



# GREEN FINS

[greenfins.net/coral-bleaching](https://greenfins.net/coral-bleaching)

## GLOBAL CORAL BLEACHING RESPONSE TOOLKIT

*Version 2, November 2025*

UN   
environment  
programme



THE REEF-WORLD  
FOUNDATION

  
2004-2024

# ABOUT THIS TOOLKIT

[The Reef-World Foundation](#), the team coordinating Green Fins, a UNEP initiative, has created this toolkit in response to the 4th Global Coral Bleaching event. It aims to provide guidance on how the diving and snorkelling industry can help manage and monitor the impacts of coral bleaching. The toolkit is compiled of a mix of freely available resources from multiple organisations, as well as Green Fins materials, and will guide you through how you can help conserve and manage coral reefs in light of the growing impacts from climate change.

This toolkit will continue to be updated as new and relevant information becomes available.



# HOW TO USE THIS TOOLKIT

This toolkit is for you if you are a:

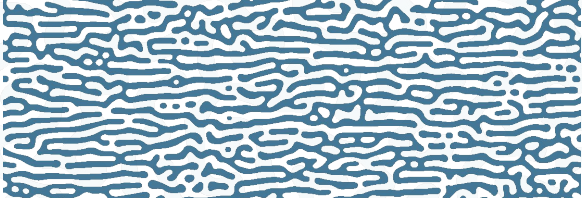
- 1 DIVE CENTRE
- 2 DIVE PROFESSIONAL
- 3 DIVER
- 4 SNORKELLER

1. This toolkit is open for use worldwide.
2. Use the [contents page](#) to navigate the toolkit.
3. There are many tools and resources linked throughout this toolkit for you to explore and learn more. Just click the images, underlined text or **button** to open a new tab to the resource.

If you have any questions or feedback please contact [info@greenfins.net](mailto:info@greenfins.net) or start a discussion on [Green Fins Community Forum](#).

This toolkit is available through [Green Fins website](#).





# EXPLORE THE TOOLKIT

## 01. WHAT IS CORAL BLEACHING

## 02. WHAT IS A GLOBAL CORAL BLEACHING EVENT

→ 4th Global Coral Bleaching Event

## 03. WHAT CAN THE DIVING AND SNORKELLING INDUSTRY DO

→ Reduce Local Impacts

→ Briefing Your Guests

→ Monitor the Reefs

→ Assist Reef Recovery



01.



# WHAT IS CORAL BLEACHING





- When corals are stressed by changes in conditions such as temperature, light, or nutrients, they can bleach
- Bleaching is when they expel the symbiotic algae living in their tissues, causing them to turn completely white
- These algae provide up to 80% of the corals food and give them their colour
- **Bleached corals are not dead!**  
Corals can survive a bleaching event, but they are under more stress and are subject to mortality



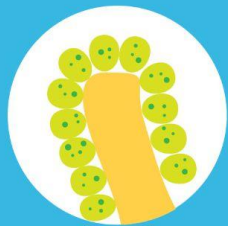


# CORAL BLEACHING

Have you ever wondered how a coral becomes bleached?

## HEALTHY CORAL

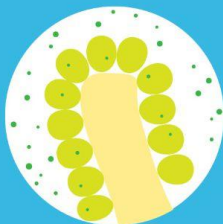
1 Coral and algae depend on each other to survive.



Corals have a symbiotic relationship with microscopic algae called zooxanthellae that live in their tissues. These algae are the coral's primary food source and give them their color.

## STRESSED CORAL

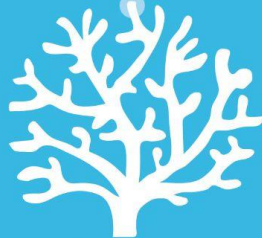
2 If stressed, algae leaves the coral.



When the symbiotic relationship becomes stressed due to increased ocean temperature or pollution, the algae leave the coral's tissue.

## BLEACHED CORAL

3 Coral is left bleached and vulnerable.



Without the algae, the coral loses its major source of food, turns white or very pale, and is more susceptible to disease.

## WHAT CAUSES CORAL BLEACHING?



### Change in ocean temperature

Increased ocean temperature caused by climate change is the leading cause of coral bleaching.



### Runoff and pollution

Storm generated precipitation can rapidly dilute ocean water and runoff can carry pollutants — these can bleach near-shore corals.



