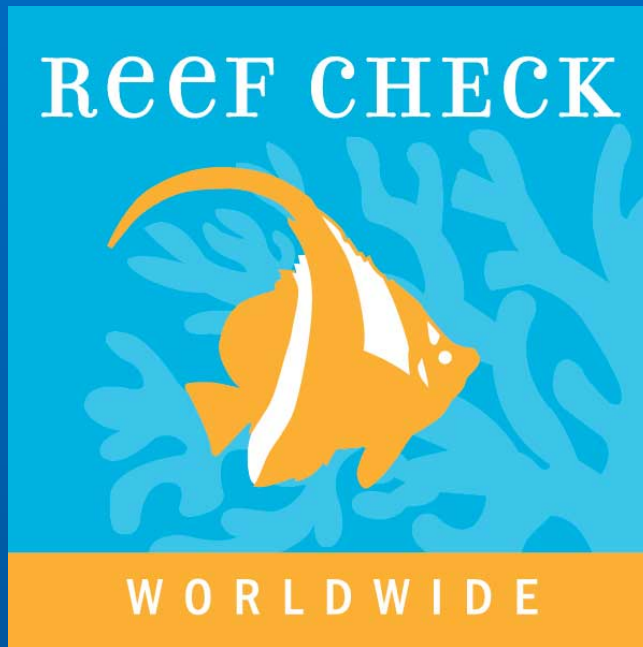


Indo-Pacific Invertebrate ID Training



Reef Check EcoDiver Course

The Methods

The objectives of the belt transect are to count mobile invertebrates and impacts along a transect line.

- 5 m wide belt transect
- Head lower than feet body position
- S-shaped search pattern

Which inverts do we count?

- Banded coral shrimp (*Stenopus hispidus*)
- Diadema urchin (*Diadema* sp. and *Echinothrix* spp.)
- Pencil urchin (*Heterocentrotus mammilatus*)
- Collector urchin (*Tripneustes* sp.)
- Sea cucumbers (Holothuridae)
 - Prickly Redfish, Prickly Greenfish, Pinkfish
- Crown-of-thorns starfish (*Acanthaster planci*)
- Giant clam (*Tridacna* sp.) (size to be estimated in orders of 10cm)
- Triton (trumpet) shell (*Charonia tritonis*)
- Lobster (Palinuridae)

What impacts to count during the invert belt transect

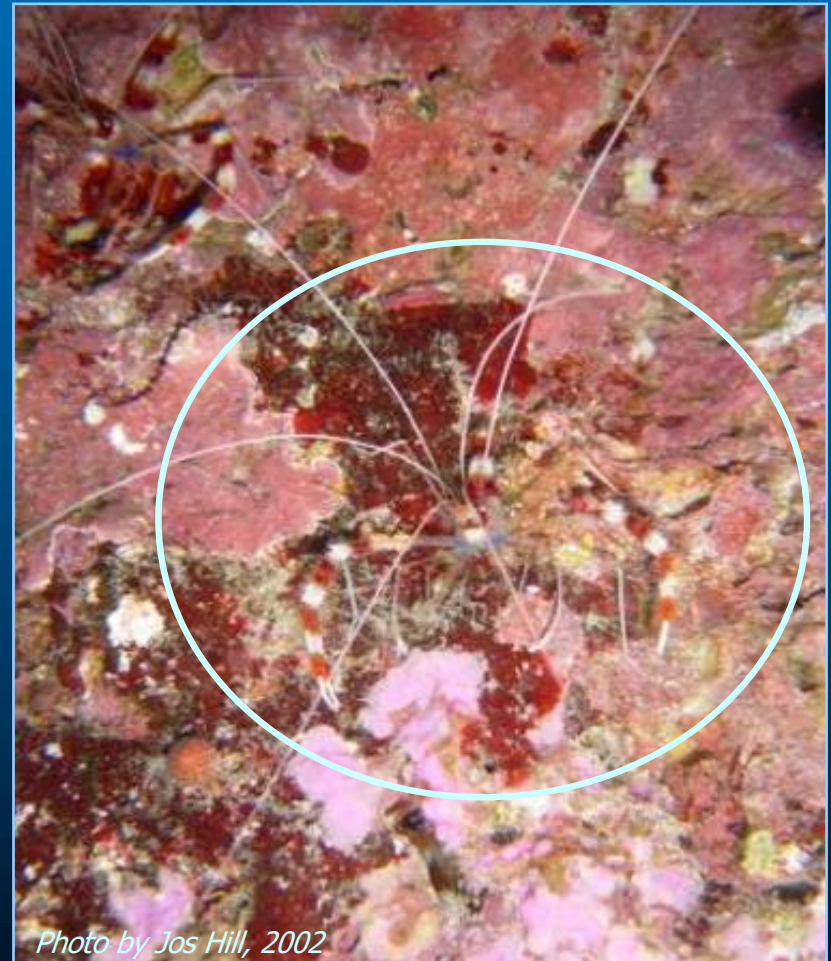
- Bleaching (% of colonies bleached in each 20m transect and % of each colony that is bleached)
- Disease (describe the disease and identify if possible)
- Coral damage (cause: anchor, dynamite, cyanide, trash, other)

