



GCRMN
GLOBAL CORAL REEF
MONITORING NETWORK

Global Threats Require Global Solutions

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Why care about reefs?



Coral reefs -- a valuable natural resource

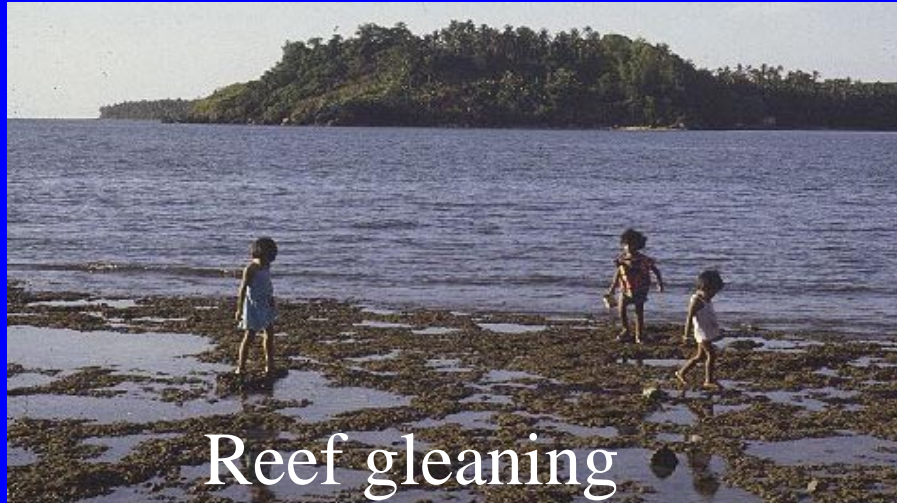
- “rainforests of the sea” -- 2nd highest biodiversity ecosystem on earth
- a food source for 100s of millions of people
- source of medicines -- worth billions \$\$
- coastal protection from wave erosion
- source of islands & white sand beaches for tourist resorts
- 20 million scuba divers
- great beauty and spiritual value

What is a coral reef ecosystem?

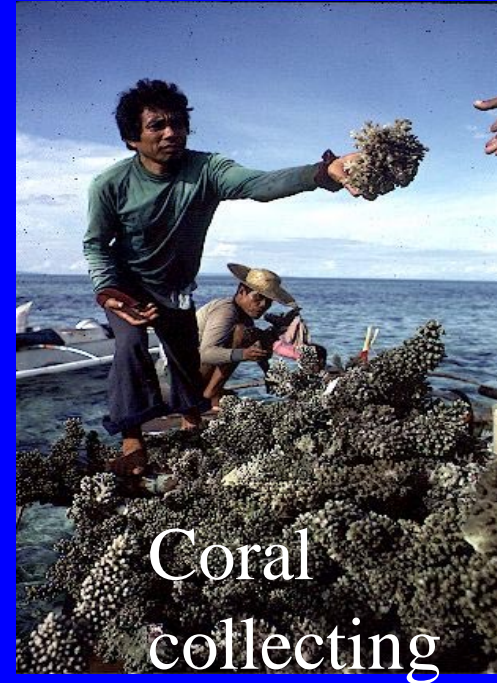


- Found in the tropics
- Geological foundation of old dead reef, up to 100 million years old
- Reef surface of living coral animals with internal 'solar panels' -- tiny algal cells
- Reef provides food and habitat for thousands of species

