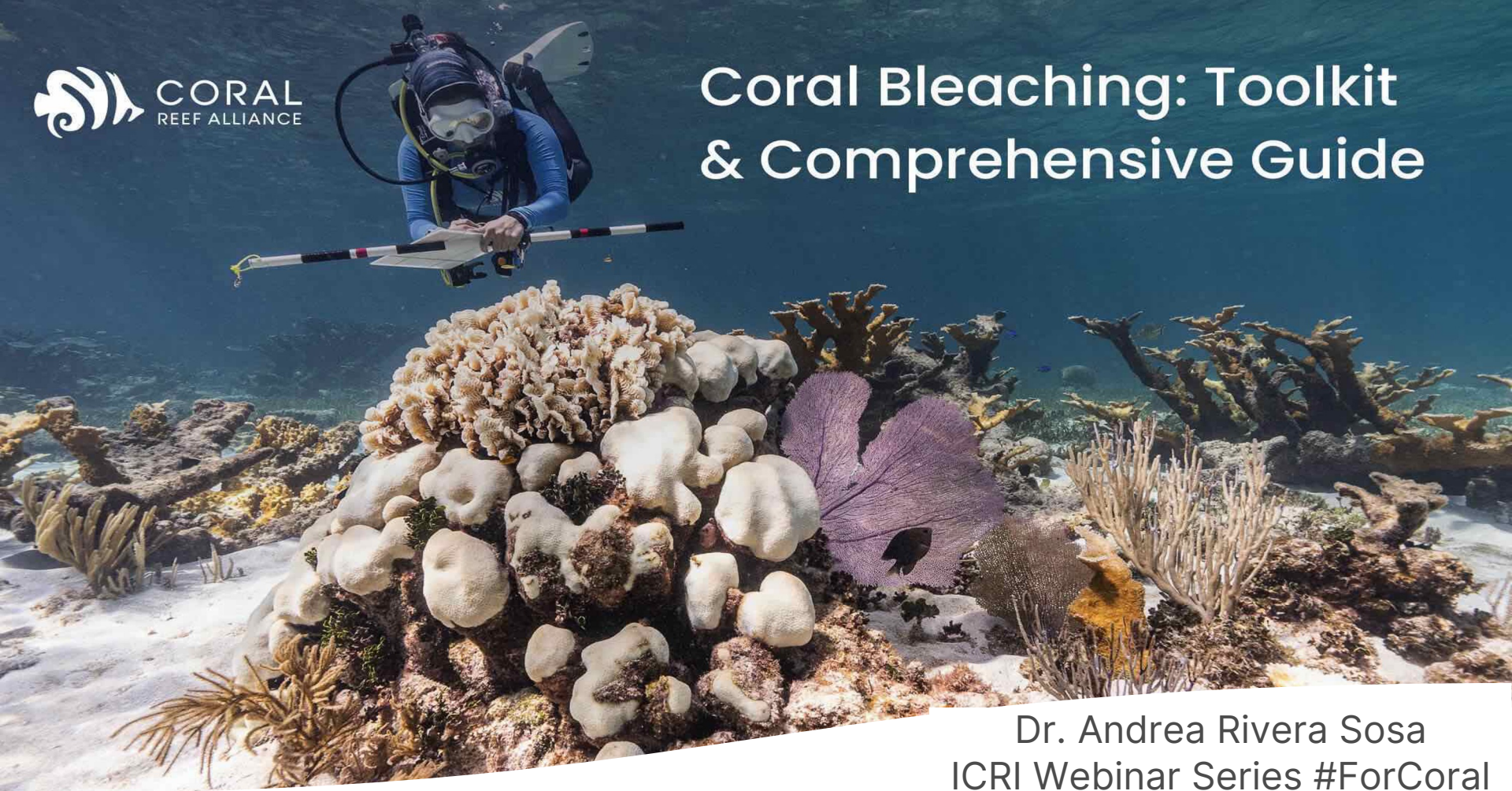




Coral Bleaching: Toolkit & Comprehensive Guide



Dr. Andrea Rivera Sosa
ICRI Webinar Series #ForCoral
March 5th, 2024

Coral bleaching Toolkit & Comprehensive Guide



Aims to gather a wealth of information, **actionable guidelines**, resources for understanding and monitoring bleaching events.



