

AGRRA: Coral Mortality



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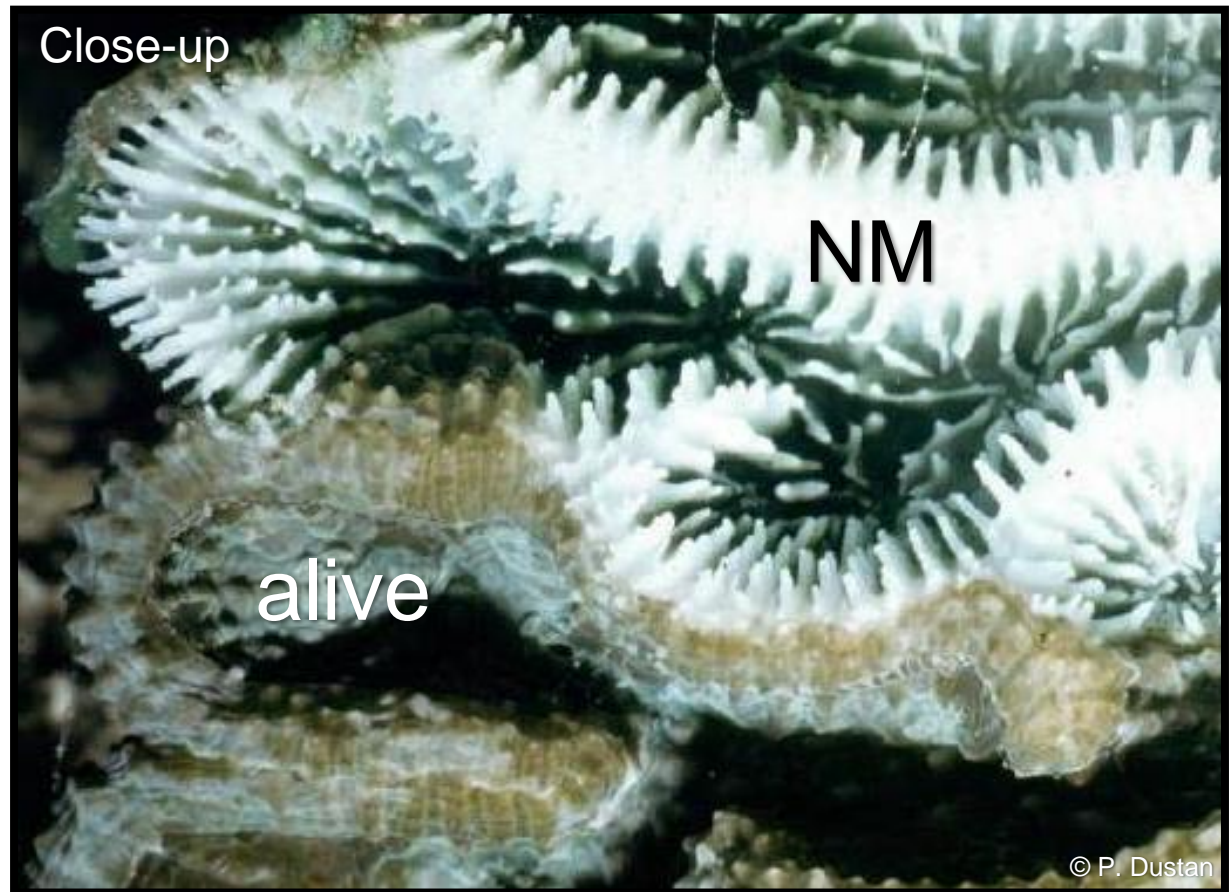
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Mortality Stages

New Mortality (NM): white skeletons are intact (unless live tissues have just been bitten by a fish or abraded), with no visible sediment, algae, *etc.*