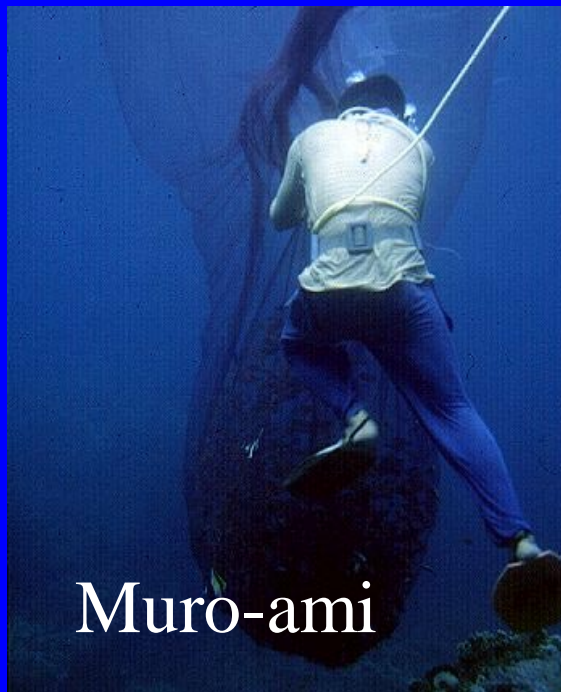
Coral Reef Problems



Reef gleaning



Coral
collecting



Muro-ami

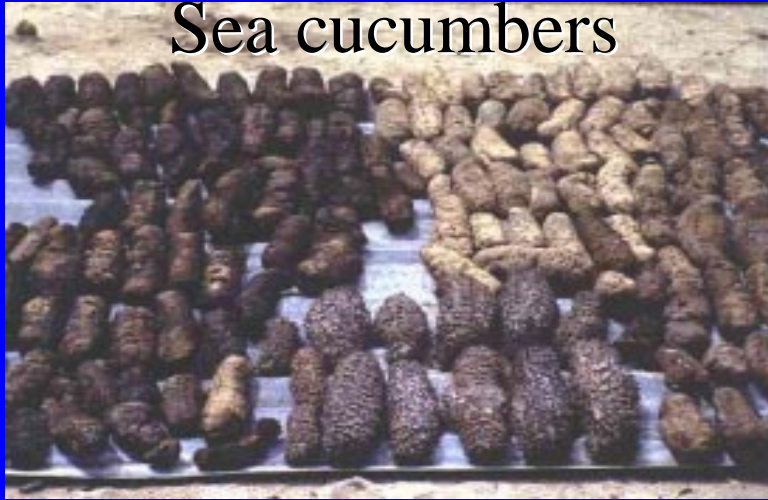


Blast Fishing



Overfishing & Cyanide

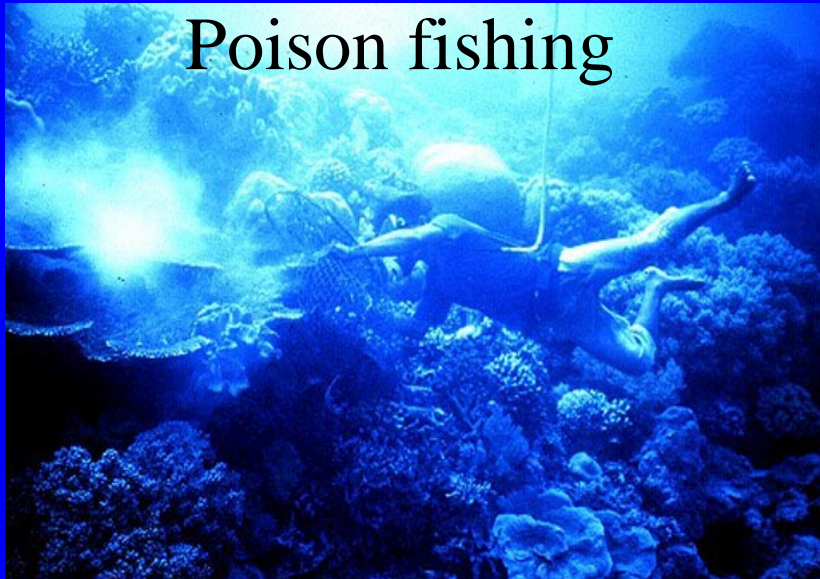
Sea cucumbers



Sea turtles



Poison fishing



Live fish trade



Miami1993 -- What is the health of coral reefs globally?

“Science as usual” failed to give answers because:

- Too few scientists, too little time on reefs
- Too few study sites
- Few long-term studies
- Emphasis on basic research
- Different questions and methods

1996 -- Design global survey method for 97 Intl. Year of the Reef

- Simple
- Rapid
- Volunteer
- Combine manpower of local communities with scientific expertise
- ‘Eco-holistic’ -- not just fish or coral
- Will work anywhere in the world
- Advertise only on internet

RC global-scale goals:

1. Science

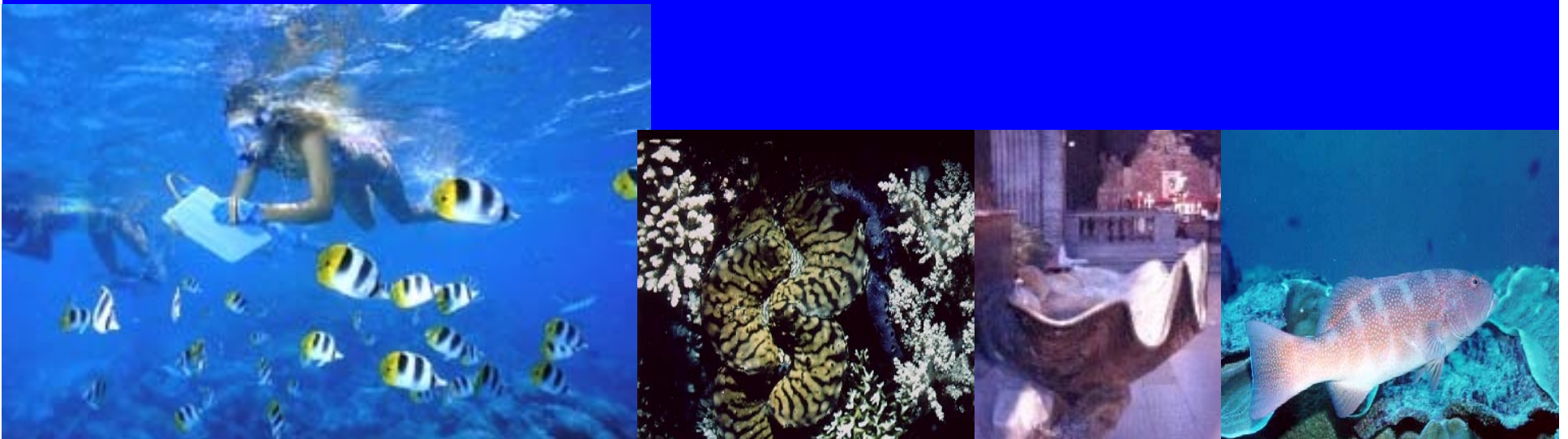
- a synoptic assessment of human impacts on coral reefs
- long-term monitoring of selected sites

2. Conservation and Management

- raise public awareness about value of coral reefs, threats to their health and solutions
- build a network of monitoring and management teams

Defined reef health based on “key indicators” (fish, shellfish, algae)

- Worldwide indicators like e.g. Butterfly fish, grouper
- Regional Indicators like giant clams



Target Reef Check “communities” include

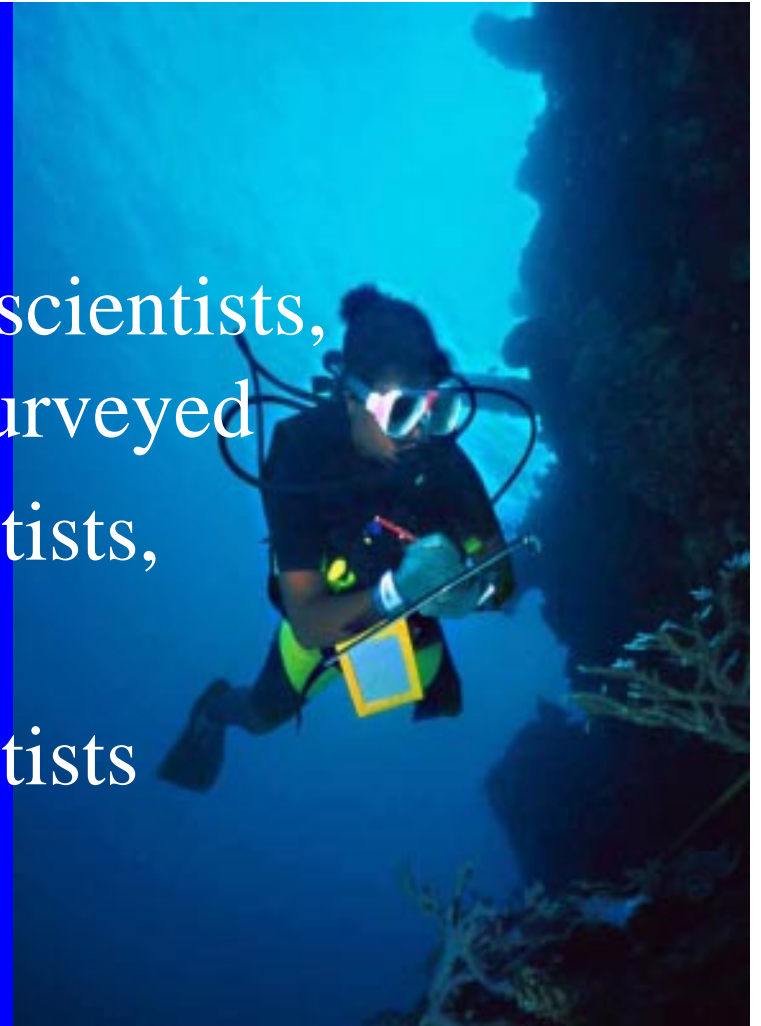
- Villagers/fishermen
- Tourist divers
- Local dive clubs
- Government agencies
- Surfers
- Other stakeholders