**Healthy coral reef
Mortality**



Coral Bleaching



Coral

The Ocean Image Bank/
The Ocean Agency)

Coral Bleaching: Toolkit & Comprehensive Guide

Coral Bleaching Checklist: Managers and Dive Operators

Protecting sensitive corals before, during, and after bleaching events

Before

Being prepared prior to a bleaching event helps tremendously in the long run. Avoid the scramble and take the following steps to get ahead.

- Develop and/or review your bleaching (and other crises) response plans**
- Don't have one? Check the Reef Resilience Network guidance to develop a [Bleaching Response Plan](#)
- Activate early warning systems – Sign up for alerts, check bleaching for specific areas using**

- NOAA Coral Reef Watch – [coralreefwatch.noaa.gov](#)
- Allen Coral Atlas – [bleaching@allenatlas.com](#)
- IHO Coral Bleaching Monitoring Service
- Caribbean SIMA2

- Prepare to communicate with authorities, dive operators, and other key partners (CORAL, NGOs)**
- Support monitoring plans for the region**
- Plan with stakeholders how to reduce stressors on the reef**
- Communicate to diving guests how they can support**
- Join a citizen science monitoring network (examples below)**

- Global – Coral Watch Reef Check**
- Great Barrier Reef – Eye on the Reef ([eoberf.org](#))**
- Philippines Coral Bleaching Watch**
- Coral Bleaching Indonesia**

After

It's important to document lessons learned and to share it at the forefront of management decisions.

- Observe and document long-term impacts**
 - Weigh down the species dying and surviving
 - Take photos of each

coral.org/coral-bleaching

During

Help reduce stressors on the reef

- Set up moorings, prevent anchoring
- Give busy dive and snorkel sites a break
- Don't touch corals, keep hands and fins off
- Reduce fishing pressure (Protect & Restore)
- If you separate, take a break
- Use reef-safe sunscreen
- Ensure you have proper waste disposal
- If you have proper waste disposal, ensure you have proper waste disposal from storage since bleacher corals are more susceptible

Document the bleaching event

- Observe carefully which corals are bleaching and note the extent of bleaching
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- Observe carefully which corals are bleaching and note the extent of bleaching

Communicate bleaching events:

- Ask them what they'll do to take action
- If authorities need support, let them know
- Connect with local monitoring groups
- Communicate about climate change and how to address it

Communicate observations to local monitoring groups

- Debrief about the coral bleaching event
- Coordinate planning on how to address climate change
- Communicate about climate change

if your ongoing restoration project

► INTRODUCTION

Overview of Coral Bleaching

Remote Sensing Tools

On-Site Monitoring Tools

CHECKLIST: How to Mobilize and Protect

Coral's Future

Other Ways You Can Help

An Intro from CORAL's Conservation Science Director

Hello!

You may have noticed what a hot summer it has been and seen the news that this is a record-breaking hot year around the world.

Indeed we are approaching a global marine heatwave (source), and it's expected to get worse by the end of this calendar year. Marine heatwaves can cause mass coral bleaching, a stress response in which corals expel the colorful algae living in their tissue, revealing the white calcium carbonate skeleton underneath, hence the term "bleaching". **This can lead to wide-spread coral death.**



In an effort to consolidate the information and resources on coral bleaching and what dive operators, managers, and stakeholders can do before, during, and after a bleaching event, we at CORAL have created this **Coral Bleaching Toolkit & Comprehensive Guide**.

We're also **supporting and mobilizing our partners to respond and coordinate with each other**, including fundraising for emergency funds to evaluate and respond to this predicted mass bleaching event this summer and fall. It's important to monitor this critical event as it unfolds, so we encourage you to learn more and find ways you can help.

Although the news is grim, we're staying strong to give corals the best chance possible to adapt to this warming world. We need to reduce emissions, change to renewable energy, and protect our coral reefs by reducing contamination from sewage and solid waste. We need to lessen our fishing pressure and help marine protected areas.

We can do a lot, but we need to work together.