BANDED CORAL SHRIMP

Collected for the Aquarium Trade

ID TIPS

- Found in cracks and crevices during the day
- Very obvious red and white stripes
- Look for long, white antennae



DIADEMA URCHIN

The keystone algae-grazers

Essential for keeping algae in control.

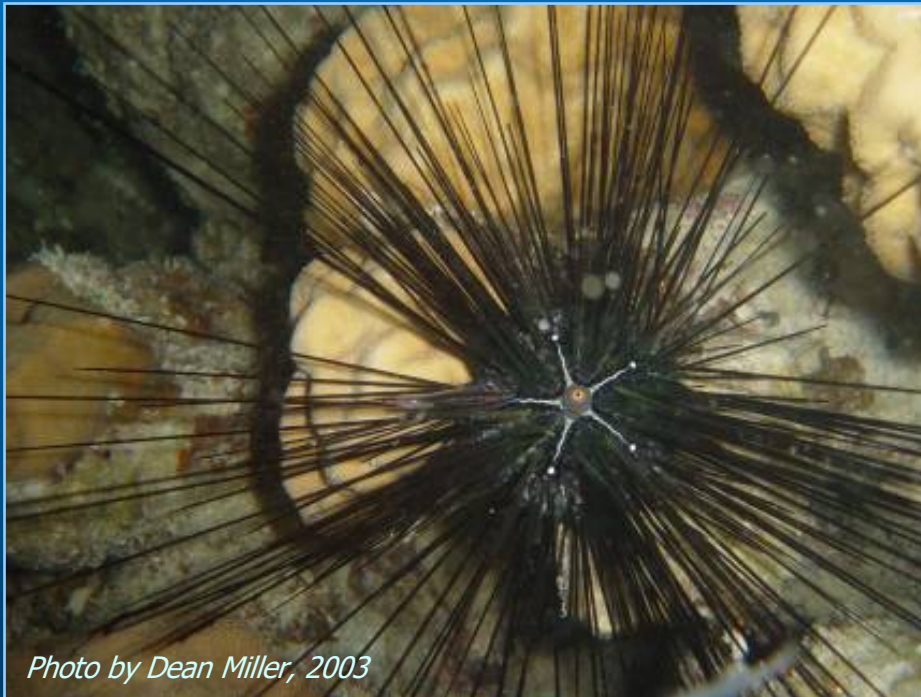


Photo by Dean Miller, 2003



Photo by Jos Hill, 2003

ID TIPS

- Very long sharp spines. May be under corals or in holes or cracks.

PENCIL URCHIN

The algae-grazers



Photo by Jos Hill

Pencil urchins are removed for souvenirs. They are algae grazers.

ID TIPS

- Thick, stubby spines
- Found in cracks or crevices
- Red or brown – colored spines

COLLECTOR URCHIN

The algae-grazers



Photo by Helen Sykes



Photo by Jos Hill

This urchin is collected for the aquarium trade and is harvested for food in many countries throughout the world.