### Overexposure to sunlight

When temperatures are high, high solar irradiance contributes to bleaching in shallow-water corals.



### Extreme low tides

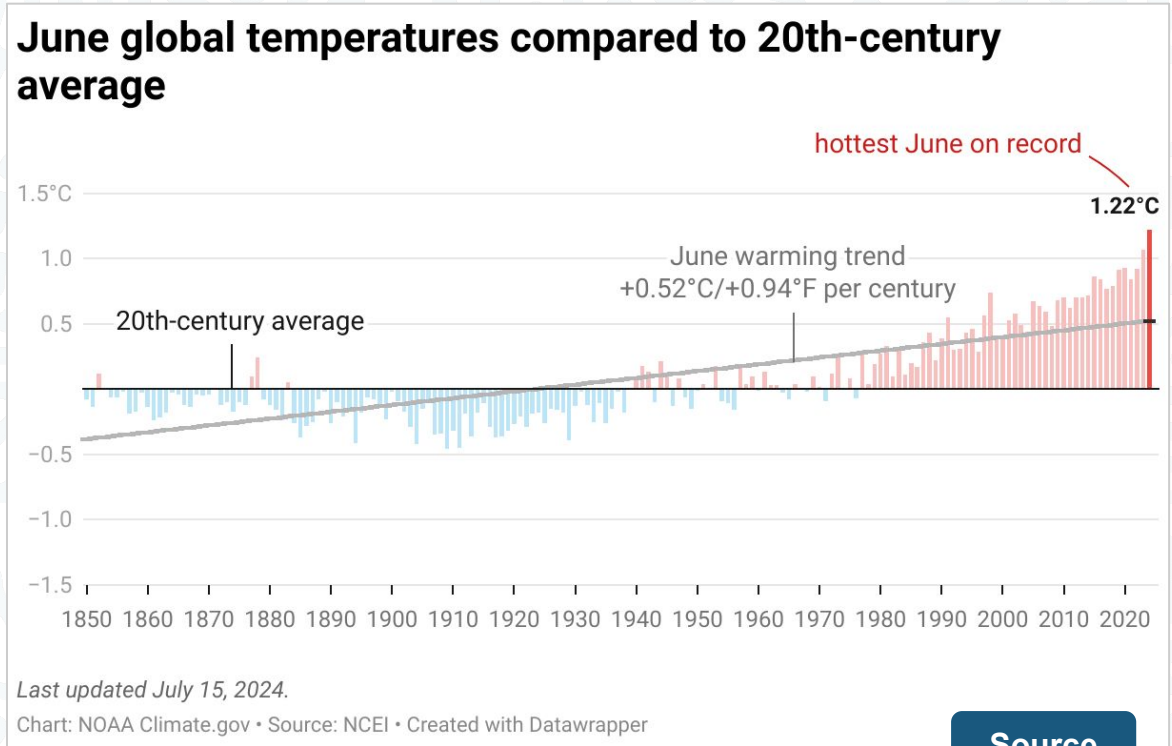
Exposure to the air during extreme low tides can cause bleaching in shallow corals.



**NOAA**  
What is coral  
bleaching?

Source

- Currently the main cause for global coral bleaching is the increasing sea surface temperatures driven by climate change ([GCRM 2020 Report](#))
- Average sea surface temperatures are increasing at an alarming rate worldwide, and this can have serious consequences for sensitive animals like corals
- The last 10 years alone have all been [reported as the hottest on record](#)





02.