Thank you for your support,

Helen Fox, PhD
Conservation Science Director
Coral Reef Alliance



Summary of Toolkit

- Introduction
- Overview of Coral Bleaching
- Remote Sensing Tools
- On-Site Monitoring Tools
- **CHECKLIST:** How to Mobilize and Protect
- The Future of Coral Reefs
- Other Ways You Can Help



Remote Sensing Tools

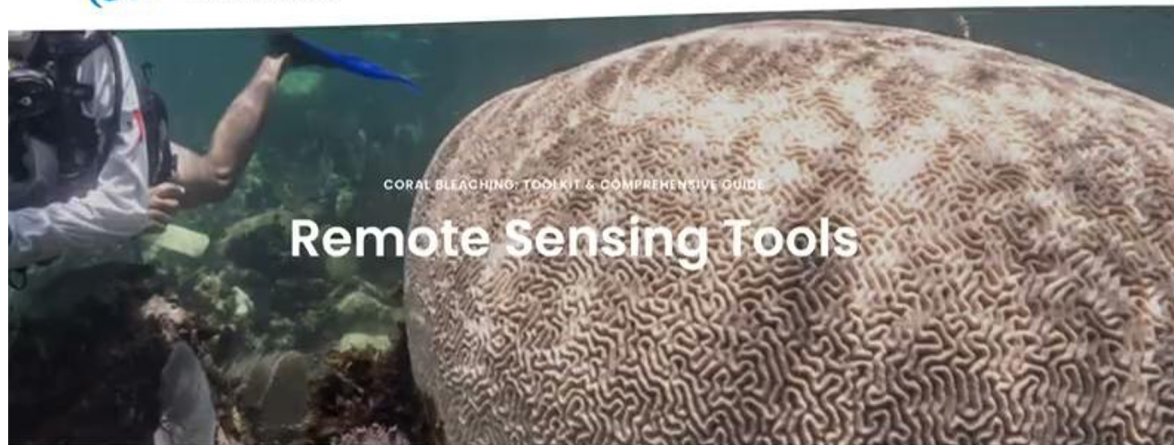
Remote Sensing Tools

Global

- NOAA Coral Reef Watch
- Allen Coral Atlas
- Aqualink

Regional

- Coastal Marine Information and Analysis System (SIMAR)
- Western Indian Ocean Coral Bleaching Monitoring Service
- Hawaii and US Pacific Islands Region Climate Impacts and Outlook



CORAL BLEACHING: TOOLKIT & COMPREHENSIVE GUIDE

Remote Sensing Tools

INTRODUCTION

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Keep an Eye on Coral Bleaching from Afar

Many programs and initiatives play a vital role in increasing our understanding of coral bleaching events across the globe. These efforts help to inform conservation and management strategies aimed at protecting these valuable marine ecosystems. Coral bleaching monitoring involves various methods that range from remote sensing products using satellite data to others that rely upon on-site observations, underwater photography, or coral tissue sampling by scuba divers. In this section, we'll cover some of the available early warning remote sensing tools used to track global or regional coral bleaching events.

NOAA Coral Reef Watch

The National Oceanic and Atmospheric Administration (NOAA) Coral Reef Watch (CRW) program provides the most widely used global early-warning system of coral reef ecosystem environmental changes.

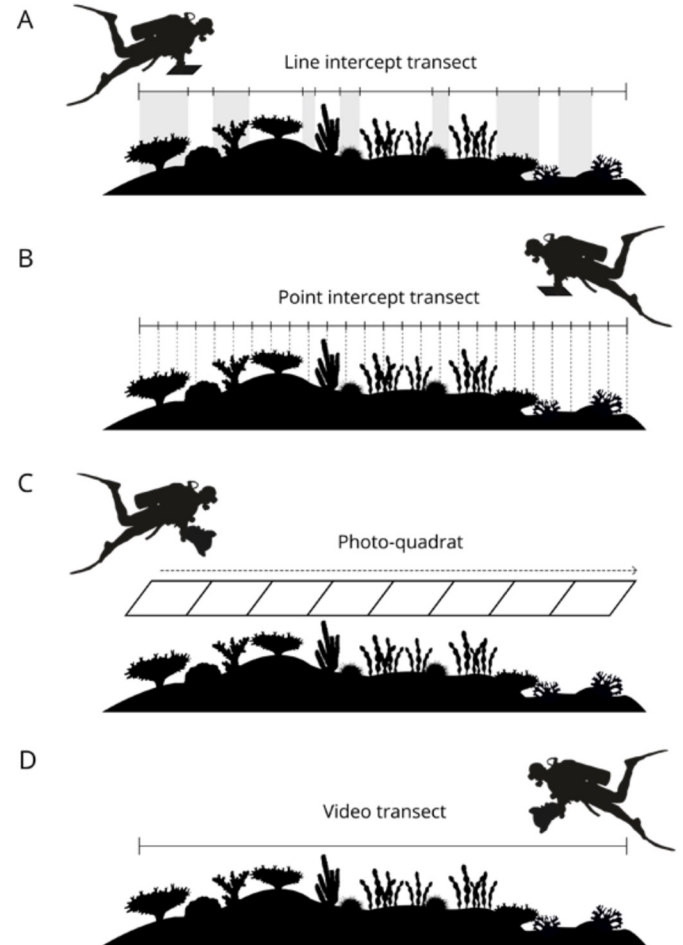
Coral reef stakeholders worldwide apply NOAA CRW's [modeled Outlook](#) and [satellite-based products](#) to predict and monitor in near real-time the thermal stress that drives coral bleaching, disease, and death. CRW products are primarily sea surface temperature (SST)-based but also incorporate light and ocean color data, among other variables. CRW offers an [automated Satellite Bleaching Alert \(SBA\) email system](#) that alerts subscribers to heat stress conducive to coral bleaching events.

