Stephanocoenia intersepta,
coral



Siderastrea siderea, starlet coral

1. Pattern of spread among species

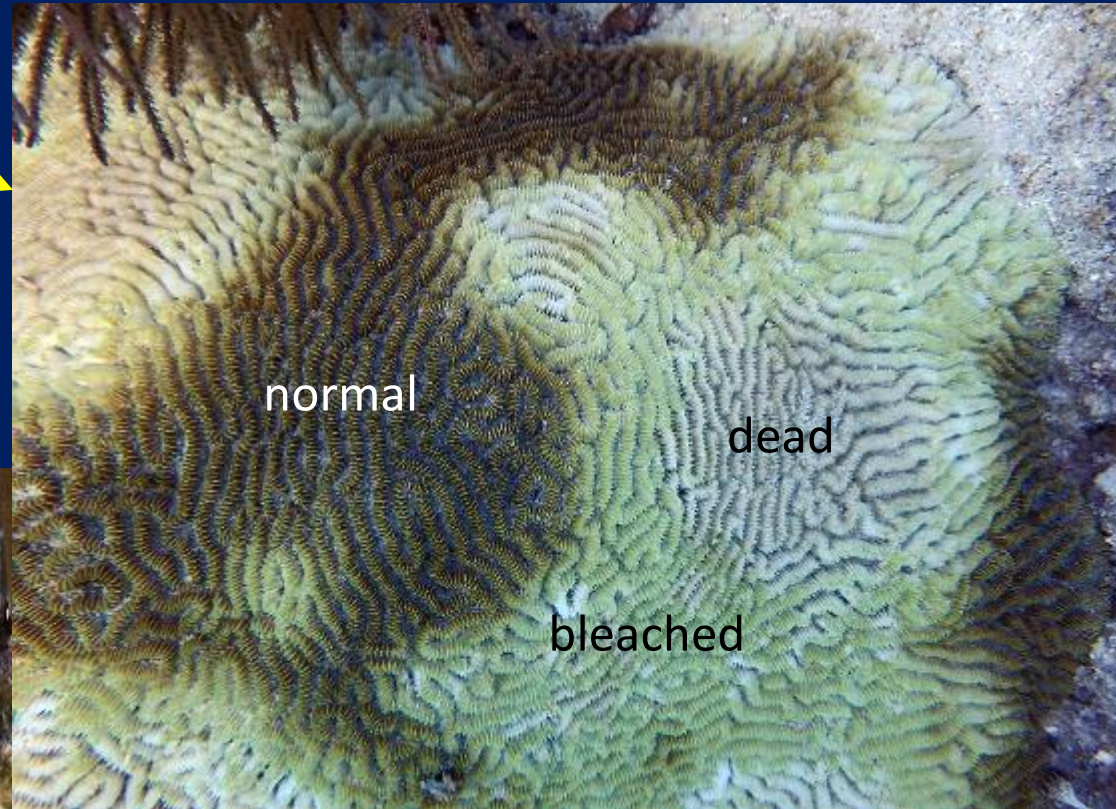
Highly variable depending on when the disease is first identified:

- If all brain corals, maze coral, elliptical star corals, pillar corals are live and unaffected and scattered Orbicella, Siderastrea, Stephanocoenia are the only affected corals it may be white plague or some other syndrome
- If many brain corals (etc.) are recently dead and active lesions on star corals the reef was affected by SCTLD weeks to months earlier
- If only a few maze, brain corals (etc.) are affected and no or few star corals show signs of disease its likely that the disease just emerged
- If only Ssid shows signs of tissue loss and other species intact, it is unlikely to be SCTLD