# WHAT IS A GLOBAL CORAL BLEACHING EVENT



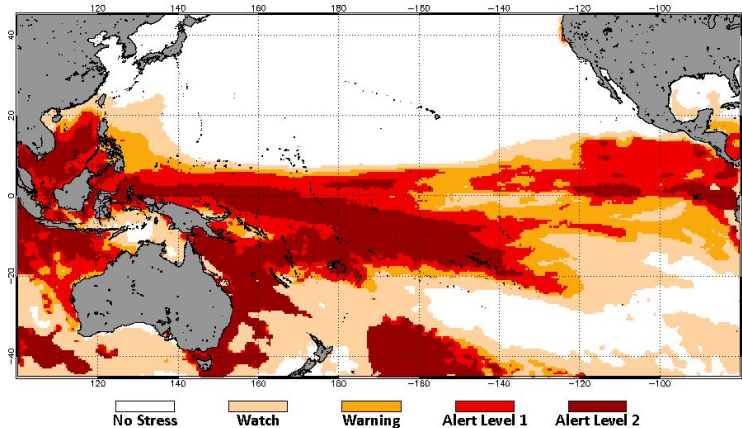


# SEA SURFACE TEMPERATURE AND CORAL BLEACHING

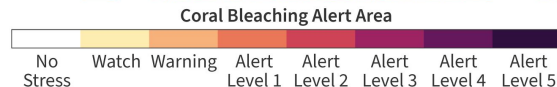
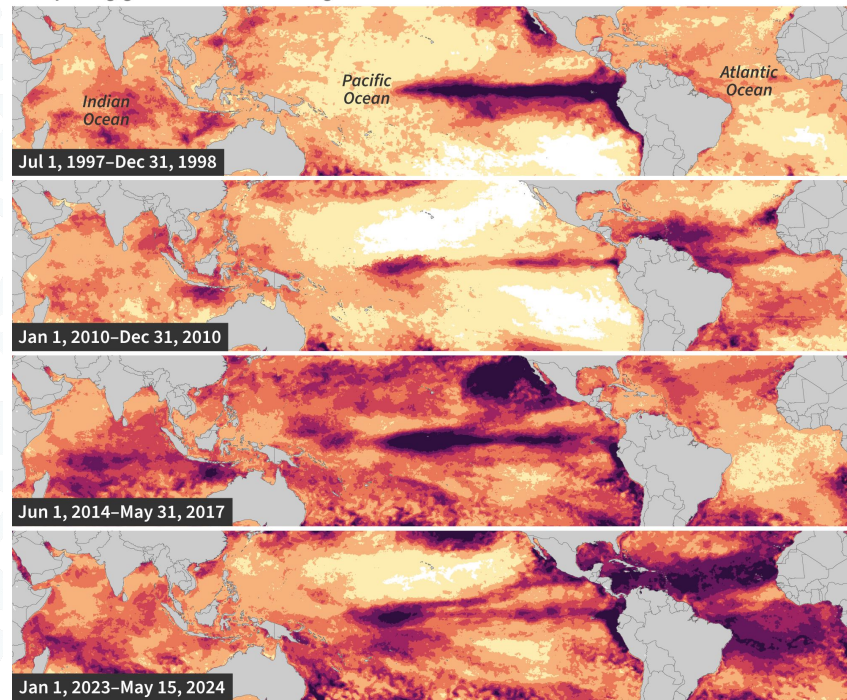
Significant coral bleaching has been confirmed in **all the ocean regions** where warm-water corals live

*The maps on this page show the extent of sea surface temperatures during these events.*

2024 Mar 5 NOAA Coral Reef Watch 60% Probability Coral Bleaching Heat Stress for Mar–Jun 2024  
Experimental, v5.0, CFSv2-based, 28 to 112 Ensemble Members



Comparing global coral bleaching events



NOAA Climate.gov  
Data: NOAA Coral Reef Watch



# THE 4TH GLOBAL CORAL BLEACHING EVENT

- There have been four global coral bleaching events on record, with two occurring in the last 10 years
- The current El Niño temperatures peaked as the highest on record
- Some areas have reported 50-90% coral mortality due to the bleaching event

For more updates on key messages and resources, visit:

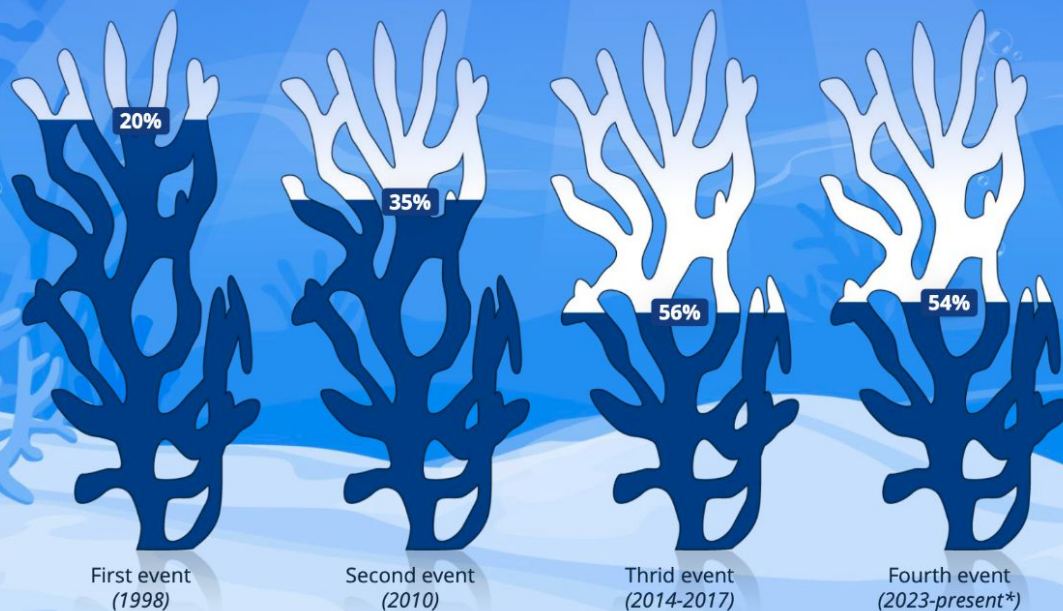
[ICRI Coral Bleaching Hub](#)