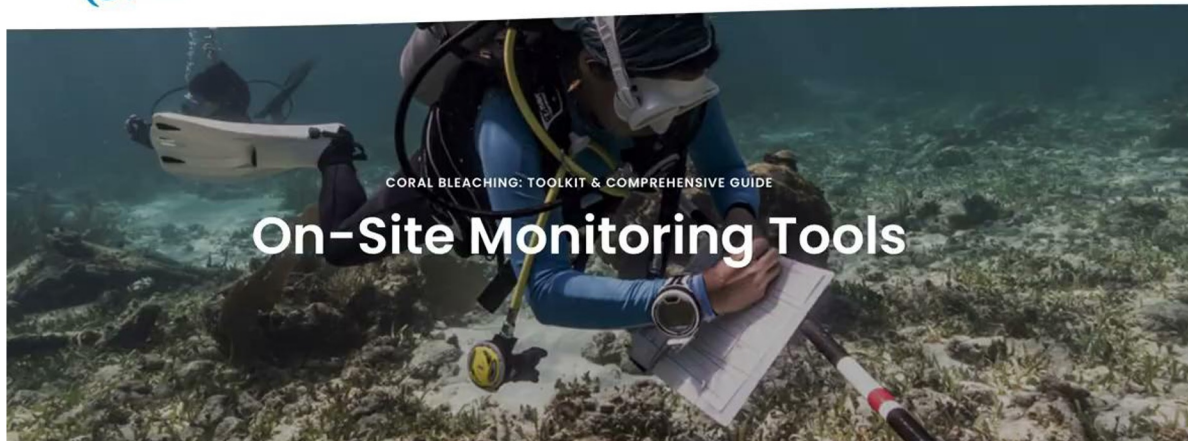
On-Site Monitoring Tools & Platforms



On-Site Monitoring Tools

- Global
- Atlantic
- Pacific
- East Asia
- Indian Ocean
- *Red Sea, Persian Gulf, Brazil coming soon!*





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On-Site Monitoring Tools for Coral Bleaching Events

Scientists and researchers around the world are actively responding to coral bleaching events through various initiatives and strategies aimed at understanding, mitigating, and adapting to the impacts of bleaching. Some of the key ways in which organizations are monitoring or tracking coral bleaching events using various on-site methods include:

Global

- [NOAA Coral Reef Watch \(CRW\)](#): resource managers, scientists, in-water monitoring networks, and the public all over the world report coral bleaching data using various methods directly to NOAA CRW.
- [Global Coral Reef Monitoring Network \(GCRMN\)](#) is a global operational network of the [International Coral Reef Initiative \(ICRI\)](#) made up by a network of scientists, managers and organisations that monitor the status and trends of coral reef ecosystemsc 10 regional nodes.
- [Wildlife Conservation Society](#) and database portal [MERMAID](#). Rapid bleaching protocol using *visual quadrats* at various locations in the world such as Western Caribbean, Melanesia, and the Southeast Asian Archipelago.

