

Protocol for assessing health statuses of corals

https://github.com/sagw/SCTLD_samples

- Guidelines to follow for determining the health condition of corals.
- Can be used for assessing in the field and for reviewing historical photos and updating colony data
- Refer to the readme for more details on how to enter data
- *Take many pictures of the entire colony from all angles , preferably after taking a sample

Health conditions (to enter in ColonyData)

Only one of the following should be entered as a condition in colony data. Any other observations, including TL or increased old mortality, should be put in the notes.

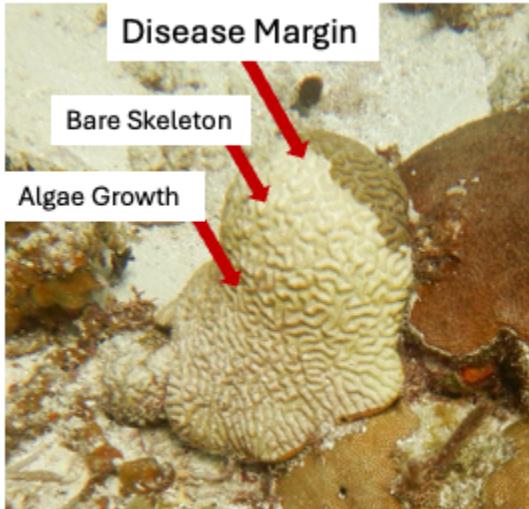
- Healthy
- Diseased
- Diseased_Other
- Dead
- CLP = Color Loss Paling
- CLB = Color Loss Bleaching
- DC = Discoloration
- Not_visited = colony was not visited on that date.

Diseased

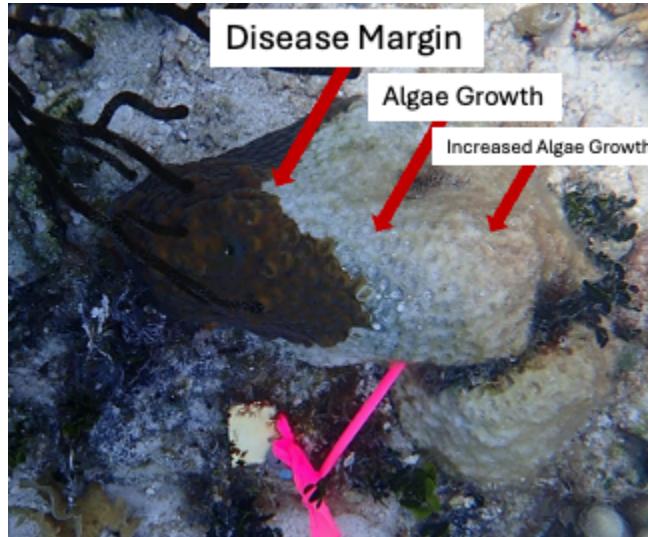
The diseased condition refers to stony coral tissue loss disease.

- Disease signs:
 - Usually focal or multifocal lesions of rapid tissue loss
 - More susceptible species will have acute tissue loss (lesion progresses quickly)
 - Less susceptible species may have subacute tissue loss (disease lesion spreads slower)
 - Bare white skeleton is exposed closest to disease margin. Algae has likely started growing on the dead, white skeleton furthest away from the disease line.
 - Very rapid tissue loss in highly susceptible species may result in little algal growth, so the dead skeleton will still look very white.
 - Subacute tissue loss may result in more algae growth

- SSIDs display different disease signs than most other coral species. They may have some purple discoloration, and overall splotchiness, and tissue loss that looks more like webbing and multifocal lesions (may have both) instead of a discrete, focal lesion
 - If there is discoloration, only call diseased if there is also tissue loss
 - Examples from our data:
https://drive.google.com/drive/u/0/folders/1LWYfYDhg1KMhQv_mtEmCb4YIXRIVBUE-
- Key sign here is TISSUE LOSS