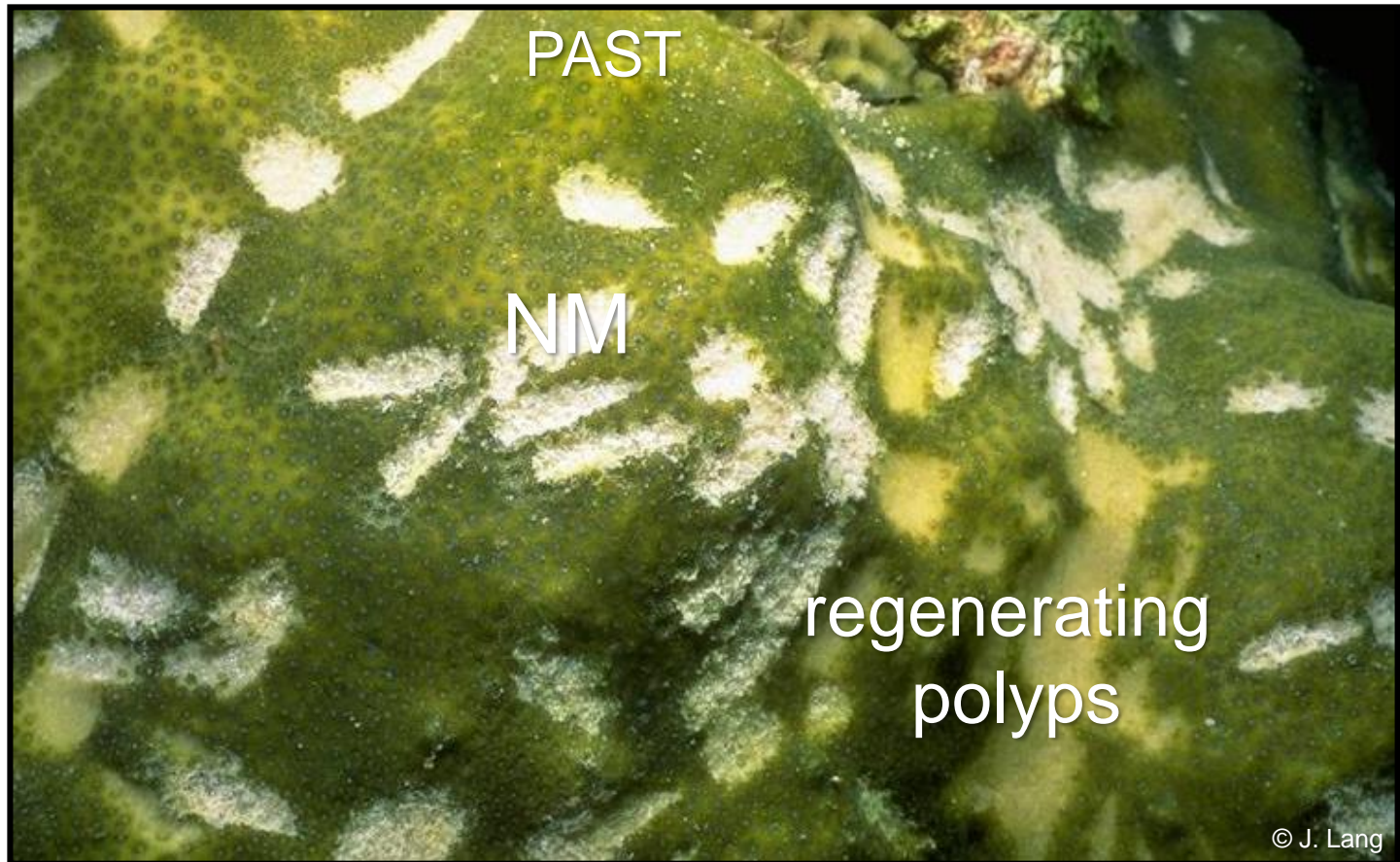
Polyps would have died within the previous few seconds to several days.

Conspicuous **during** outbreaks of disease, mass bleaching mortality events, and just after hurricanes or other large-scale perturbations.



Mortality-₂

New polyps regenerating over scars, as here caused by parrotfish bites, initially are pale (= lack zooxanthellae); do not confuse with bleaching.



Mortality-₃

When part of a coral dies, turf algae or other organisms will quickly start to colonize the exposed skeleton.



Mortality-₄

Transitional Mortality (TM): skeletons are mostly intact and covered with a thin layer of sediment or biofilms, or tiny, multi-coloured turf algae (unless they have just been bitten by a fish or abraded).

Polyps would have died within the previous days to months.