SEA CUCUMBERS

The reef's vacuum cleaners

ID TIPS

- Three species only
- On sand in between coral patches
- Elongated with distinct color and shape



Photo from Reef Check Headquarters, 2003



Photo by Undersea Explorer, 2004



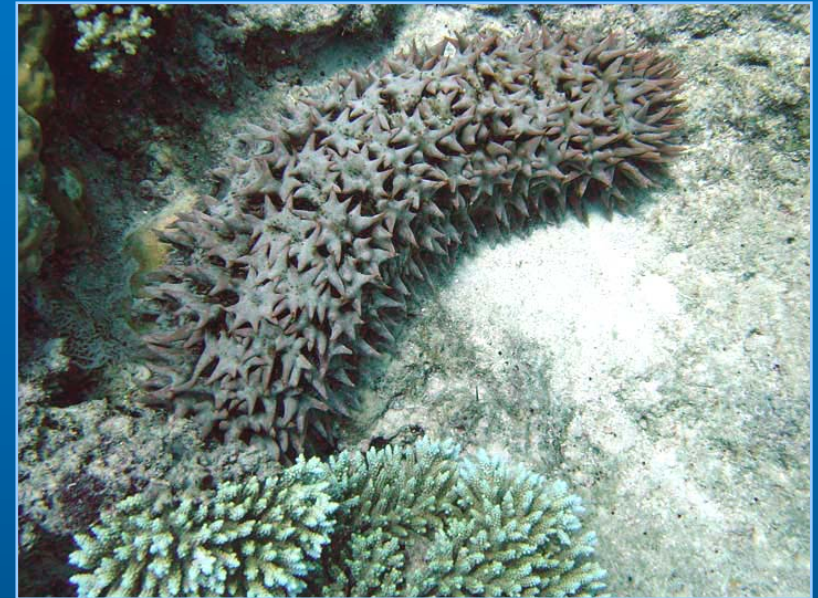
Photo by Jos Hill, 2003

SEA CUCUMBERS

The reef's vacuum cleaners

Reef Check counts 3 species of sea cucumbers:

- Prickly Redfish (*Thelenota ananas*)
- Greenfish (*Stichopus chloronotus*)
- Pinkfish (*Holothuria edulis*)



SEA CUCUMBERS

The reef's vacuum cleaners

Prickly Redfish (*Thelenota ananas*)

ID Tips:

- Orange to dark brown
- Many pointy soft papillae
- Can attain 10 cm diameter and 7 cm length, flat underside.



SEA CUCUMBERS

The reef's vacuum cleaners

Greenfish
(*Stichopus chloronotus*)

ID Tips

- Black to dark purple with orange tips to papillae
- 4 rows of papillae run length of body
- Flat underside, almost square in cross-section
- Hard body wall



SEA CUCUMBERS

The reef's vacuum cleaners

Pinkfish
(*Holothuria edulis*)

ID Tips:

- Black on top, pink underside
- Smooth, no papillae
- Completely round in cross section
- Small -- hotdog sized



CROWN OF THORNS

The coral-eaters

COTS can be conspicuous on the reef. Look for the spines under plate corals and inside coral thickets if you see irregular white patches with no tissue larger than 15 cm across.