PSTR - more susceptible; acute TL



MCAV - intermediate susceptible; subacute TL



SSID - webbing and multifocal lesions

- Helpful references:
 - <https://cdhc.noaa.gov/coral-disease/characterized-diseases/stony-coral-tissue-loss-disease-sctld/>
 - https://floridadep.gov/sites/default/files/Copy%20of%20StonyCoralTissueLossDisease_CaseDefinition%20final%2010022018.pdf (found in (Eaton et al., 2021))
- For distinguishing between other coral diseases:
<https://cdhc.noaa.gov/coral-disease/coral-disease-id-key/#2>

Diseased_Other

This condition refers to any disease other than scld

- May include black band disease (BBD) or white band disease (WBD)
- If you think you can ID the disease, put it in the notes

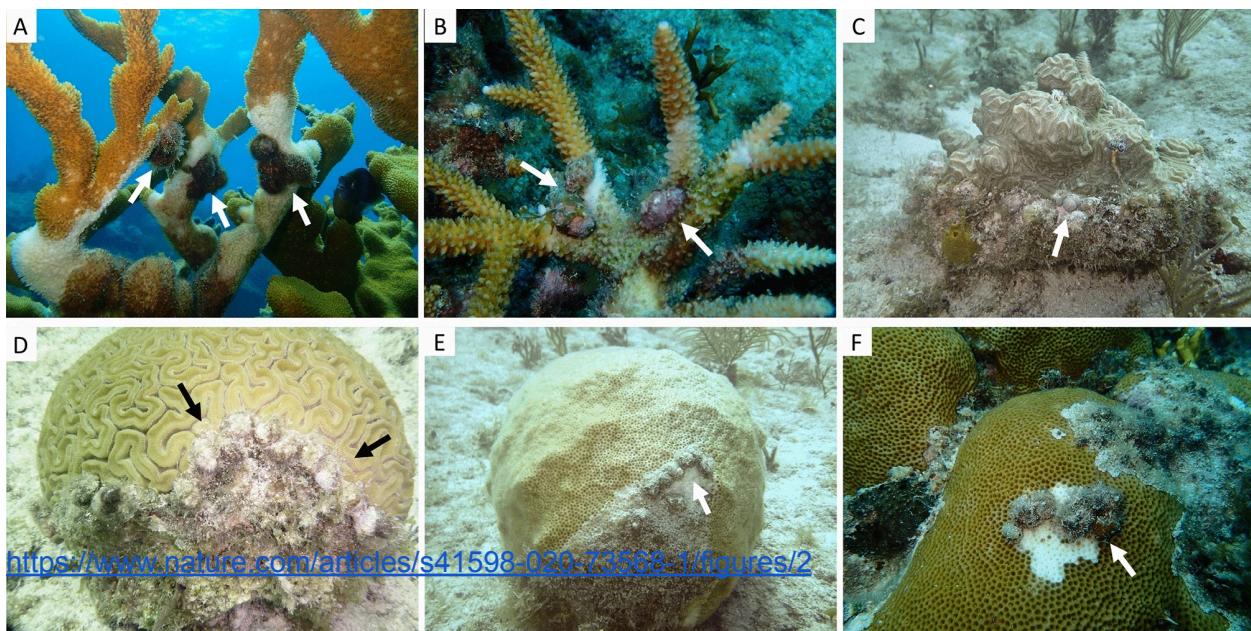
Other diseases examples:

Black band disease

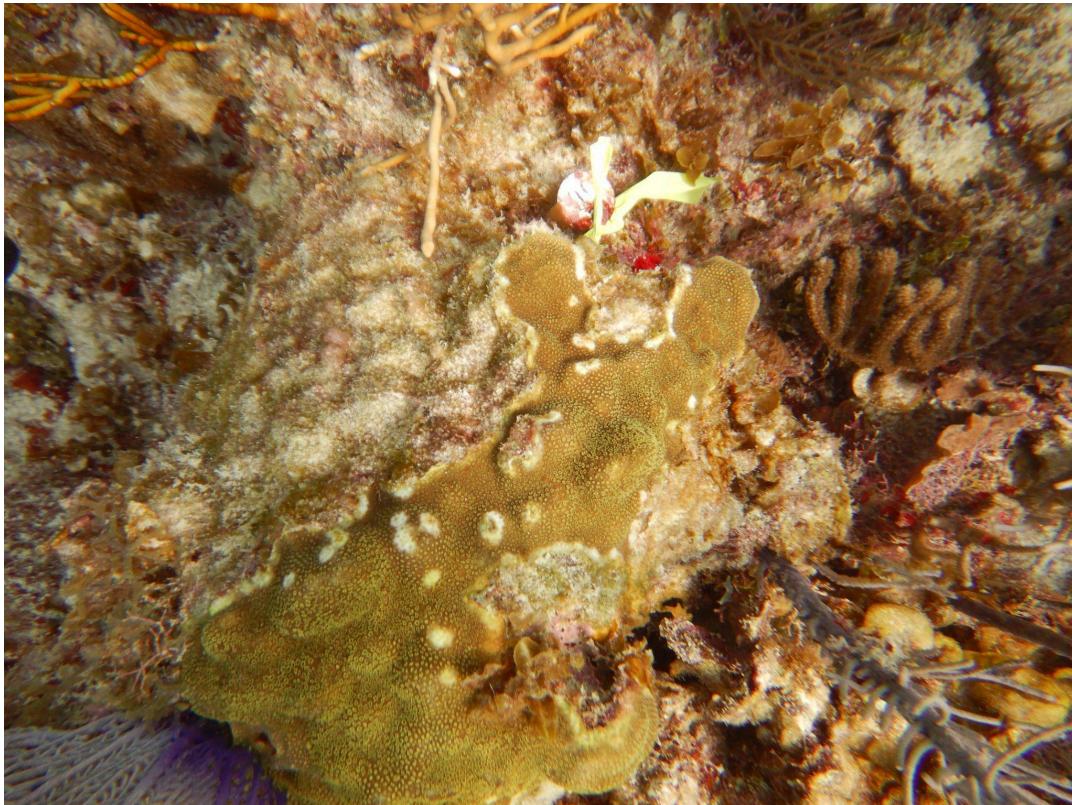


Predation/Healthy Issues

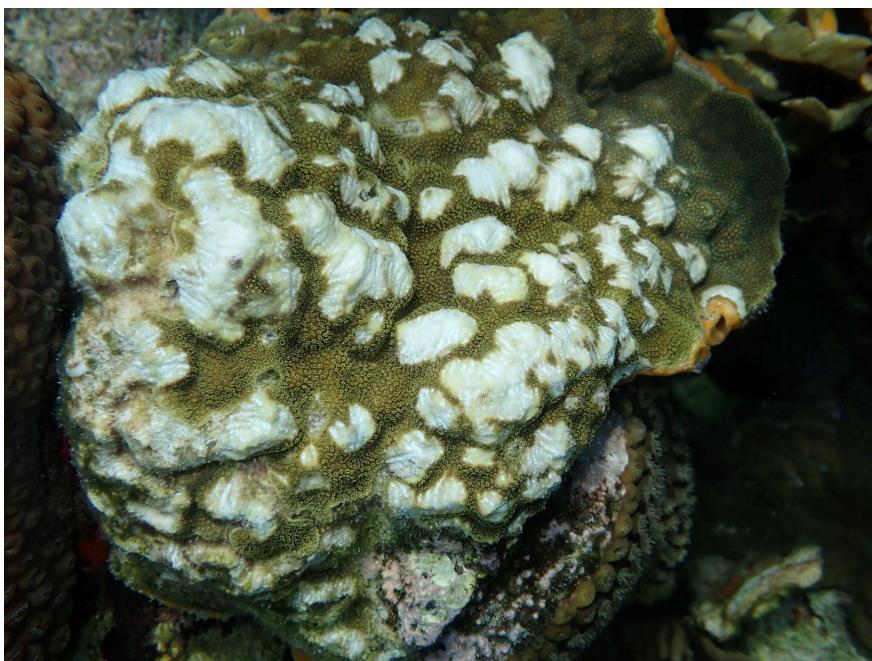
- Predation can look very similar to some of these issues but is normal, and corals experiencing predation should be recorded as healthy.
 - Corallivorous snails can do major damage to corals. They eat coral in groups and can leave a band of dead tissue that may look similar to scld lesions. Sometimes these snails can be quite camouflaged, so make sure to look for them.