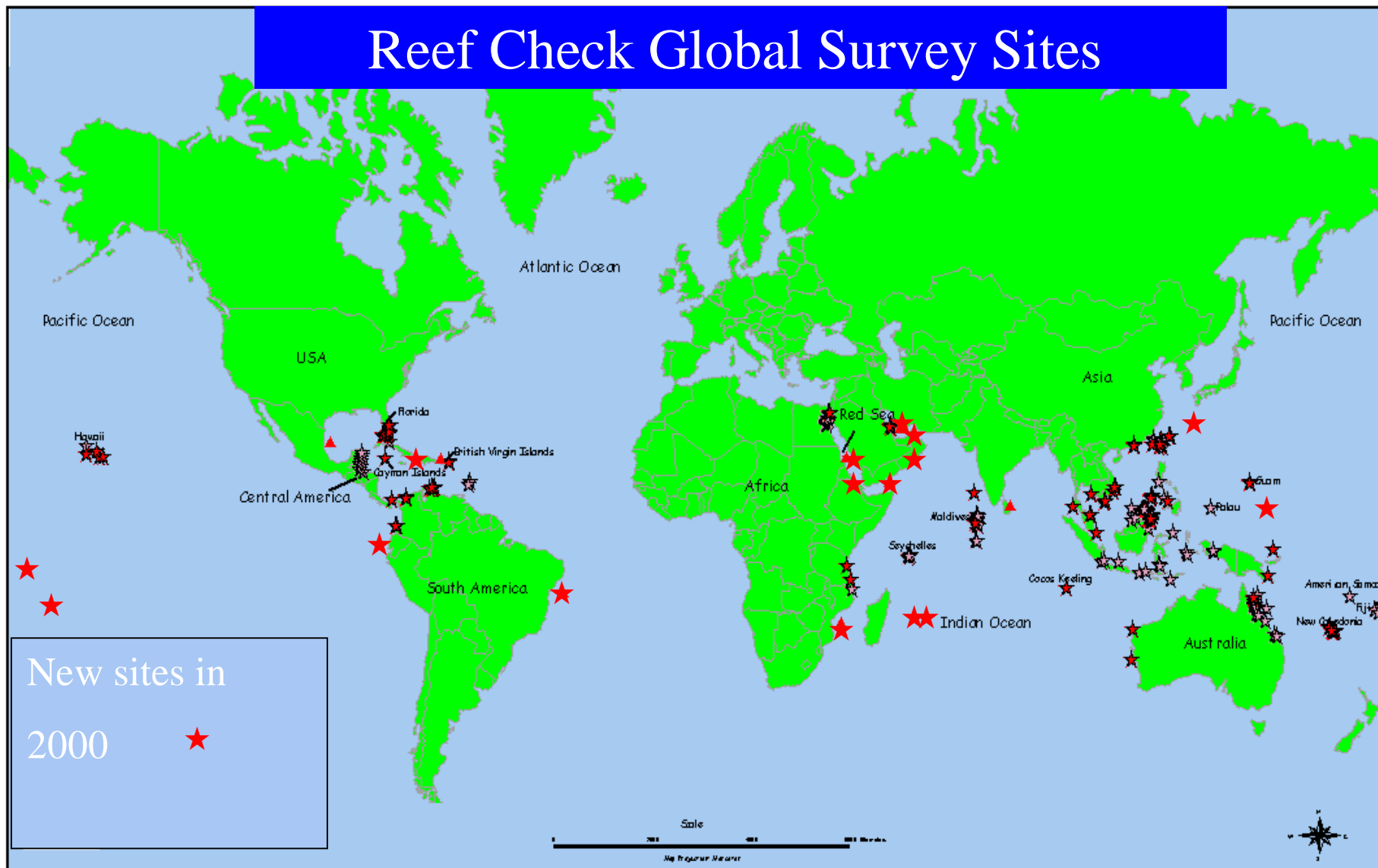
What happened in 1997?