Photo by Jos Hill, 2003



Photo by Jos Hill, 2005

COTS

The coral-eaters

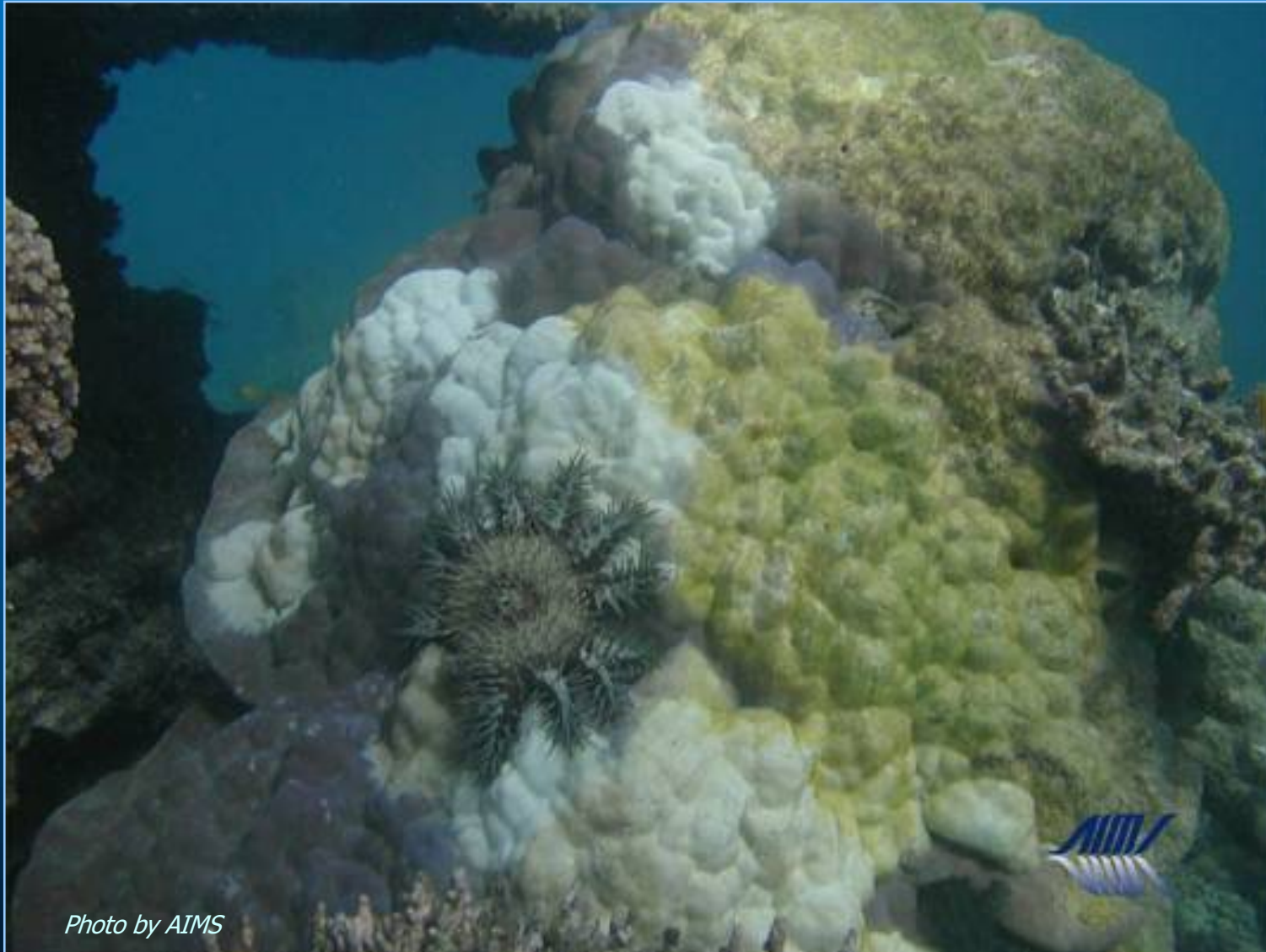


Photo by AIMS

GIANT CLAM

Filter feeders



Photo by Jos Hill, 2003



Photo by Jos Hill, 2003



Photo by Jos Hill, 2003

Remember to size to the nearest 10 cm!

TRITON SHELL

COTS-eaters



Photo by Jos Hill, 2003. Courtesy of Digital Dimensions



Photo by Jos Hill, 2003. Courtesy of Digital Dimensions

ID Tips:

- Look for orange and black antennae protruding from front of shell
- Shell is large and spirals at one end

LOBSTER

Scavengers

ID Tips:

- Look for their antennae protruding from cracks



Photo by Jos Hill, 2003



Photo by Dean Miller, 2003

Lobster (*Panulirus* sp.)

REEF IMPACTS

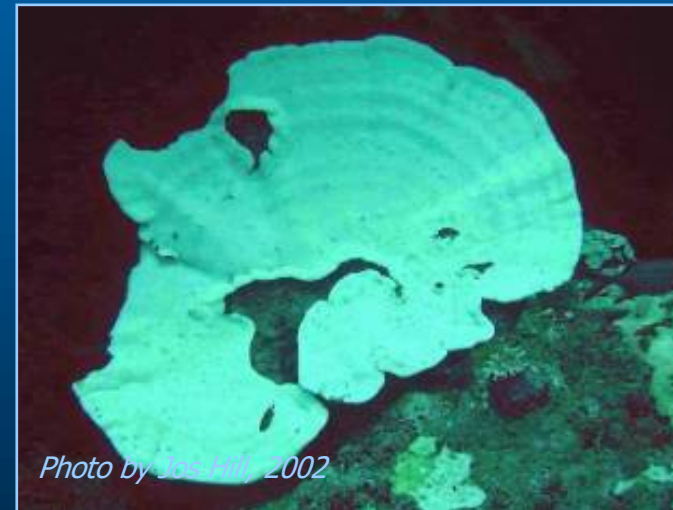
Impact Information

Remember that as a part of the invertebrate survey, we also collect information on reef impacts. Impacts recorded include the presence of:

- Bleaching
- Disease (with type identified if possible)
- Trash (with type recorded)
- Fish nets or traps
- Boat/anchor damage
- Dynamite damage
- Other coral damage

CORAL BLEACHING

Global warming indicator



The white patch here is bleached and the brown parts are unbleached.