2. Presence of unusual patterns of bleaching

Usually in Mcav and Mmea

bleached



normal

dead

bleached

recently dead

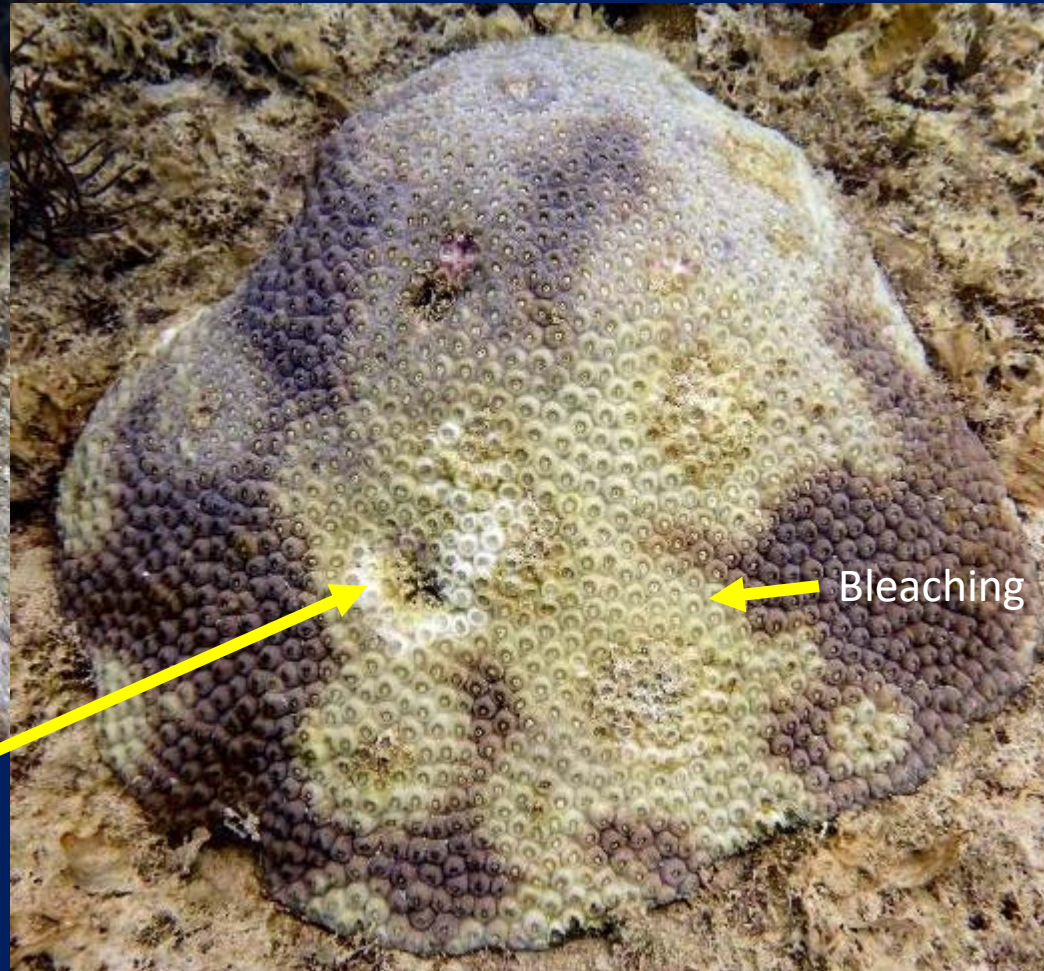
Large-cup star coral, *Montastrea cavernosa*