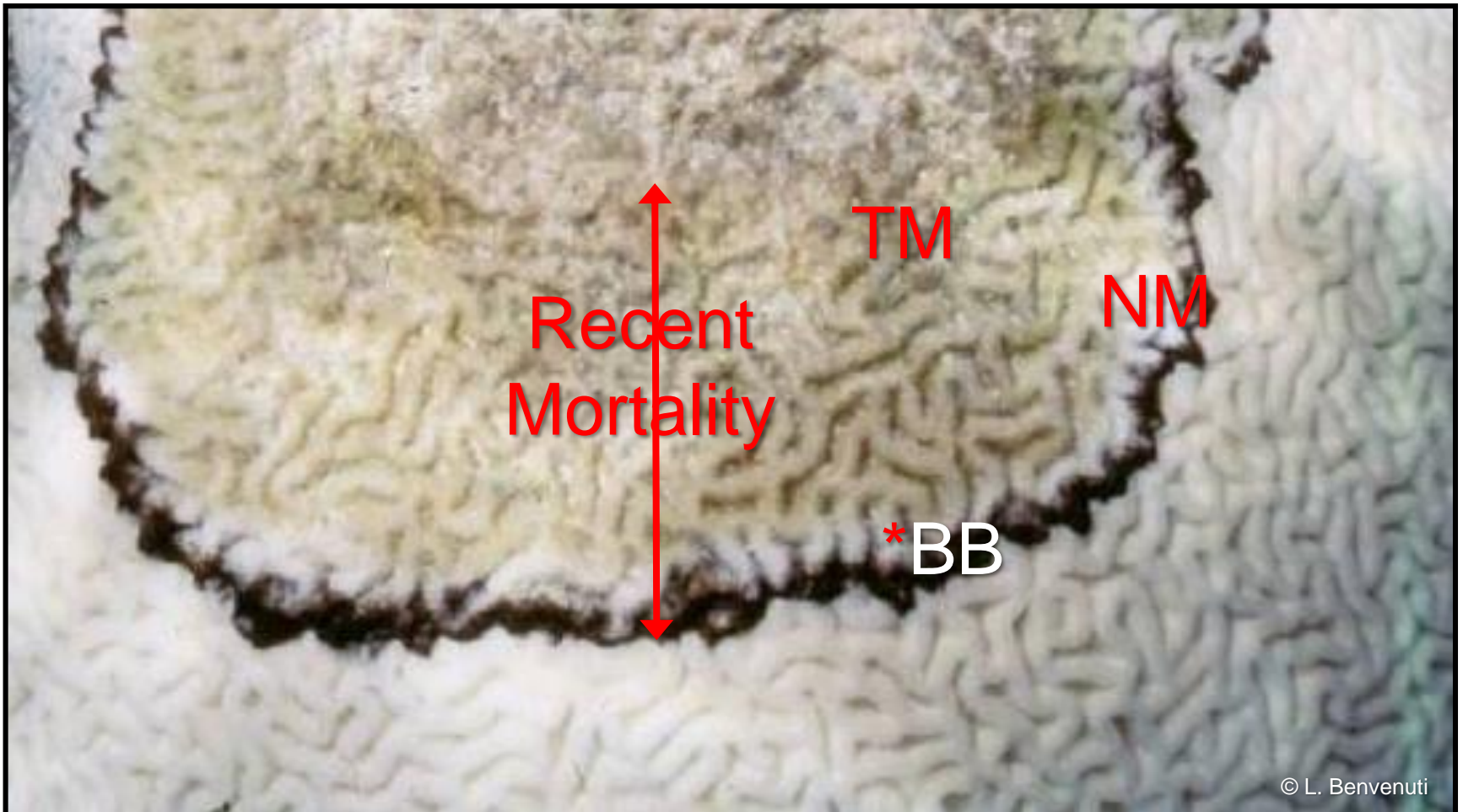
Conspicuous **soon after** outbreaks of disease, mass bleaching-related mortality events, hurricanes or other perturbations.



Mortality₅

Recent Mortality = (New Mortality + Transitional Mortality)

Polyps would have died anytime within previous few seconds to months.