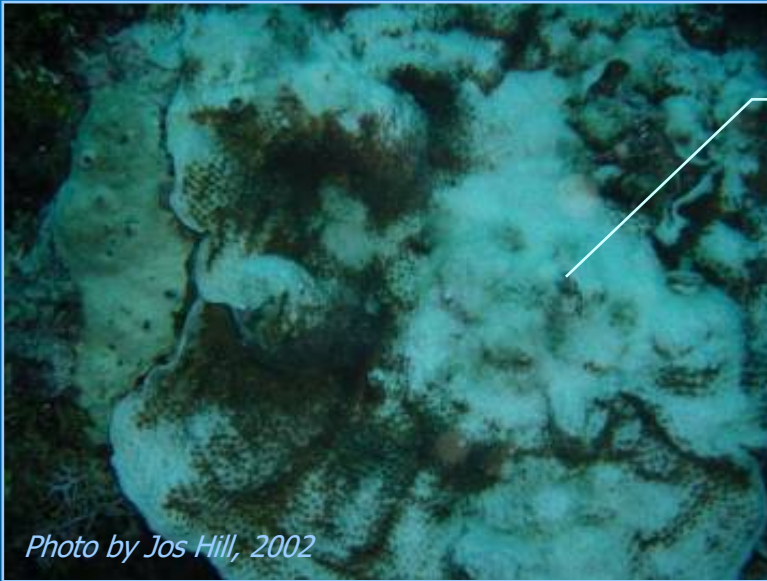
CORAL BLEACHING

Global warming indicator



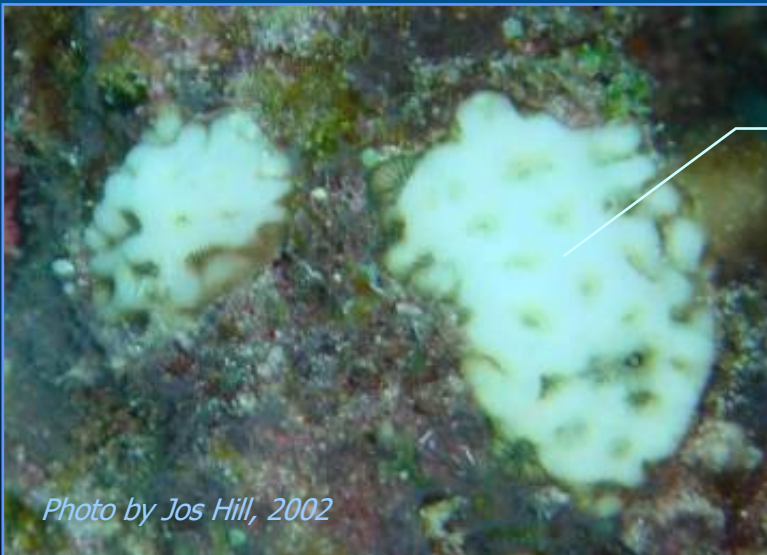
CORAL BLEACHING

Global warming indicator



This coral is only partially bleached

For this coral colony, you would say that 60% of it is bleached.