The same species in one location can exhibit different signs



dead

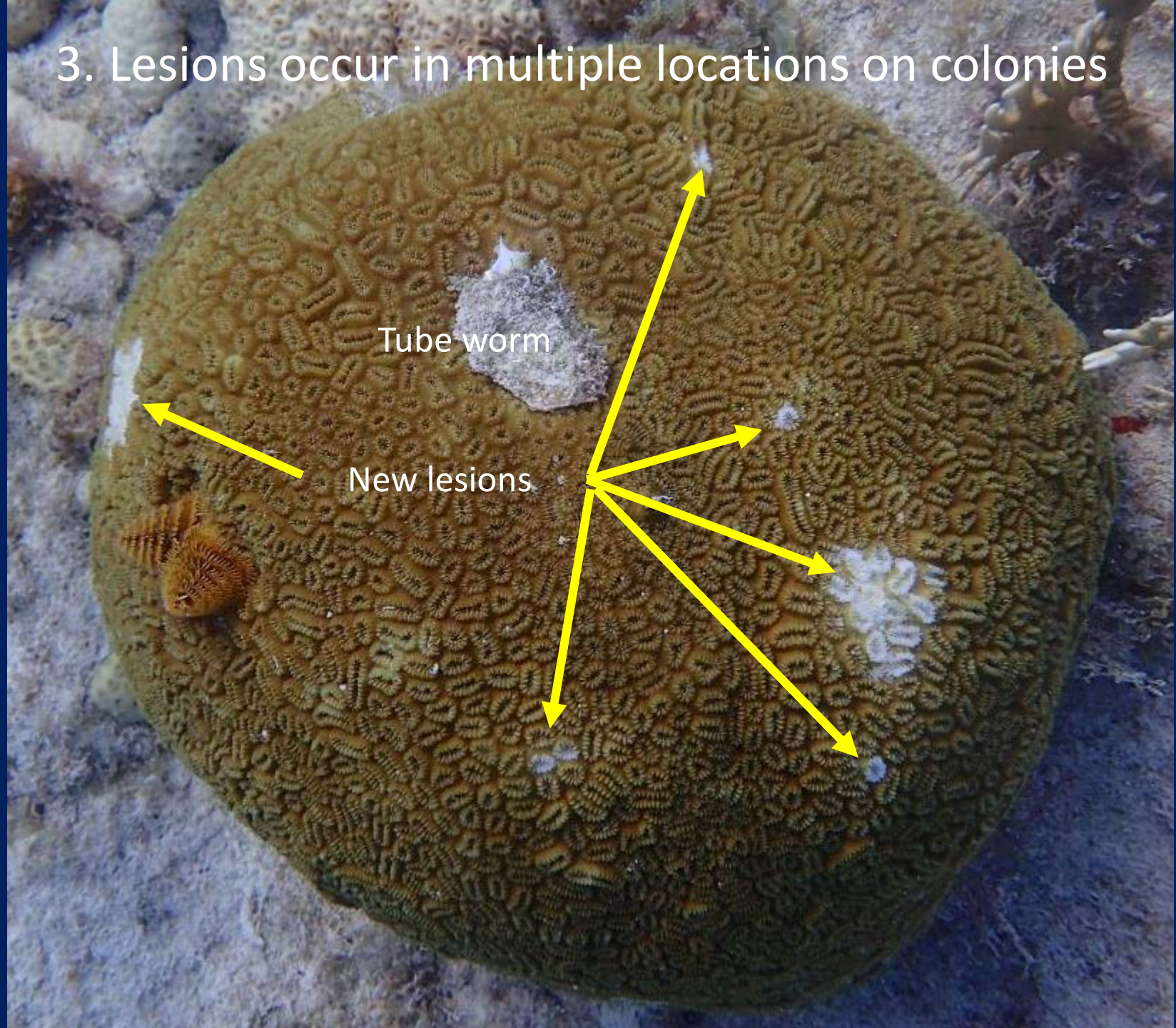
No bleaching



Bleaching

dead

3. Lesions occur in multiple locations on colonies



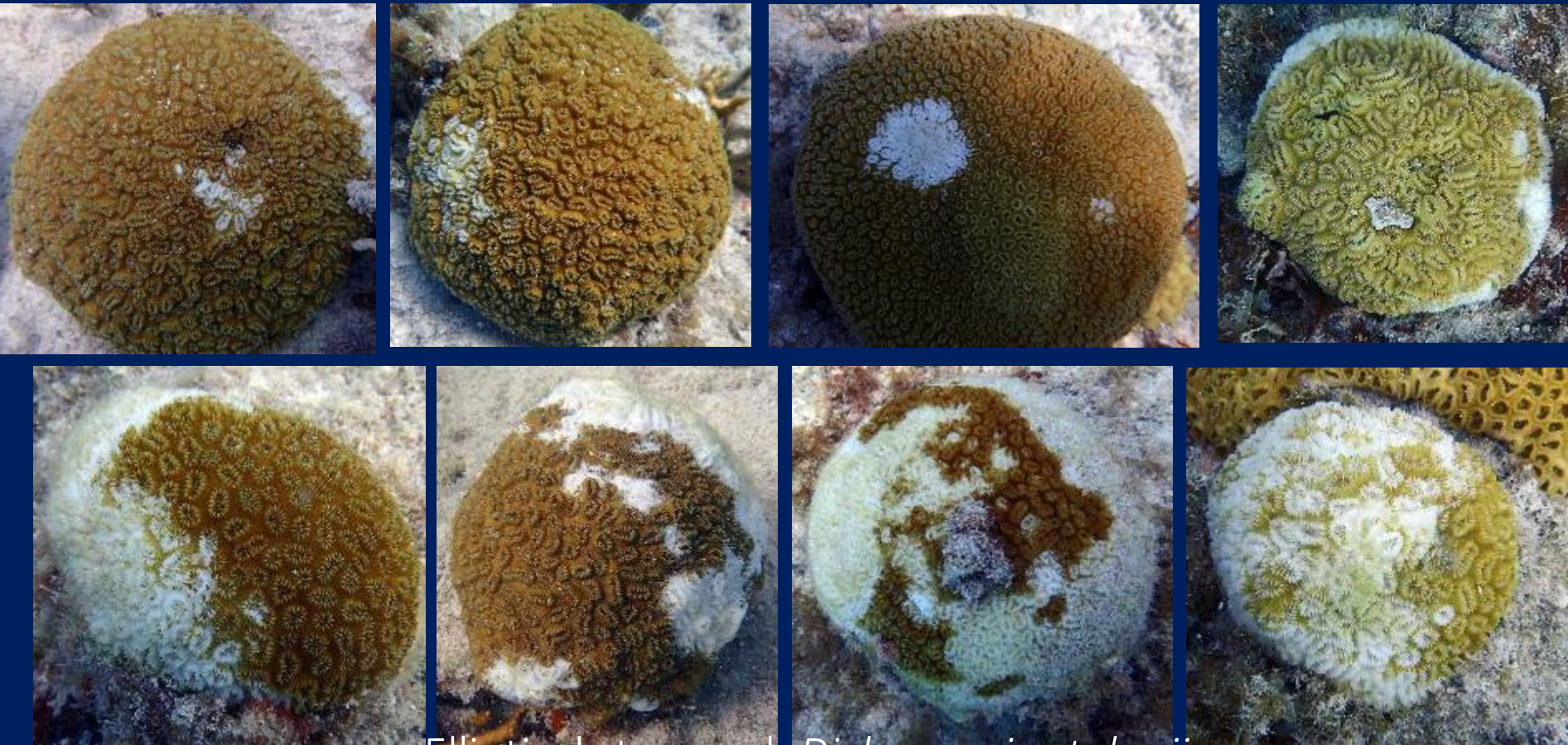


Mmea with four lesions

4. Patterns of tissue loss highly variable among same species

bleached

recently dead



Elliptical star coral, *Dichocoenia stokesii*



Smooth brain coral