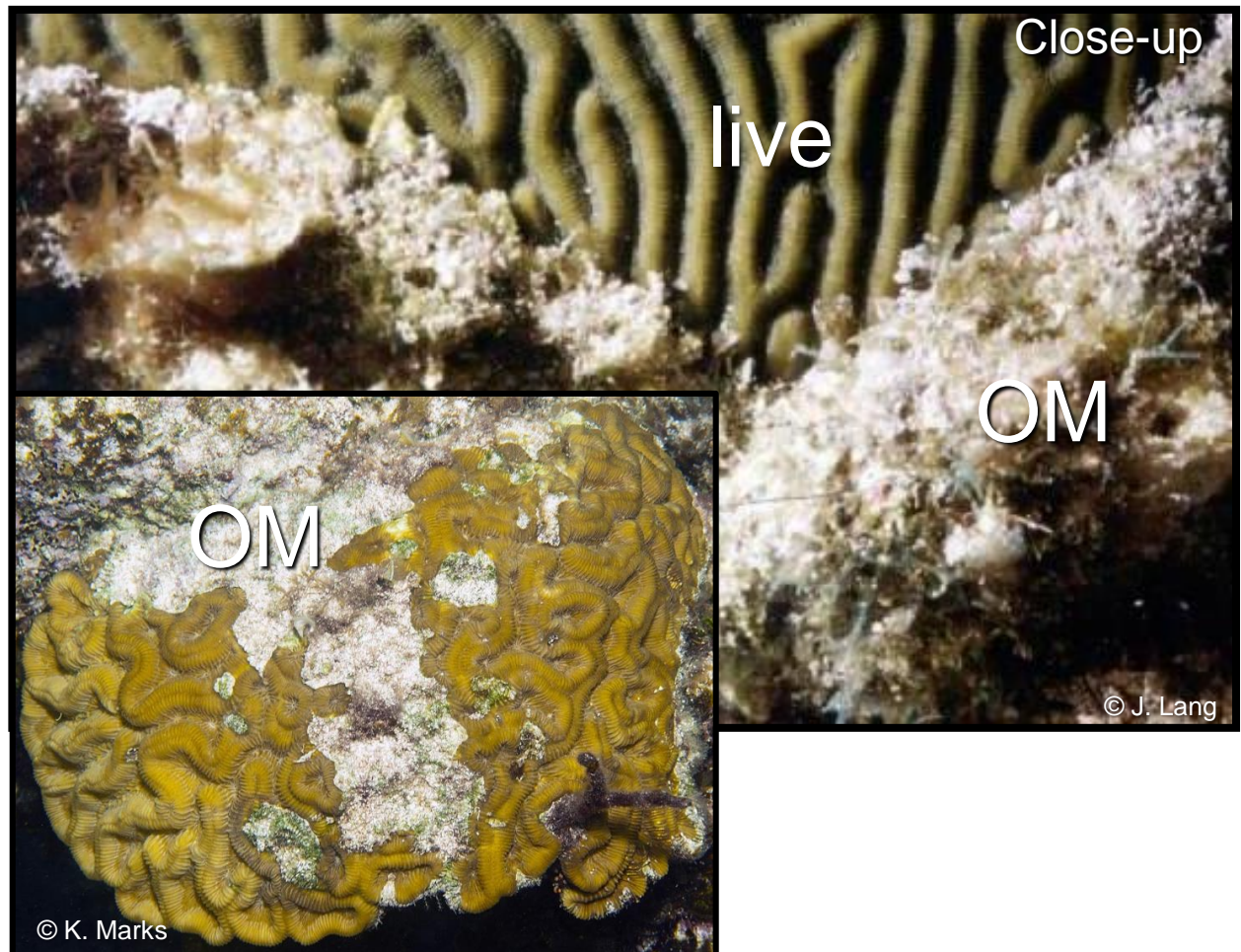
*BB = black band disease

Mortality-₆

Old Mortality (OM): skeletons are covered with thick algal turfs, macroalgae or benthic animals that aren't easily removed (unless these organisms have just been bitten by a fish or abraded).