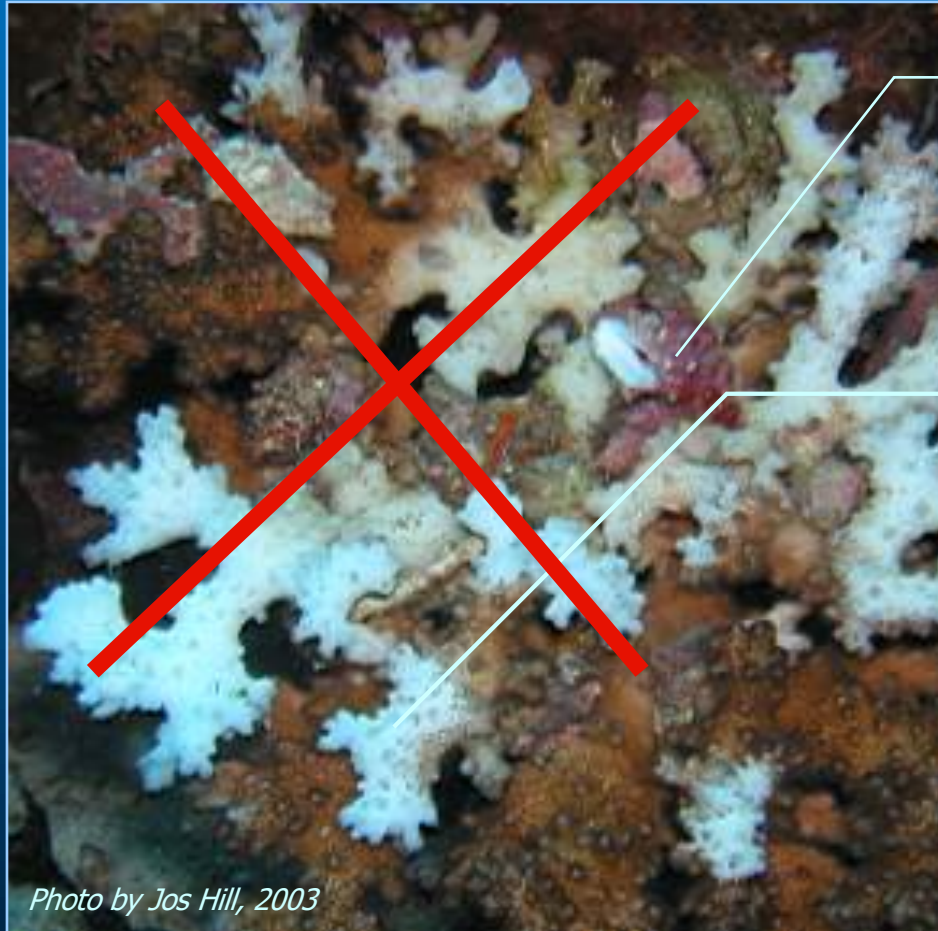


This coral is totally bleached

For this coral colony, you would say that 100% of it is bleached.

CORAL BLEACHING

Global warming indicator



Drupella snail

This is not bleaching. The gradation between the white coral and the coloured coral is sharp NOT gradual. If you look carefully you see that the coral tissues are gone, and were eaten by little snails called *Drupella*.

BLACK-BAND DISEASE

Coral health indicator



Photo by Sam Birch, 2004



Photo by Jacqui Shiels, 2004

BLACK-BAND DISEASE

Coral health indicator

Note there is no white or black band between the dead and live tissue here. This is predation - look for small snails when you see this.