Success!

- **1997:** 750 divers, >100 marine scientists, 31 countries, 350 reefs surveyed
- **1998:** >1000 divers, >150 scientists, 40 countries, 250 reefs
- **1999:** >1500 divers, >160 scientists, 50 countries, 250 reefs
- Growing support worldwide



Reef Check Global Survey Sites





Australia



Thailand



Bahrain



Cocos



J
a
p
a
n



Philippines

Video presentation

1999 World Results: Spiny lobster

- Formerly abundant -- overfishing indicator
- None found at 65% of reefs, an improvement to near 1997 levels



World Results: Large Grouper

- Cyanide fishing indicator
- None at 48% of reefs (improved from 1998 levels)
- 20 fish at best reefs
- Caribbean: Nassau grouper -- missing in action



Indo-pacific Results: Humphead

- Once moderately common in groups
- None at 90% of reefs
- Cyanide-fishing indicator



Indo-pacific Results: Edible sea cucumbers -- 3 species

- Formerly abundant
- None at 53% of reefs
- About 50 cucumbers at protected sites
- Overharvesting



Indo-pacific Results: Giant clams

- Sashimi market
- Shell for curio trade
- None at 30% of reefs (an improvement over 1998)
- Over 400 clams per site at protected reefs
- Overharvesting