CHECKLIST: How to Mobilize and Protect



Coral Bleaching Checklist: Managers and Dive Operators

Protecting sensitive corals before, during, and after bleaching events



Before

Being prepared prior to a bleaching event helps tremendously in the long run. Avoid the scramble and take the following steps to get ahead.

Develop and/or review your bleaching (and other crises) response plans

- Don't have one? Check the Reef Resilience Network guidance to develop a [Bleaching Response Plan](#)

Activate early warning systems – Sign up for alerts, check bleaching for specific areas using

- [NOAA Coral Reef Watch](#) – coralreefwatch@noaa.gov
- [Allen Coral Atlas](#) – bleaching@allencoralatlas.com
- [WIO Coral Bleaching Monitoring Service](#)
- [Caribbean SIMAR](#)

Prepare to communicate with authorities, dive operators, and other key partners (CORAL, NGOs)

Support monitoring plans for the region

Plan with stakeholders how to reduce stressors on the reef

Communicate to diving guests how they can support

Join a citizen science monitoring network (examples below)

- [Global – Coral Watch, Reef Check](#)
- [Great Barrier Reef – Eye on the Reef \(GBRMPA\)](#)
- [Philippines Coral Bleaching Watch](#)
- [Coral Bleaching Indonesia](#)

During

Help reduce stressors on the reef

- Set up moorings, prevent anchoring (if necessary, do so in sand patches)
- Give busy dive and snorkel sites a rest, especially if they are fluorescing!
- Don't touch corals, keep hands and feet of the reef (stand on the sand)
- Reduce fishing pressure (Protect key herbivore species, like parrotfish)
- If you spearfish, take a break
- Use reef-safe sunscreen
- Ensure you have proper wastewater treatment to reduce contaminants from sewage since bleached corals are more susceptible to diseases

Document the bleaching event

- Observe carefully which corals survive and which ones die (ecological and socioeconomic impacts) – this is really important for understanding adaptation, resilience and restoration efforts
- Take before and after photos of the same landscape
- Add an explanation of what's happening to the reef (in your dive brief)

Communicate bleaching events to the media, authorities, and NGOs

- Ask them what they'll do to take action
- If authorities need support, link to this checklist

Connect with local monitoring groups

Communicate about climate impacts, and advocate for policies that address climate change

After

It's important to document lessons learned and let data sit at the forefront of management decisions.

Observe and document long-term impacts

- Write down the species dying and surviving
- Take photos of each

Communicate observations to authorities and NGOs

Debrief about the coral bleaching impacts and responses in a coordinated manner with all stakeholders

Continue planning on how to reduce stressors on the reef

Communicate about climate impacts, and advocate for policies that address climate change

If your ongoing restoration project is facing coral bleaching, check the [Coral Restoration Consortium Guidelines](#).



Check it out!

Coral Bleaching: Toolkit & Comprehensive Guide

Coral Bleaching Checklist: Managers and Dive Operators

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- Support monitoring plans for the region
- Plan with stakeholders how to reduce stressors on the reef
- Communicate to diving guests how they can support
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 - Coral Bleaching Indonesia

After

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- Write down the species dying and surviving
 - Take photos of each

coral.org/coral-bleaching

During

- Help reduce stressors on the reef
 - Set up moorings, prevent anchoring
 - Give busy dive and snorkel areas a rest
 - Don't touch corals, keep hands and fins away
 - Reduce fishing pressure (protect + release)
 - If your operators take a break
 - Use reef-safe sunscreen
 - Use reef-safe sunscreen
 - Ensure you have proper waste disposal from sewage since bleached corals are more susceptible
- Document the bleaching event
 - Observe carefully which corals are bleaching and note their location and socioeconomic impacts – this helps with adaptation, resilience and restoration
 - Take before and after photos of bleached corals
 - Add an explanation of what's happening
- Communicate bleaching events!
 - Ask them what they'll do to help
 - If authorities need support, let them know
 - Connect with local monitoring
 - Communicate about climate change and its impact on coral reefs

- Communicate observations!
 - Debrief about the coral bleaching event
 - Continue planning on how to address climate change
 - Communicate about climate change and its impact on coral reefs

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- [Other Ways You Can Help](#)

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Helen Fox, PhD
Conservation Science Director
Coral Reef Alliance



coralbleaching.com

Thank you!



CORAL
REEF ALLIANCE

Questions & Answers

Please contact: arivera-sosa@coral.org