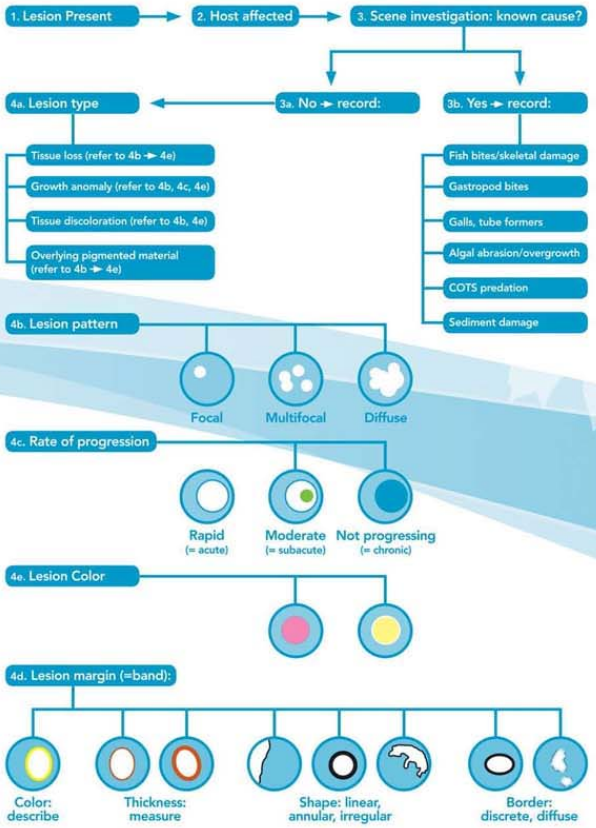

Figure 2.1 A globally-relevant decision tree used to identify known causes of lesions and describe lesions of unknown cause. All lesions denoted as white represent bare, exposed skeleton; green symbolizes secondary algal colonization of bare skeleton. Other colors represent examples of commonly-encountered lesions or legion margins characteristic of specific diseases.

Yellow band disease

- Focal, multifocal, diffuse lesions with annular to linear margins of pale yellow, bordered by healthy tissue.
- Lesions progress mm to cm per month.
- The leading edge of the band remains pale yellow or lemon colored, while tissue previously affected gradually darkens prior to full tissue loss; acute tissue loss is rare.
- Primarily affects *Montastraea*.

Pigmentation response

- Multifocal or diffuse areas of white, purple, yellow, brownish or blue colored tissue discoloration.
- Tissue may appear unhealthy, swollen, and/or peeling away at the edges.
- Pigmentation may form lines, bumps, spots, patches, bands or irregular shapes.
- Considered a response of the coral host to a variety of stressors (i.e. unidentified pathogens, competition, predation, boring fauna, abrasion, etc.), suggesting that organism health is compromised.
- Common on corals such as *Porites*, *Siderastrea*, and *Montastraea* and octocorals such as *Gorgonia*, *Pseudoplexaura*, *Plexaura*, *Briareum*, and *Erythropodium*.

Aspergillosis

- Diffuse lesion(s) of various sizes and shapes distributed throughout the sea fan blade and branch network, resulting in loss of tissue and/or skeleton.
- Tissue surrounding the lesion often becomes dark purple (pigmentation response). Affected colonies may also produce purple nodules or galls near the lesion, which can encapsulate fungus, algae or other epibionts in an attempt to confine the infection.
- Lesions recently produced by predation (flamingo tongue, fireworms) usually do not show purple coloration but instead the dark brown skeletal matrix, devoid of tissue, is clearly seen.
- Some of these lesions along the branches eventually produce purpled edges.
- Lesions from continuous contact with other octocorals, corals, hydrocorals and/or the substrate usually show the pigmentation response at the point of contact.
- Only affects octocorals, most commonly *Gorgonia, Pseudopterogorgia, Plexaura, Plexaurella*.