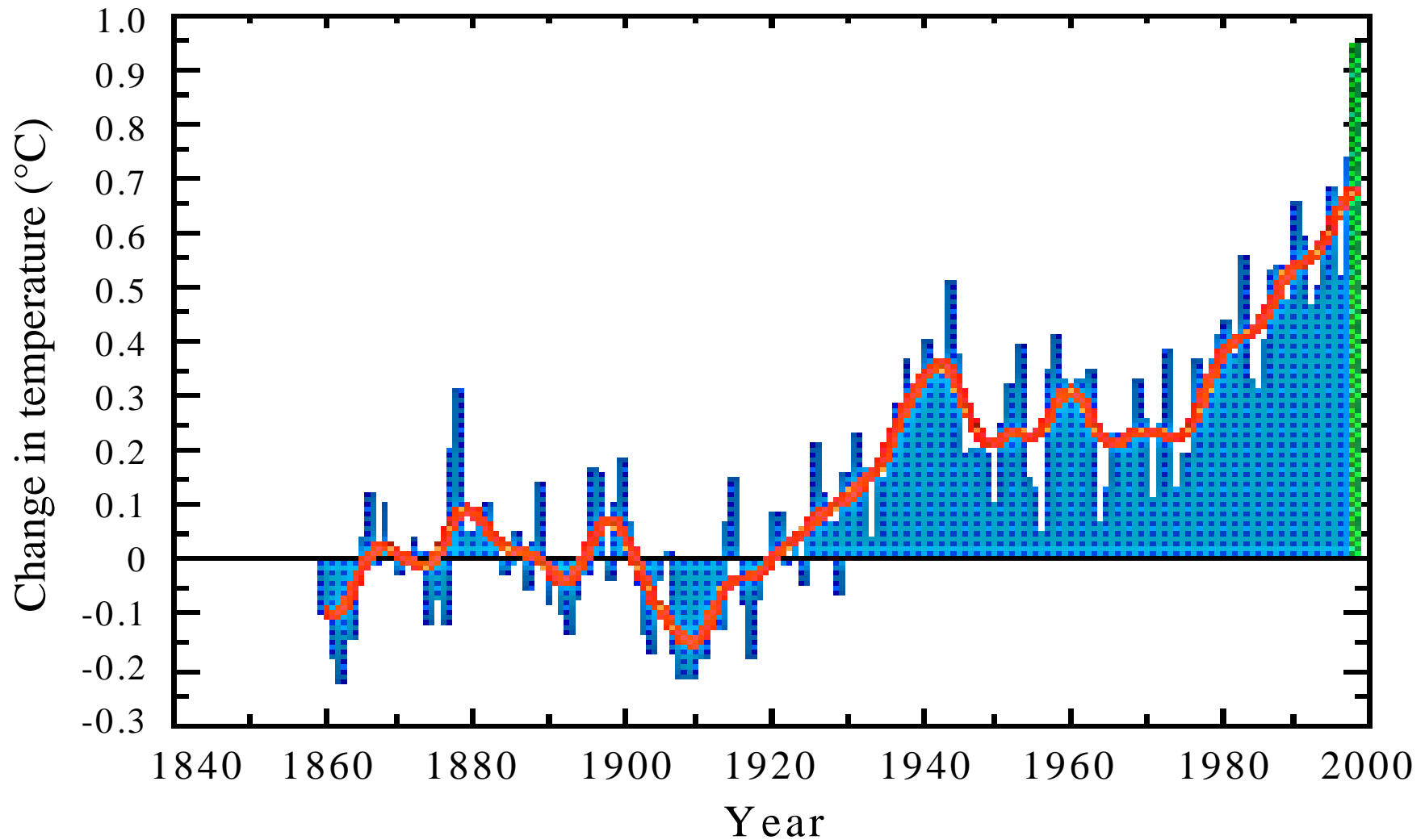
1998 Global bleaching and die-off



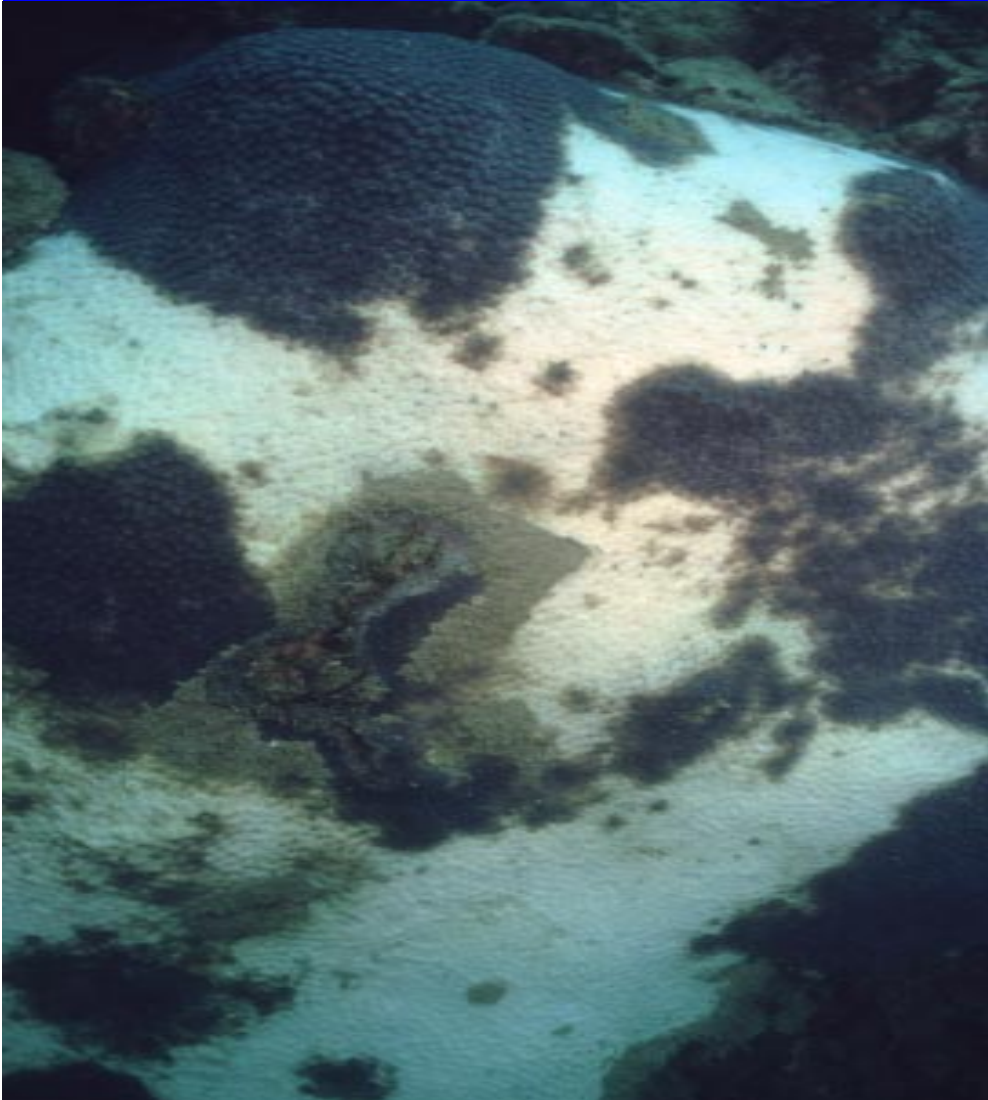
- Corals are animals
- They contain millions of tiny plant cells
- The plants (algae) provide food to coral
- The algae give corals green/brown color