Psuedodiploria strigosa



Maze coral
Meandrina meandrites





Lobed star coral
Orbicella annularis





Mountainous star coral
Orbicella faveolata



5. Affected corals have prominent areas of recently denuded skeleton

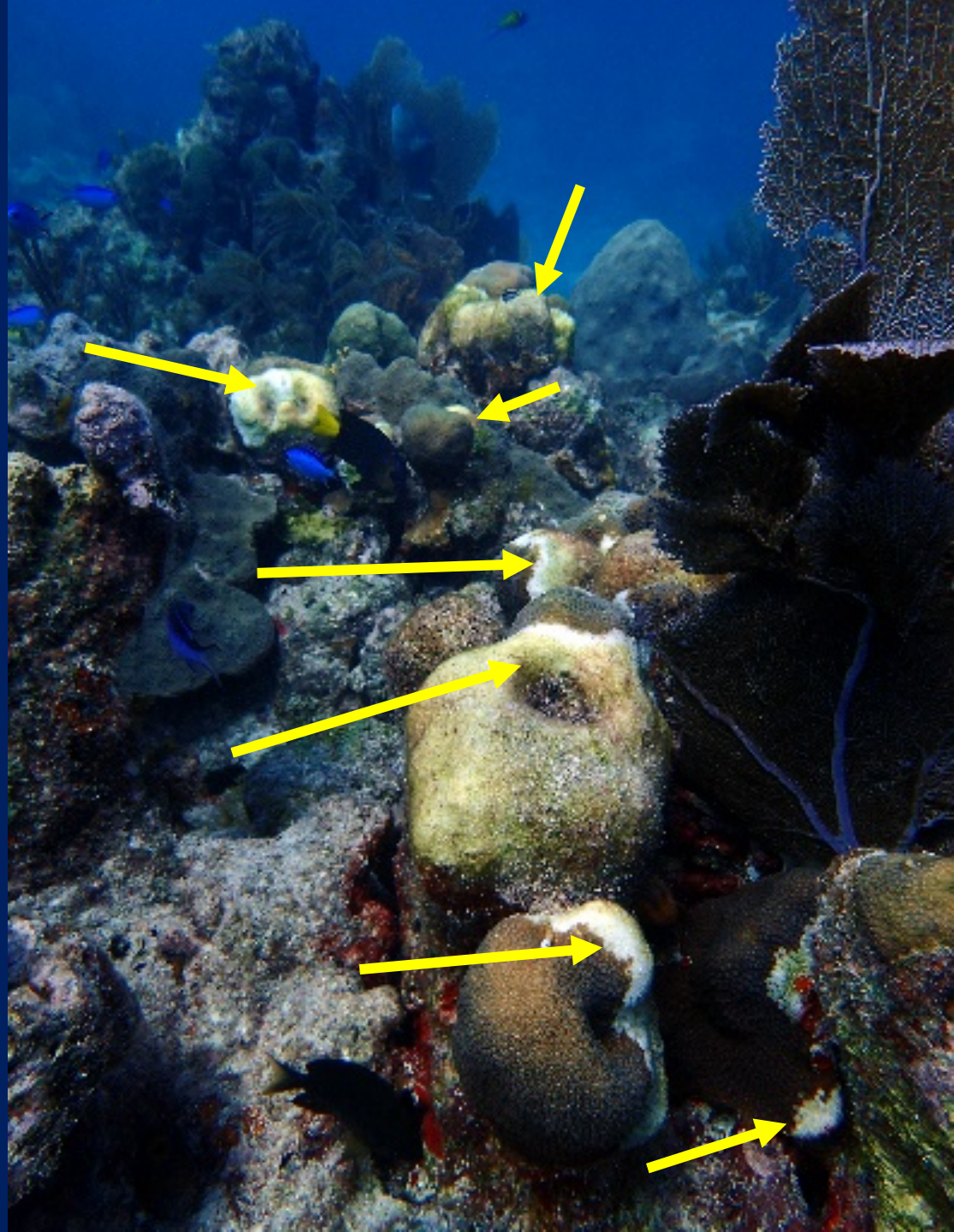


Mcav Marquesas 12/2019



Ofav Looe Key Reef July 2019

6. High prevalence of affected corals once disease is established

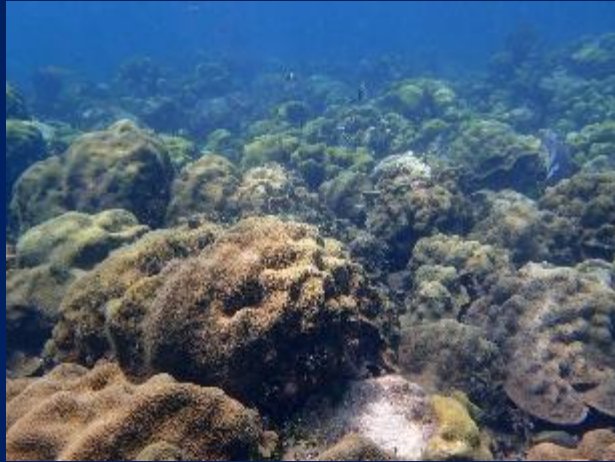