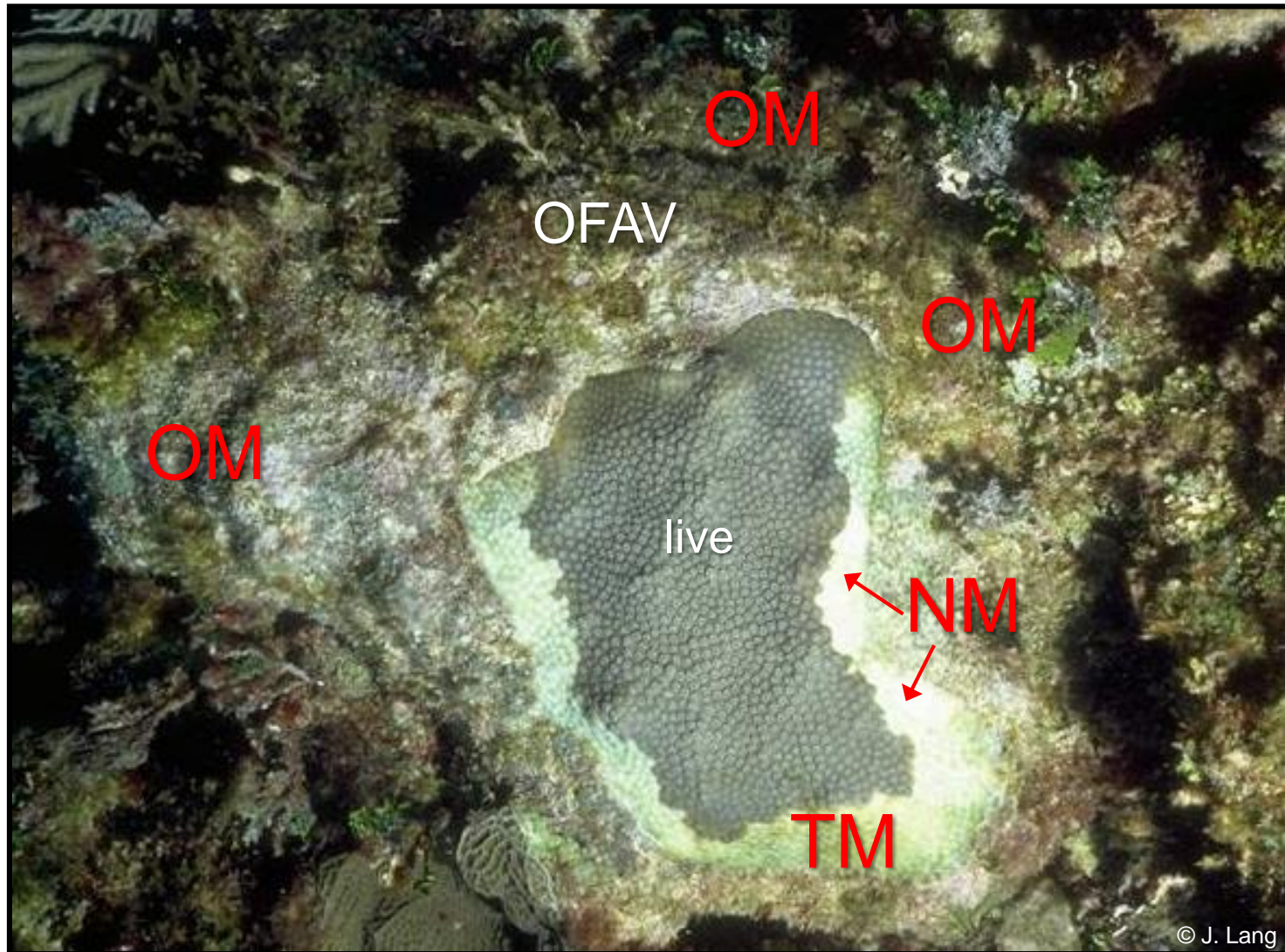
Polyps would have died within the previous months to years, or even decades to centuries.

Areas of OM accumulate over very long periods in long-lived corals.



Mortality-7

What kinds of mortality are visible in this OFAV?