# The extent of global coral bleaching events

2/2

Share of coral reefs worldwide that experienced heat stress high enough to cause bleaching on each declared global bleaching event



The fourth global bleaching event has been confirmed in all the oceans where warm water coral reefs grow (Pacific, Atlantic, Indian), affecting at least 62 countries and territories like Australia, the U.S., Mexico, and Tanzania.

Source

statista

Version 2, Nov 2025

26 | Notes: \* As of April 2024

Sources: Global Coral Reef Monitoring Network; The Guardian; NOAA; ID: 1465461



# NOAA & ICRI ANNOUNCEMENT, 15 APRIL 2024

“

The world is currently experiencing its fourth global coral bleaching event, according to NOAA scientists and ICRI's network of global coral reef scientists, the second in the last 10 years.

Mass bleaching of coral reefs, since early 2023, has been confirmed in at least 53 countries, territories, and local economies, including Florida (U.S.A), the Caribbean, the Eastern Tropical Pacific (including Mexico, El Salvador, Costa Rica, Panama, and Colombia), Australia's Great Barrier Reef, large areas of the South Pacific (including Fiji, Vanuatu, Tuvalu, Kiribati, and the Samoas), the Red Sea (including the Gulf of Aqaba), the Persian Gulf, and the Gulf of Aden.”

Sources: [NOAA](#) | [ICRI](#)



# 03.



## WHAT CAN THE DIVING AND SNORKELLING INDUSTRY DO





# IN LIGHT OF GLOBAL CORAL BLEACHING, WHAT CAN WE DO?

- Reducing local impacts increases [reef resilience](#), a chance for corals to recover ([read more about the research](#))
- Global climate change and other global threats can be daunting, but focusing on local impacts is something we can do every day
- Monitor coral reefs near your dive operation and report it to decision makers and NGOs
- Help reefs recover from bleaching events by managing predator outbreaks and continuing to reduce our impacts





## WHAT IS REEF RESILIENCE

- Reef resilience is the ability to resist and recover from disturbances
- To make sure reefs stay resilient, local threats must be kept to a minimum
- We can work together to reduce these impacts from marine tourism





# REDUCE LOCAL IMPACTS

## Chemical Discharge

- Be mindful of chemical pollution from a variety of sources
- Choose non-toxic cleaning agents, non-toxic sunscreens, holding tanks on boats, and septic systems
- No fish feeding as this can lead to increases in algal abundance
- Solutions for these can be implemented easily and they will greatly reduce land-based threats to coral reefs



# REDUCE LOCAL IMPACTS



## ENVIRONMENTAL BEST PRACTICE FOR CHEMICAL DISPOSAL



Many chemical cleaning agents used for equipment, showers, sinks or toilets contain hazardous substances. These **must not** enter the aquatic environment as they can pose a significant threat to the ecosystem.

### WHERE TO DISPOSE OF CHEMICAL CLEANING AGENTS AND WASTEWATER:

- A **sewage treatment system** that does not enter the water directly
- A **septic system** where liquid cannot enter the environment via the water table / groundwater
- Facilities on land** for emptying marine vessel's holding tanks
- If you must empty the holding tank at sea, do so while moving in an open, deep body of water to ensure the highest possible dilution. **NEVER** empty a holding tank in shallow water, bays, lagoons, harbours, piers, marinas or other areas with limited water circulation

### NEUTRALISING CHEMICAL CLEANING AGENTS

You can neutralise many chemicals if a sewage treatment system or septic tank is unavailable. Always do this **away from water** to reduce the risk of chemical spills.