2c. Annular or linear tissue loss without distinct pigmented band

White band disease

- Disease front characterized by linear, discrete band of acute tissue loss, 2-10cm wide, which may circumscribe the branch.
- Band separates healthy tissue from exposed skeleton colonized by epibionts.
- Disease progresses rapidly (mm-cm/day) from colony base or branch bifurcation.
- Tissue adjacent to exposed skeleton may be bleached; snails and fireworm predators may colonize the disease front.
- Only observed in *Acropora*.

White plague

- Lesions are focal or multifocal-to-coalescing, with a linear or annular margin, depending on colony morphology.
- A discrete band of bare skeleton separates live tissue from algal-colonized skeleton.
- Tissue adjacent to exposed skeleton may be bleached.
- Linear tissue loss begins at the base or margin of a colony, or emanates from an algal/sediment interface within the colony, and advances 1mm to > 10cm/day.
- Closely resembles white band disease, but affects more than 40 spp. of non-acroporid massive and plating corals.

2d. Tissue loss without distinct pigmented band

Caribbean white syndromes

- Diffuse patterns of tissue loss with no distinctive pigmented mat or band at the interface, i.e. tissue loss that is not characteristic of either white band or white plague.
- In acroporids, this can include diseases that start within the colony and not at the base, and spread in irregular patterns.

3. Discoloration

Dark spots disease

- Focal to multifocal lesions with annular to irregular margins, purple to brown in color and 1cm to more than 45cm in diameter.
- Dark spots may expand over time, coalesce, and form diffuse to annular bands adjacent to or surrounding exposed skeleton.
- Affected tissue may be associated with a depression of the coral surface and may seasonally disappear.
- Underlying skeleton may retain dark pigmentation when tissue is gone.
- Primarily affects *Stephanocoenia*, *Montastraea* and *Siderastrea*.

2.3 Field assessments of Western Atlantic diseases and compromised health states

1. Tissue loss: known predation by fish and invertebrates resulting in compromised health

Fish bites

- Predominant corallivorous fishes including parrotfish, butterflyfish, filefish, pufferfish, triggerfish, and damselfish families.
- Corallivores may be in the surrounding area, but often are not observed feeding on coral.
- Most predators create distinctive scars characterized by removal of tissue and underlying skeleton. Butterflyfish delicately extract tissue from individual polyps without abrading the skeleton – these lesions are often only visible with a hand lens.

Below we describe the most common examples of fish predation encountered on western Atlantic reefs.

Parrotfish (focused biting)

- Diffuse patterns of tissue loss associated with scrapes or gouges (i.e. bite marks) by *Sparisoma viride* (stoplight parrotfish) that remove **corallites** and underlying skeleton.
- Lesions are large (2-50cm wide), and may be focal, multifocal or diffuse. Lesions often expand rapidly over one to five days, beginning at a focal point at the colony margin or within the colony surface and radiating out.
- *Sparisoma viride* graze predominantly on *Montastraea annularis, Montastraea faveolata, Colpophyllia natans* and *Porites astreoides*, and on 18 other species.
- In brain corals (*C. natans* and *Diploria strigosa*), fish remove tissue in a radiating band starting at one end of the colony. Look for predators in the area.

Spot biting

- Multifocal, paired lesions associated with removal of corallites, resulting from bite marks of parrotfish, pufferfish and other fishes.
- The size and shape of lesions may form a pattern consistent with the upper and lower jaw of the predator.
- Various species leave numerous bite marks on individual colonies.
- Scars include recent lesions lacking tissue and lesions in various stages of regeneration, as evidenced by pale tissue covering the injury.

Damselfish

- Multifocal well-circumscribed, circular, less than 1cm in diameter, acute to subacute (most species) or diffuse (brain corals) associated with tissue loss and removal of corallites by *Stegastes planifrons*.
- Lesions generally expand outwards, as older lesions are colonized by algae.