Drupella snail

BLACK-BAND DISEASE

Coral health indicator



Photo by Jos Hill 2004

WHITE SYNDROME DISEASE

Coral health indicator

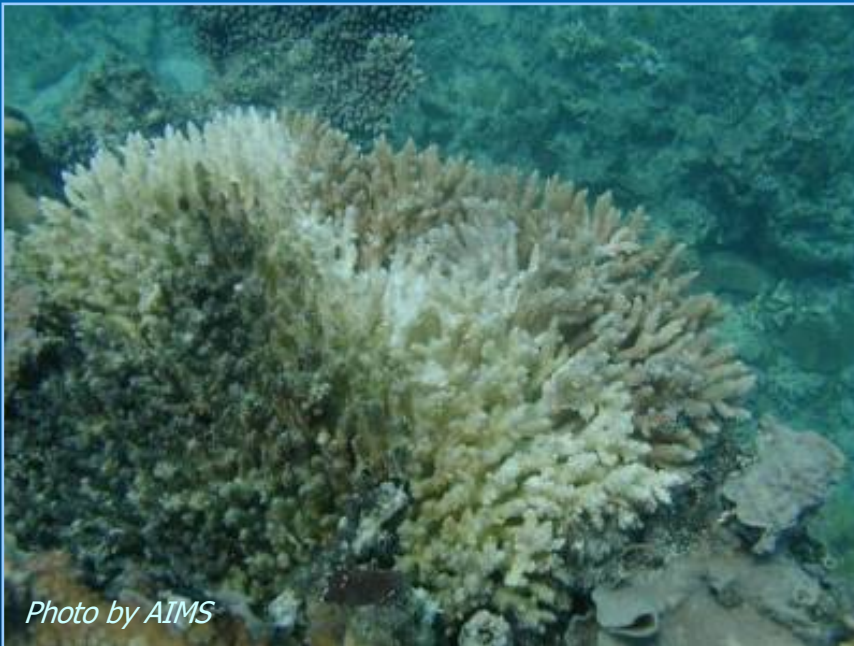


Photo by AIMS

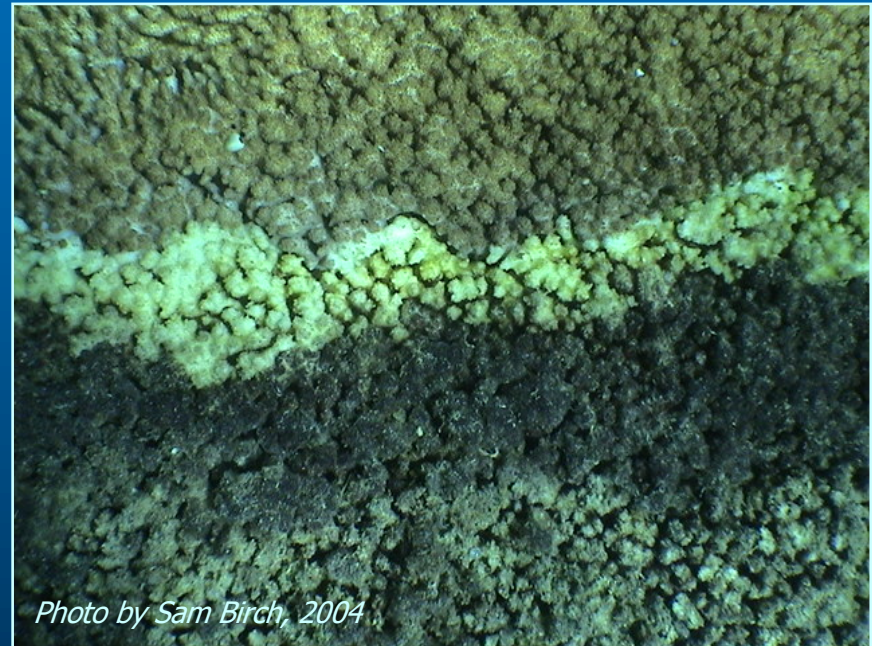


Photo by Sam Birch, 2004

<http://www.aims.gov.au/pages/research/reef-monitoring/coral-diseases/diseasecp.html>

BROWN BAND DISEASE

Coral health indicator



Photo by AIMS

Summary

Is it bleaching, disease, drupella or COTS?

BLEACHING

- Gradual color loss
- Begins on upper surface
- More than one colony affected
- Tissue intact
- Bleached coral is not always white



Photo by Jos Hill, 2004

DISEASE

- Disease progresses across the colony
- White or black band between the dead coral and the live coral
- Necrosis at the interface between the disease and the live coral



Photo by Sam Birch, 2004

DRUPELLA

- Jagged edges between live and dead coral because tissue is rasped off
- They prefer *Acropora* sp. and *Pocillopora* sp.
- Coral eaten in patches
- Snails often near by new, white scars



Photo by Jos Hill, 2004

COTS

- Abrupt interface between live and dead tissue
- COTS tend to prefer plate and branching *Acropora* sp.
- COTS scars are larger than *Drupella* scars



Photo by AIMS

TRASH and CORAL DAMAGE

Trash includes discarded fishing lines, as shown below, and other gear or any other rubbish you see on a reef.

Damage and Trash should be rated as the following:

None=0

One piece/damage per transect any type is Low=1

Two to four pieces/damage per transect is Medium=2

More than four pieces/damage is High=3

It is important to put zeros in these fields if there is no bleaching, disease, trash or coral damage.



BLAST FISHING DAMAGE



Photo T. Heeger


OTHER CORAL DAMAGE

Poison fishing



Muro Ami





These materials were
produced by Jos Hill and
colleagues.

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THE END!