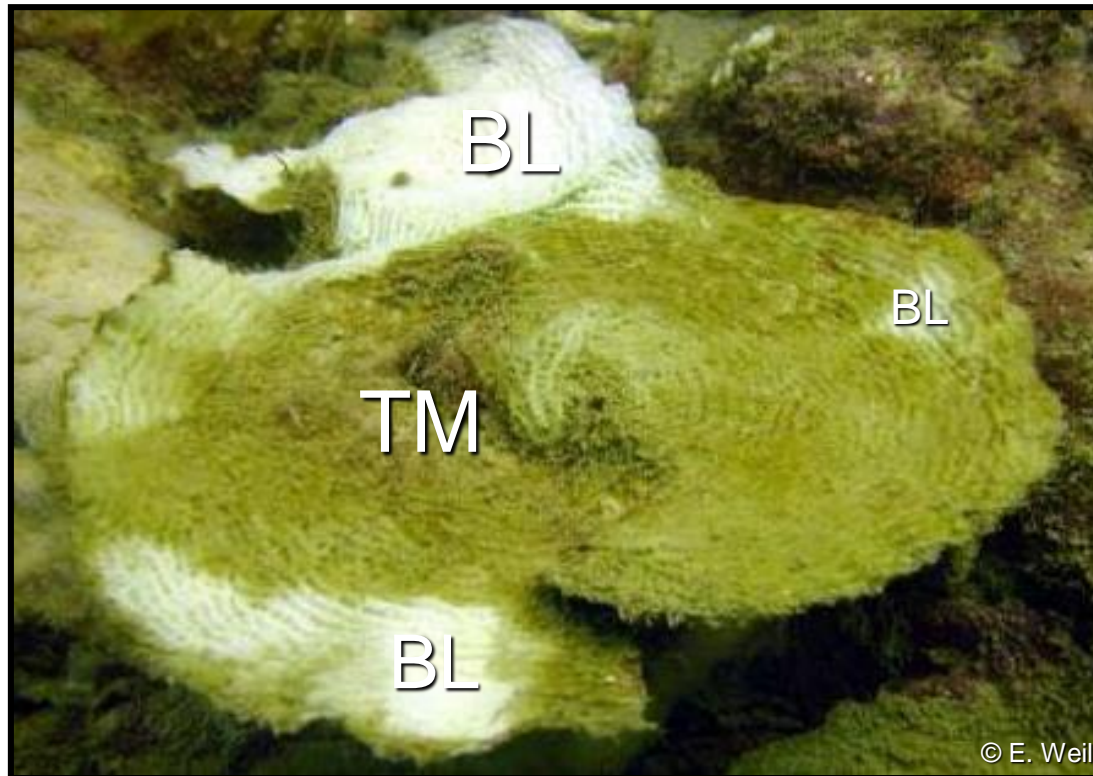
Mortality₈

What kinds of mortality (and which disease) can be seen in this CNAT?



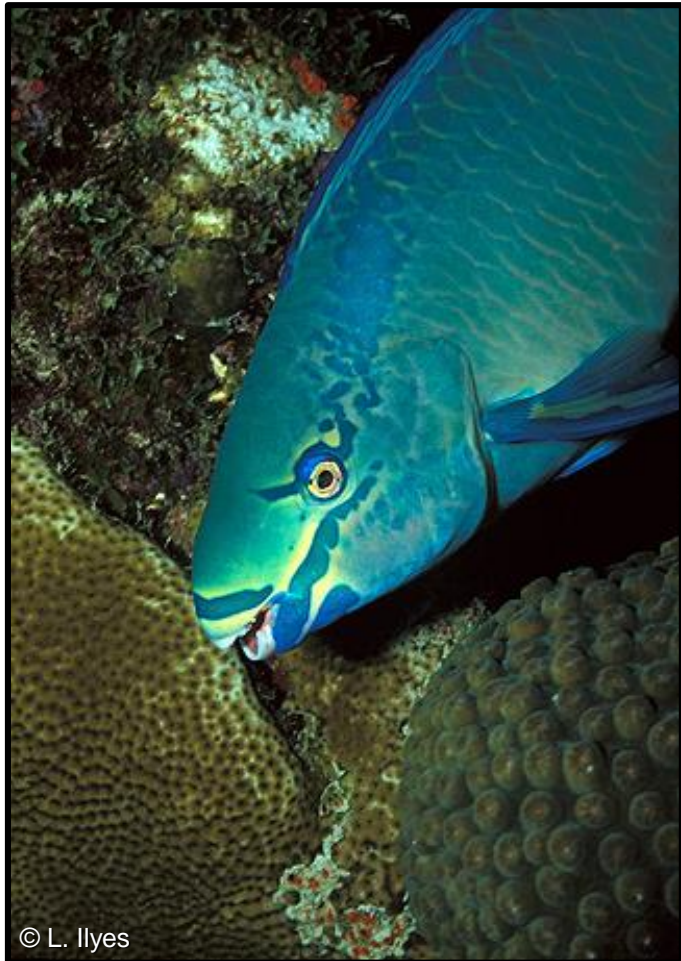
Mortality from Bleaching

Depending on the severity of the stress and its state of health, a coral can survive bleaching (BL) and subsequently recover zooxanthellae, or incur partial mortality, or the entire coral dies.