Global temperature pattern -- 138 years

1998 was the **hottest** year on record

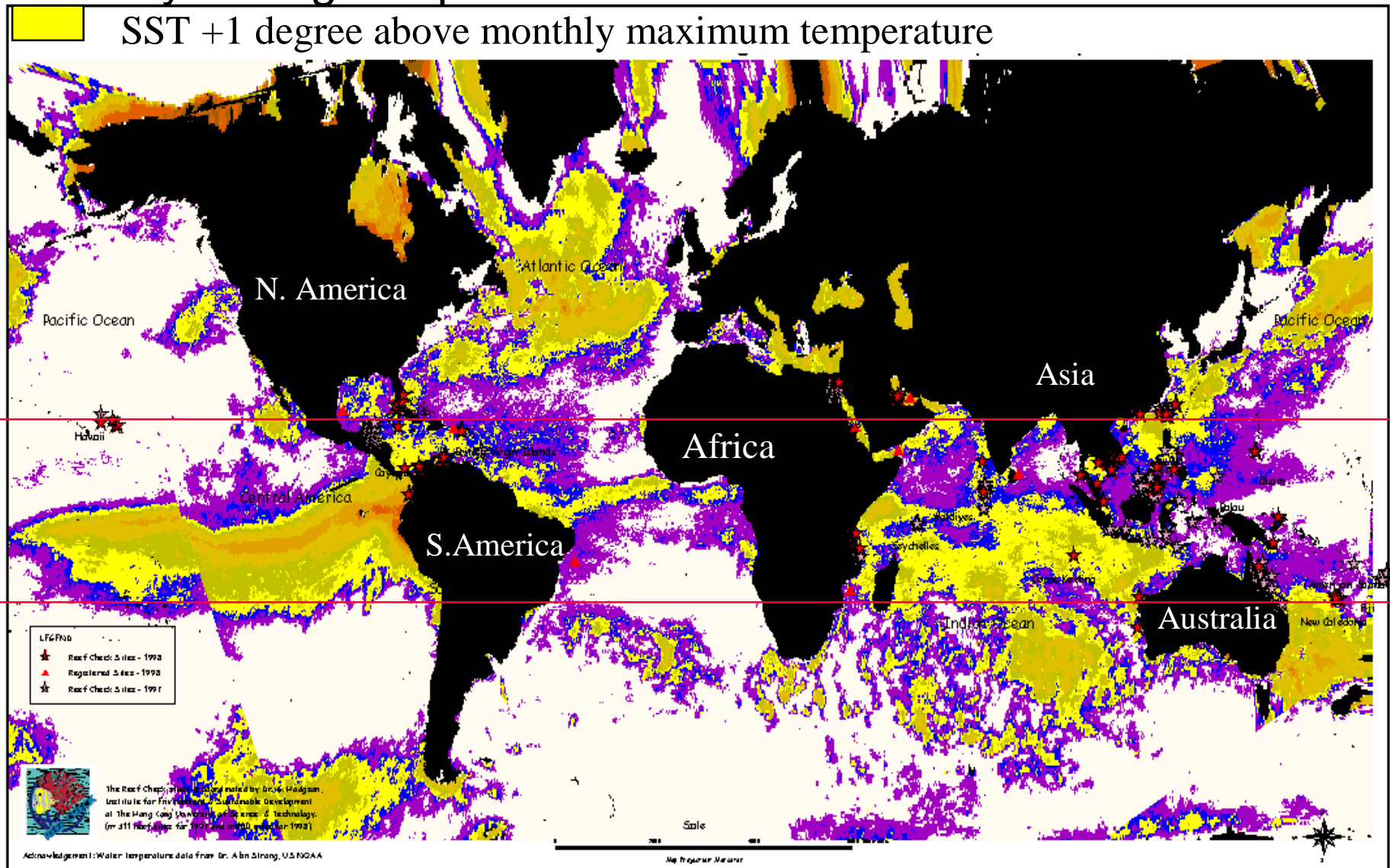


Above normal water temperature (1-2 degrees C) causes loss of algae called “bleaching”