- Fish predation. Small discrete bite marks that leave dead skeleton behind.
 - How to tell apart from disease - usually smaller marks of white, sporadic, may not be covering the whole colony. In PASTs, usually at the top of the 'hills'



- Damselfish farming

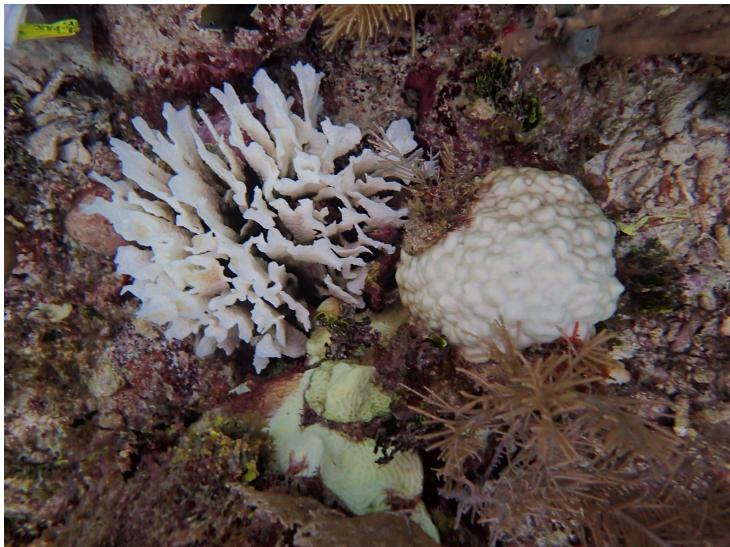


- Parrotfish predation (can see scrape marks)

- Competition/abrasion
 - Boring sponges or sometimes soft corals will grow in/around coral and there may be abrasion spots or tissue damage near this overgrowth. If you see TL make sure to look out for signs of competition (organisms near the suspected TL)

Color Loss Bleaching (CLB)

- Coral colonies may be partially or totally bleached (resulting from expulsion of algal endosymbionts). Record % of bleaching (estimate of affected % of whole colony)
- Completely bleached colonies will appear fully white but their tissues are still alive (you can see the translucent polyps).
- Usually coincides with high sea temperatures or other environmental stressors.
 - Usually occurs in waves where many species are affected simultaneously
- Bleaching and paling will usually occur on the top side of the coral ??
- Ex of completely bleached colonies from our data:



Color Loss Paling (CLP)

- Sometimes colonies will just appear lighter in color before they bleach completely, or part of the colony will pale and part of it will be completely bleached. Record % of paling (estimate of affected % of whole colony)
- Also associated with high temperatures
- Examples of partial paling (left) and partial paling and bleaching (right)



Discoloration

- Usually multifocal (or focal) patches of abnormal coloration on the colony that doesn't fit any of the above descriptions.



Estimating % Tissue Loss

- Estimate percent tissue loss (including old mortality??) of colony.
- Based on the size of the coral colony (estimate in the picture), determine the percentage of dead tissue
- How do we want to enter this? I think separate column or entirely new spreadsheet
- Tissue loss vs old mortality

Record % live tissue remaining of the entire skeleton.

- Take into account existing old mortality in your first tissue estimation.
 - This way, you should be able to determine % tissue remaining at each individual time point. However, if you run into issues or are missing photos of the entire colony, you should refer back to the initial photo.
- So one on left starts at 98% tissue and on the right is 5%



102023



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