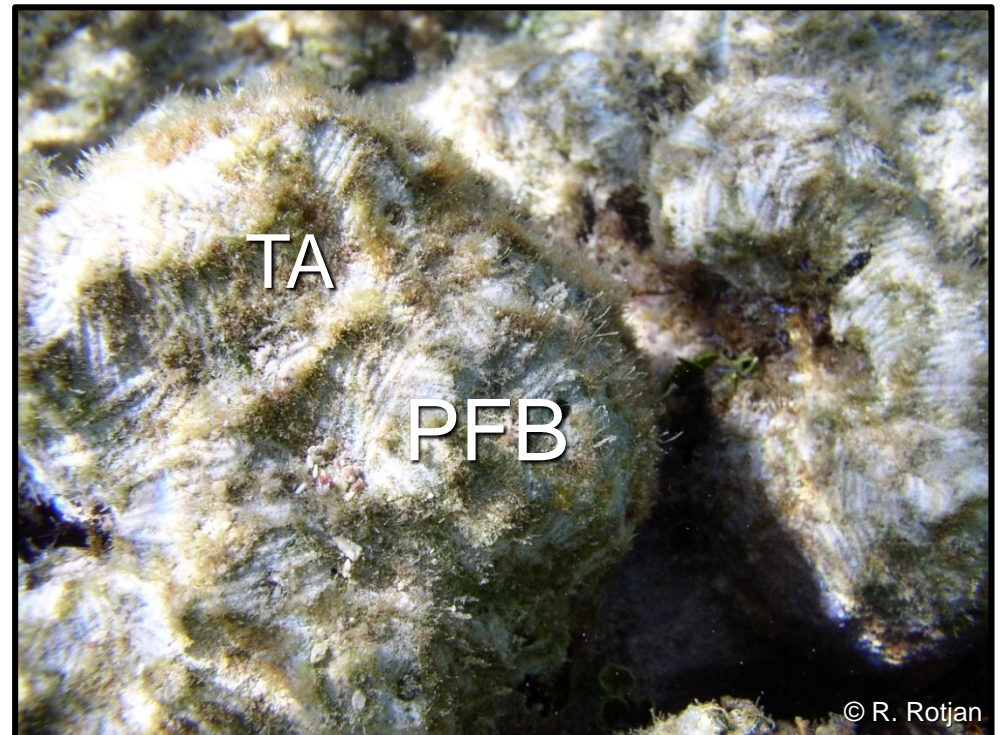
Mortality from Parrotfishes

Score new mortality to live coral polyps from parrotfish bites as NM...



...Ignore mortality that parrotfish biting causes to turf algae (TA) and other organisms that grow on dead coral skeletons.

PFB = parrotfish bites

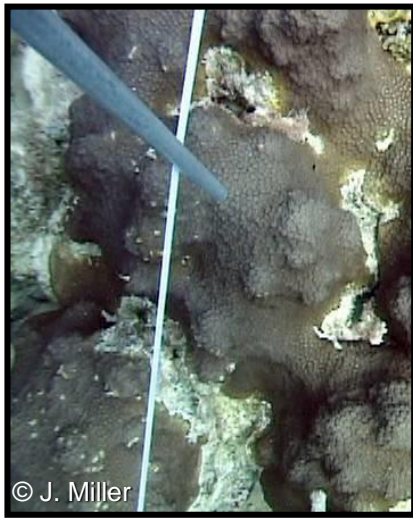


Post-Bleaching Mortality

Stony corals may survive a bleaching event but later die from a disease or other unknown causes, possibly including starvation.

Repeat surveys of the same corals are especially valuable in understanding the long-term effects of mass bleaching events.

