Coral Bleaching Protocol

Overall Objective

The aim of this protocol is to monitor the severity of bleaching events and the recovery potential following bleaching events by surveying coral populations at different depths on the reef. Depending on your time you want to invest and your knowledge of coral taxonomy you can choose option **A** OR **B**

Option B – Line intercept transect

This option is recommended for observers with limited time and basic knowledge of benthic organisms or coral taxonomy in Maldives. Knowledge in coral taxonomy is not required to collect data using this option. The estimated time to do one transect (50m) is about 15-20 minutes regardless of the coral cover present at the site.

Objective

Survey coral at different depths. At 1m (or top reef), 5m (reef crest) and 10m (reef slope). If you can survey only one depth, then choose **5 m**.

Suggested equipment

Protocol forms, pencils, Perspex or other u/w slate or clipboard, rubber bands to fix the form, 100 m transect tape (2x 50m), snorkeling or SCUBA gear and associated safety equipment, sunscreen and/or protective clothing, a safety plan and these instructions.

Instructions

Lay a 50m transect tape and every 50cm identify which of the following categories intercepts with the transect tape:

BC All fully or partially bleached, living hard corals

NBC All not bleached, living hard corals

RKC Recently killed coral (disease, predation, algal overgrowth)

OT Anything other than living hard corals (you can add your own categories to identify different benthic types if you are comfortable with identifying additional categories)

When surveying, never count the benthic intercept at 0m on the transect tape. Instead start at 0.5m, and read intercepts until 50m to complete one transect. Leave a 5m gap between each transect. At each site and depth, 3 transects (3x50m) should be completed. For each reef, where you lay the transect tape, please fill in the required fields on the data form. Enter the reef name that is commonly used in the area, the time, atoll, water temperature, depth and visibility. Note down the latitude, longitude of the starting point and the direction (in compass degrees) to which the end transect tape is pointing. It is also important to record whether there are additional stressors visible such as sedimentation or crown of thorn starfish. You can take a video of the transect line but make sure that the transect tape and whole coral colonies are visible (do not go to close!).

Suggested Frequency

Twice-yearly in case of no bleaching.

In case of a bleaching event, survey the reef once before the predicted bleaching event, then during the bleaching event every 1-2 weeks (if possible), and then every month following the bleaching event (if possible) to monitor recovery.

Notes/Suggestions

Draw a line on the transect tape every 0.5m with permanent marker, on both sides. This makes it quicker underwater to see the location where you are assessing (and thus saves a LOT of time underwater). Also, if people are filming it'll make it easier for whoever is interpreting the video where to survey especially if the tape has rotated.

Data sheet (option b – line intercept)

m	T1	T2	T3	m	T1	T2	T3	Observer Name:
0.5				10.5				Atoll:
1				11				Reef Name:
1.5				11.5				Start point Latitude:
2				12				Start point Longitude:
2.5				12.5				Transect direction:
3				13				Transect depth:
3.5				13.5				Start time:
4				14				Date:
4.5				14.5				Water Temperature:
5				15				Date:
5.5				15.5				
6				16				**Codes:**
6.5				16.5				**BC Bleached hard coral**
7				17				**NBC Not bleached hard coral**
7.5				17.5				**RKC Recently killed coral**
8				18				**OT Other**
8.5				18.5				
9				19				**T1 Transect 1**
9.5				19.5				**T2 Transect 2**
10				20				**T3 Transect 3**

m	T1	T2	T3	m	T1	T2	T3	m	T1	T2	T3
20.5				30.5				40.5			
21				31				41			
21.5				31.5				41.5			
22				32				42			
22.5				32.5				42.5			
23				33				43			
23.5				33.5				43.5			
24				34				44			
24.5				34.5				44.5			
25				35				45			
25.5				35.5				45.5			
26				36				46			
26.5				36.5				46.5			
27				37				47			
27.5				37.5				47.5			
28				38				48			
28.5				38.5				48.5			
29				39				49			
29.5				39.5				49.5			
30				40				50			

COMMENTS:

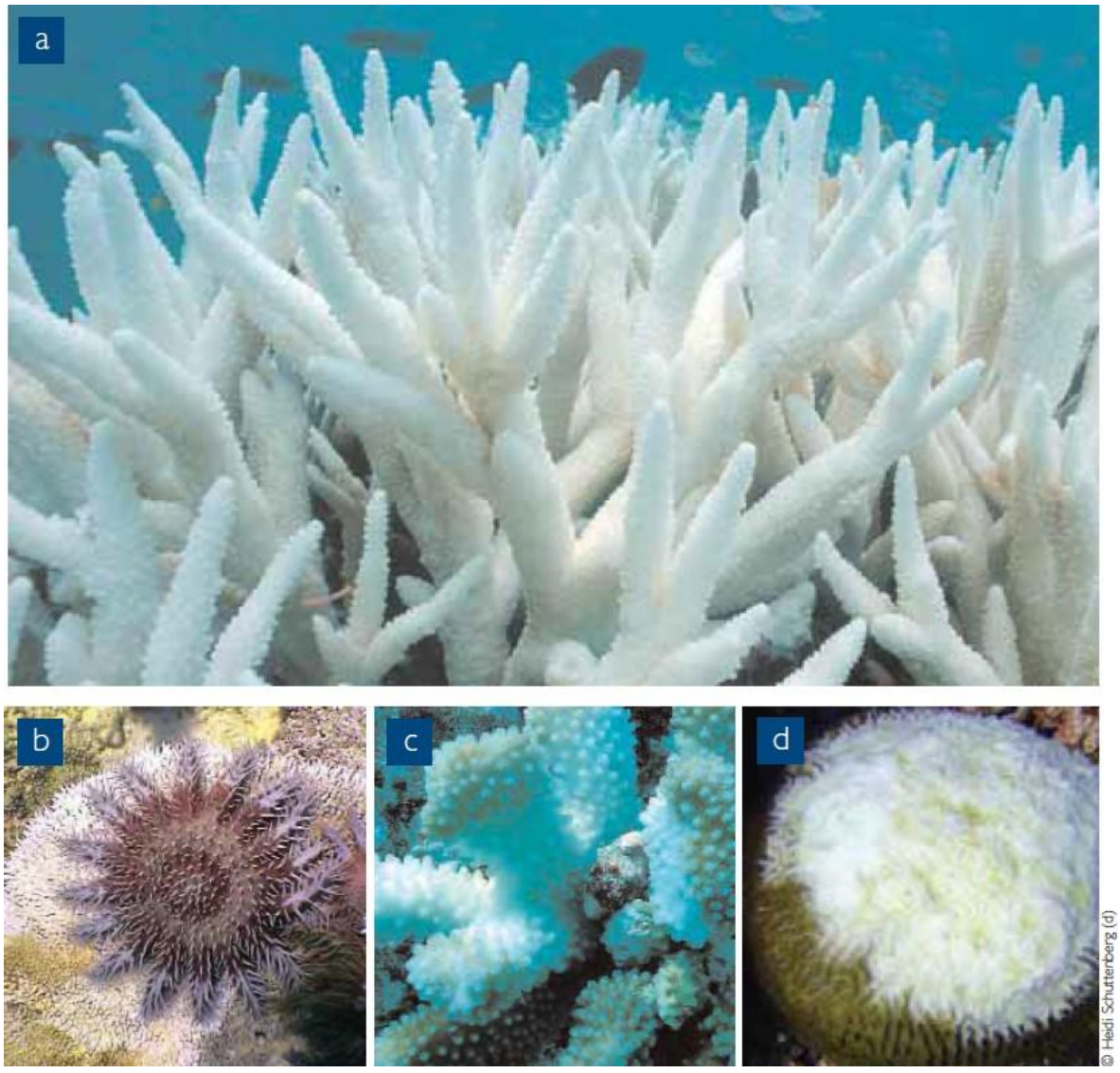
Instructions:

Fill the collected data into the colored fields and send to, or request the Excel sheets to fill in from the following people:

Nizam Ibrahim: nibrahim@mrc.gov.mv
and copy Ahmed Basheer: ahmed.bashyr@gmail.com

How to identify bleaching during a mass bleaching event?

Mass coral bleaching is visually very distinctive, but determining whether bleaching or some other stress is affecting individual corals can sometimes be difficult. See the photos on the next page: (a) Bleaching is usually distinguished by the way it affects entire colonies or large sections of colonies similarly. Sometimes coral tissue and polyps can still be seen remaining on the skeletons as the coral is still alive. The effects of coral predators, such as (b) crown-of-thorns starfish and (c) drupella snails can often be recognized by patches of bare skeleton adjoining patches of live, healthy tissue. (d) Coral diseases can also be sometimes mistaken for the early stages of mass coral bleaching. Disease takes many forms, but the effects of disease are often characterized by a strong line separating live and
dead parts of a coral, or by rapid erosion of the surface structure of the coral, as shown here (Marshall, Paul, 1969 “A reef manager’s guide to coral bleaching”).



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White tips

Branching and plating corals (for example Acropora species) appear to have white tips although the rest of the colony seems to be intense in color. In this case, it is part of the growing process of a healthy coral.

A healthy, branching coral (*Acropora sp.)* displaying white tips.

A branching coral (*Acropora sp.)* displaying white tips as part of a natural growing process. These corals are not bleached.

For more information, see the links below

Facts about coral bleaching:
http://oceanservice.noaa.gov/facts/coral_bleach.html

Snails feeding on coral polyps:
http://www.reefresilience.org/coral-reefs/stressors/predator-outbreaks/drupella/

Crown of thorn starfish:
http://www.reefresilience.org/coral-reefs/stressors/predator-outbreaks/crown-of-thorns-starfish/

Coral disease:
http://www.reefresilience.org/coral-reefs/stressors/coral-disease/