24hrs

Cleaning agents such as **sodium hypochlorite (bleach), hydrogen peroxide and chlorine dioxide break down when exposed to the sun**. Leave them in the sun for 24 hours before safely disposing.

**WARNING:** Quaternary ammonia (e.g. Dettol, Streamline) and hydrochloric acid (muriatic acid) **DO NOT** have proven methods for neutralising. Use different chemicals or biodegradable products for cleaning where possible.

NOTE: Stronger solutions will have a greater impact on the environment. Follow the correct dilution ratios as per the product instructions.




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Click on images to download posters for free



## DO NOT USE TOXIC SUNSCREEN

Some chemical components in sunscreen, including **OXYBENZONE, OCTINOXATE, NANO ZINC OXIDE AND NANO TITANIUM DIOXIDE**, can have a negative impact on the environment.

### ALWAYS CHECK THE INGREDIENTS LIST

**DO NOT RELY ON CLAIMS LIKE "REEF-SAFE". THIS IS NOT BACKED BY SCIENCE.**

Only **NON-NANO zinc oxide or titanium dioxide** UV filters are known to have no environmental impact. Look for them in the active ingredients list.



### SUNSCREEN

ACTIVE INGREDIENTS:

- NON-NANO ZINC OXIDE
- NON-NANO TITANIUM DIOXIDE




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## DO NOT FEED THE FISH

It is dangerous to **fish health** and damaging to the **natural balance of the ecosystem**.



Marine ecosystems are **ALL** connected.

Simply by feeding the fish, you are changing natural behaviours which can lead to the destruction of coral reefs and the incredible marine life they support.




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# REDUCE LOCAL IMPACTS

## Waste Management

- Waste management when living and interacting with marine ecosystems is vital
- Ensuring waste from land does not make it to the ocean is a big positive impact we can have on the marine environment
- Eliminating the waste at source by not using disposable plastic can educate guests and improve reef resilience



Click on images to download posters for free

# REDUCE LOCAL IMPACTS

## Other Impacts

- The Green Fins Code of Conduct is designed to help marine tourism operators reduce their impacts on marine ecosystems
- It is a proven method for reducing impacts discussed in this toolkit, as well as many others
- There are **free materials available in multiple languages** to assist with this

For more readily available materials, visit:

**Green Fins Action Centre**


**GREEN FINS** | **THE GREEN FINS CODE OF CONDUCT**

**To protect our fragile marine ecosystems, Green Fins members and marine tourism operators who care about the environment should:**

- 1 Adopt the Green Fins mission statement: "To protect and conserve coral reefs by establishing and implementing environmentally friendly guidelines to promote a sustainable diving and snorkelling tourism industry."
- 2 Display the Green Fins Code of Conduct, Icons and signed certificate for your guests and staff to see
- 3 Follow the Green Fins Icons and act as responsible role models for guests
- 4 Take part in regular beach and/or underwater cleanups
- 5 Help to develop and implement or support mooring buoy programmes and actively use moorings, drift or hand place anchors for boats
- 6 Prohibit the sale or display of corals, shells and other marine life
- 7 Take part in regular marine life monitoring and report the data to an active database
- 8 Provide adequate trash facilities on board your vessel and dispose of all waste responsibly
- 9 Prevent any toxic chemicals (e.g. oil, cleaning products, sunscreen etc.) from entering the ocean
- 10 Abide by all local, regional, national and international environmental laws, regulations and customs
- 11 Explain the Green Fins icons to your guests in pre-dive briefings
- 12 Provide training, briefings, talks or information to help employees and guests understand good environmental practices for marine tourism activities (e.g. snorkelling, diving, boating, marine life interactions etc.)
- 13 Provide environmental materials (e.g. ID books, educational posters etc.) for your staff and guests to read
- 14 Inform guests about local Marine Protected Areas and their associated environmental rules and regulations
- 15 Promote a strict 'no touch' policy for all reef diving and snorkelling






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# BRIEFING YOUR GUESTS

- It is always important to brief your guests about [environmental best practice](#) on all dives
- Particularly during bleaching events, diver's contact with the reef can **significantly damage corals that are already weakened**
- Consider adding information [about bleaching](#) and why divers should be extra careful during bleaching events
- Remember to explain [why you are monitoring](#) the bleaching to educate them on conservation efforts and how to get involved. The more eyes on reefs, the better!
- Give busy dive and snorkel sites a rest (*recommended by [Reef Check Malaysia](#) and [Coral Reef Alliance](#)*)

## Environmental Briefing Guidelines

Boat and dive briefings are a great opportunity to tell your guests about Green Fins and how you and your company expect people to behave while diving with you. Research shows that environmental briefings work incredibly well to reduce diver damage. By providing clear and interesting direction, you and your guests can become Green Fins champions! The checklist below outlines environmental content to be included in your standard dive and boat briefings on every tour. Please use the Green Fins icons and Guidelines to the Code of Conduct for further support.