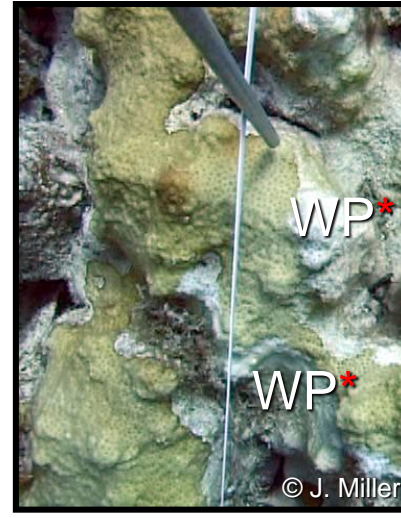
Live tissues
look “normal,”
February, 2005



Tissues survive
bleaching,
November, 2005



Tissues pale +
abundant WP*,
March, 2006



Widespread
TM and OM by
February, 2007



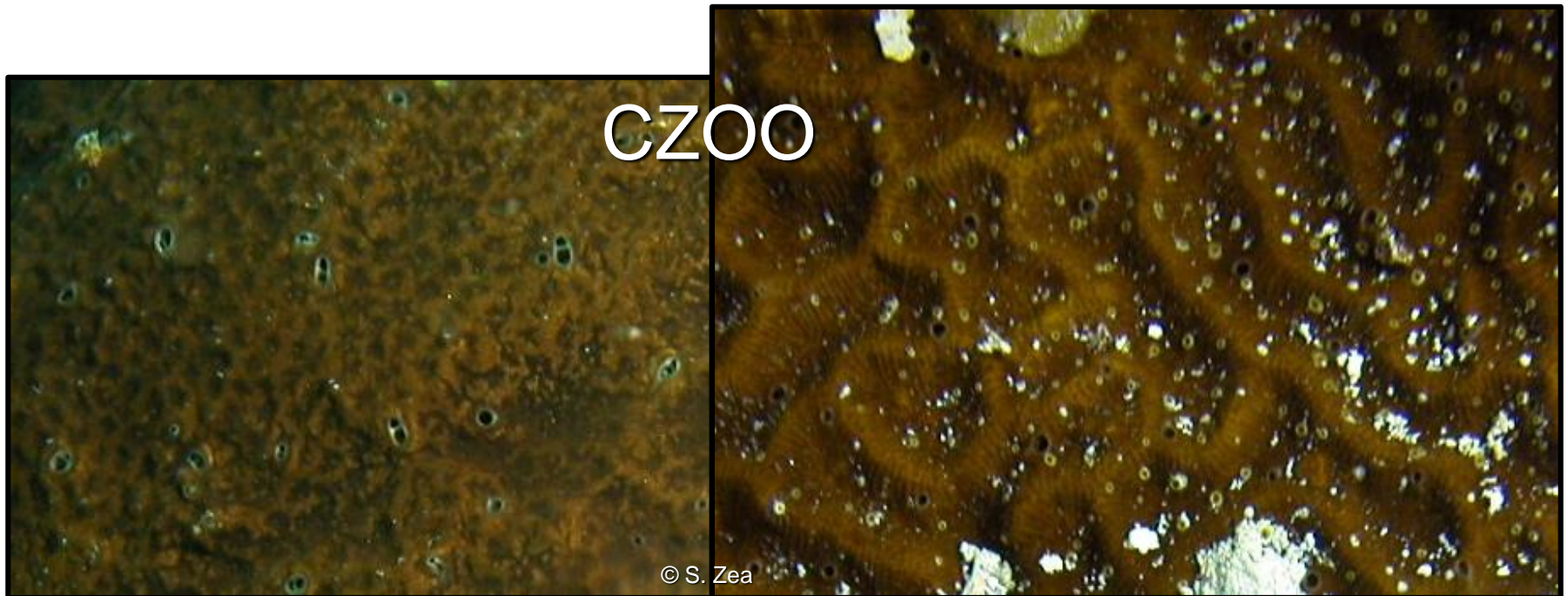
Bleaching and Delayed Mortality of OFAV monitored in St. John.

*WP = white plague disease

Mortality from Zooxanthellate Clionids

When corals are partially or completely overgrown by CZOO (zooxanthellate clionaid sponges), the live polyps are replaced by sponge tissues with their characteristic ostia and oscules (openings).

Sometimes outlines of the former coral polyps are visible in the skeletons beneath the dark CZOO, but they are not alive!



Standing Dead

SD (**standing dead**) means the entire coral has died but can still be identified to species, to species complex, or to genus. (Live remnants are sometimes found on corals that look all dead in planar view.)