7. High rates of colony mortality in early susceptible species



Once the disease moves through a reef, few susceptible species remain

8. Disease active throughout the year and for multiple years in individual reefs



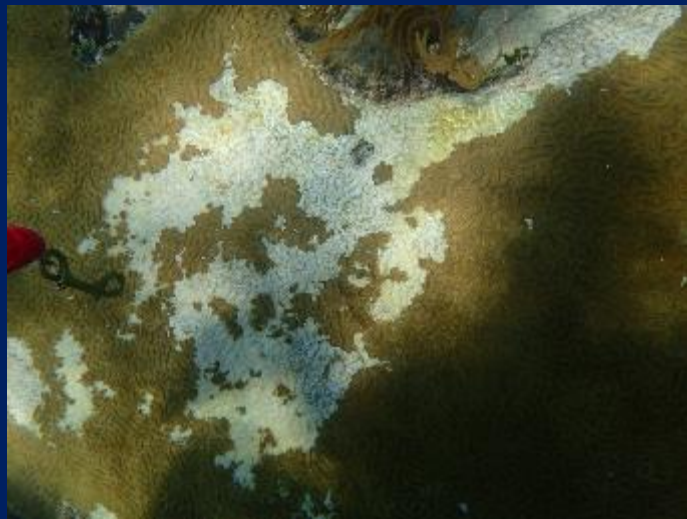
2015



Dec 2016



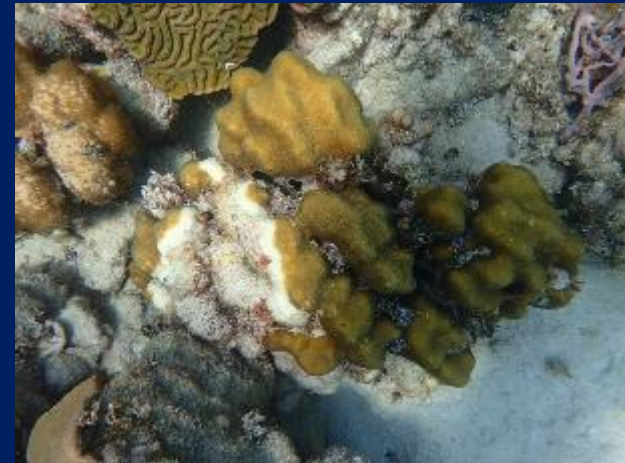
March 2017



Apr 2018



May 2019

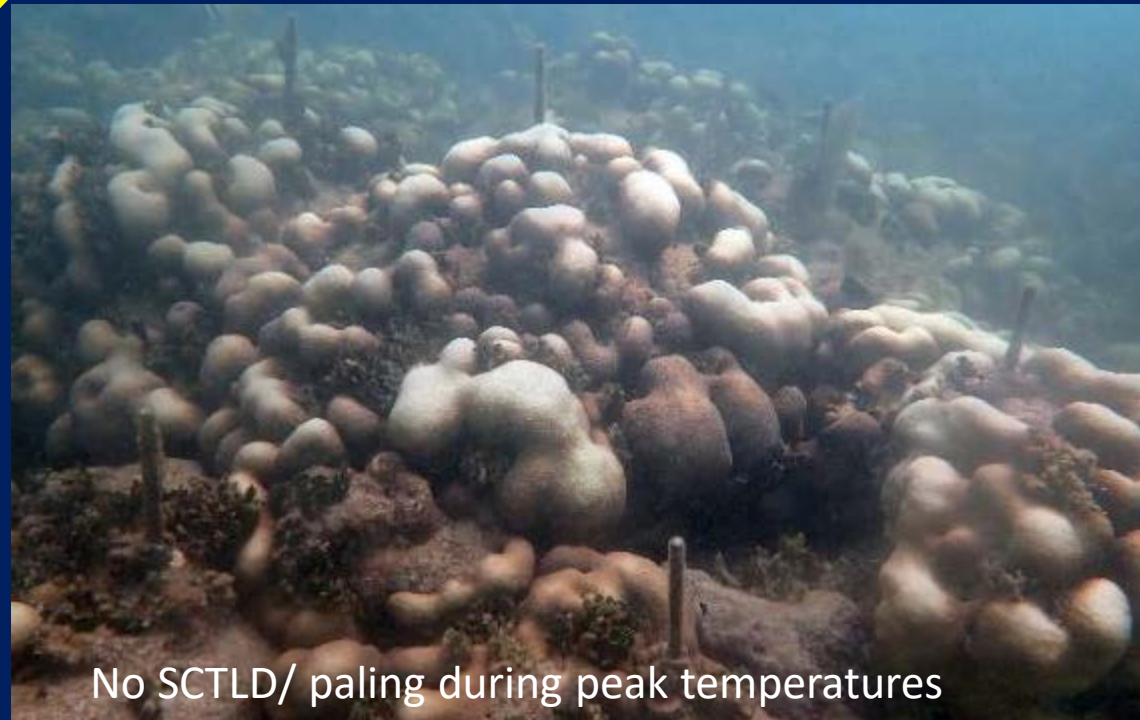


June 2020

Cheeca Rocks, Upper Keys, Florida

9. Disease often highly virulent during winter months; declines during peak temperatures especially when colonies paling or bleaching

Extensive rapid tissue loss in winter, then it slows and colonies go in remission
Denuded skeleton colonized by filamentous algae/diatoms



Spatial patterns of spread

2020 DRM Marquesas Survey Sites August 27 - Sept 2 Preliminary Data