### Boat Briefing

-  **Marine toilet**  
Anything you flush down the toilet will enter the ocean if your boat does not have a holding tank. If this is the case, ask your guests to use the trash can for tissue and to avoid using it over dive sites.
-  **No littering**  
Marine litter can kill turtles, birds and coral. Show guests how to safely dispose of waste while on board, including food waste, so they do not become part of the problem.
-  **Use ashtrays**  
Cigarette butts are the most commonly found marine litter item and can poison marine life. Provide your guests with ashtrays for proper disposal and point them out during your briefing.
-  **No fish feeding**  
Any food thrown overboard attracts fish away from their natural food source. This damages the food chain and leads to unattractive, algae-covered coral reefs. You and your guests can protect the reef by not fish feeding.

**Lead by example and don't be afraid to help your guests be better divers.**

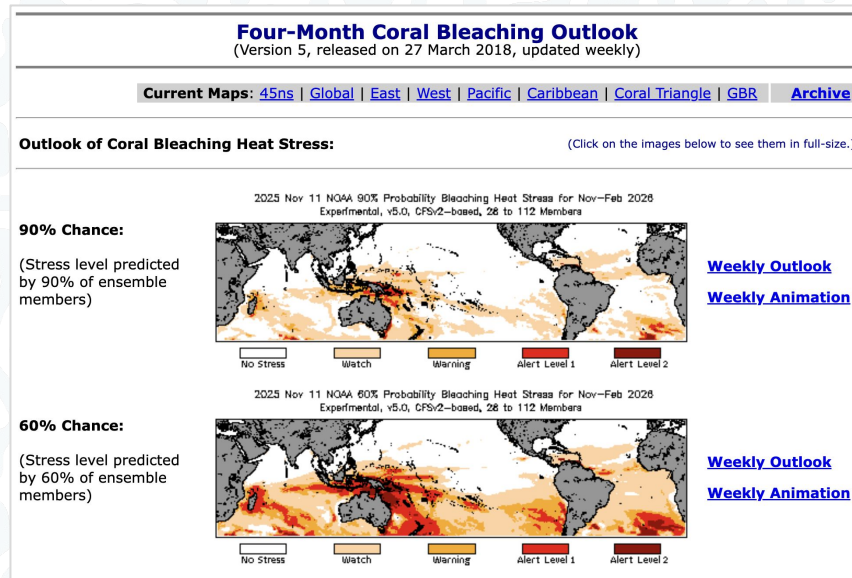
### Dive Briefing

-  **No touching**  
Touching the reef can damage it and spread disease. Harassing and touching marine life can remove them from their homes leaving them vulnerable to predation. Sticks and reef hooks should only be used on rock, NOT coral. Teach your guests the difference and encourage good buoyancy.
-  **Keep away from the reef**  
Encouraging guests to maintain good buoyancy reduces the damage caused by fins and fin wash. By not getting too close to the reef, animals feel safer, allowing you to enjoy more natural behaviour.
-  **No gloves**  
In some dive sites it's illegal to use gloves while diving. By providing protection, they encourage people to touch the reef and marine life. In most cases, they won't remove the risk of injury from dangerous marine life.
-  **Secure all equipment**  
Dangling equipment may break coral without divers even realising. Protect the coral and your equipment by using BCD clips to secure gauges and octopus.
-  **No collecting**  
If it is found underwater, it should stay underwater. Collecting marine life, dead or alive, should be discouraged because it is often illegal and can leave your favourite species homeless.
-  **Be a responsible photographer**  
Research shows that photographers damage the reef more than any other diver. Help them to maintain neutral buoyancy throughout the dive and correct them if necessary. Encourage minimal flash photography as 'over-flashing' can harm many species.

# MONITOR THE REEFS

## WHAT DOES YOUR MONITORING DATA DO?

- Ground-truth predictive models, these help with international and national level management of coral reefs
- Help local reef managers understand the most vulnerable and most resilient areas
- Identify reef refugia; areas of reef that are more resilient to bleaching
- **Be part of something bigger than yourselves!**



**Coral Reef Watch - Coral Bleaching Forecast**

*“Citizen science can fill that gap in data collection and help decision-makers in environmental conservation and management make well-informed decisions.” — Dr. Rubén Torres, Founder and President of Reef Check Dominican Republic*

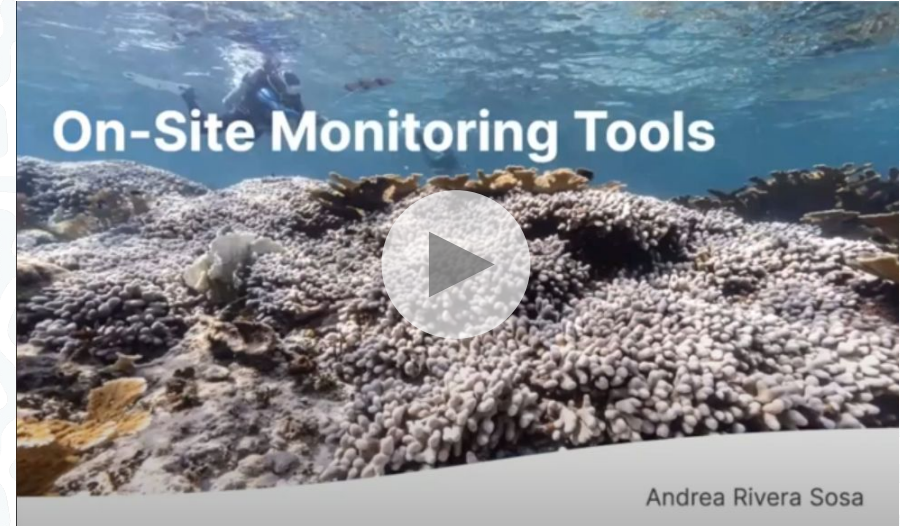


# Monitoring Guide

1. Watch this training video by the Coral Reef Alliance describing the different types of monitoring.
2. If full surveys are not feasible for you, try taking photos of sites or individual bleached coral colonies over time with water temperature data and submit this directly to NOAA or regional partners.
3. Try to monitor your chosen site(s) or coral(s) every 2-weeks, or at least once a month through the bleaching event.

4. [Submit data here](#)

*Remember to **always follow environmental best practice** while in the water*



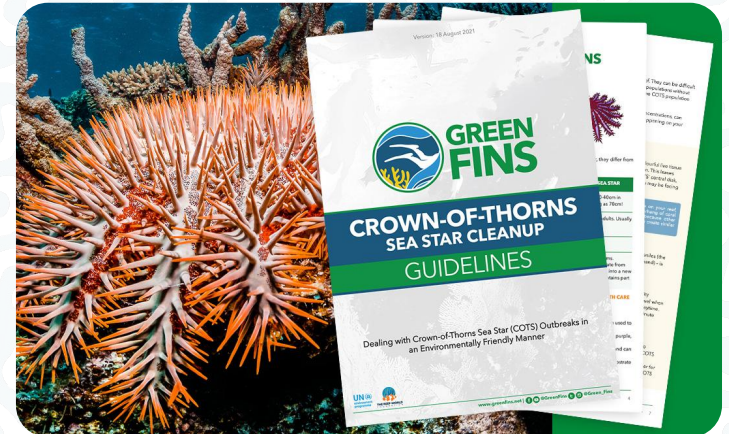
Video Credit: [Coral Reef Alliance](#)

# ASSIST REEF RECOVERY

- After bleaching events, corals are highly susceptible to disease and predation
- While coral predators are a natural part of the ecosystem, they can become overpopulated and threaten coral reefs on a large scale
- To help coral reefs recover from bleaching events consider learning how to:
  - a. Monitor coral predator populations
  - b. Identify if they are overpopulated
  - c. Manage the threat through controlled removals

Additional knowledge:

**Drupella research**





# SHARE THIS TOOLKIT WITH YOUR NETWORK!

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The Reef-World Foundation leads the global implementation of the UN Environment Programme's Green Fins initiative, which focuses on driving environmentally friendly scuba diving and snorkelling practices across the industry globally.