- When algae leave, coral appears white because we can see white skeleton through transparent coral tissue

Composite monthly satellite sea surface temperature increases January through September 1998 and Reef Check sites



SST data courtesy of Dr. Alan Strong, US NOAA

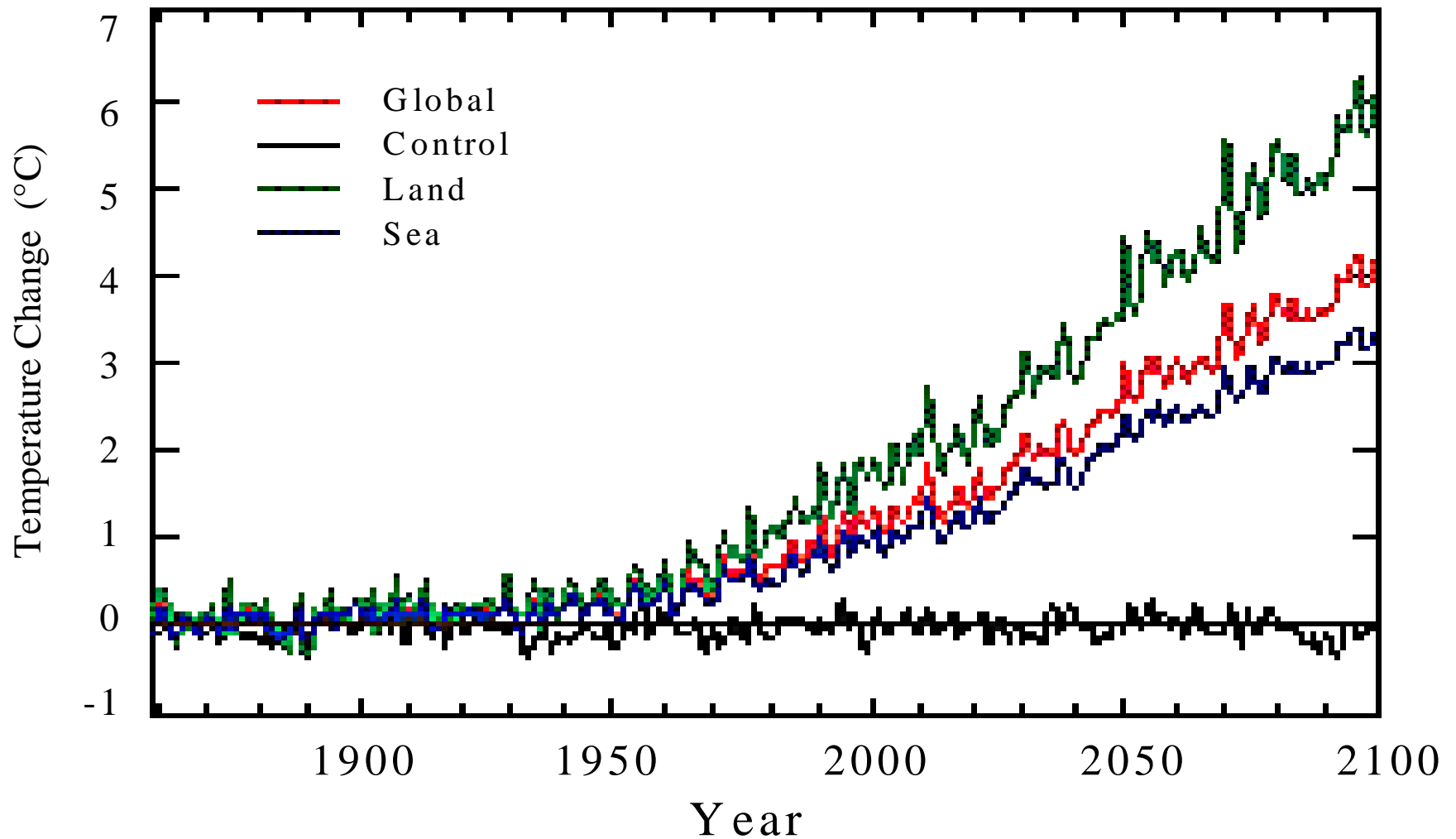
“Bleached” corals may recover or die



- In 1998, 29% of Reef Check sites reported bleaching
- Mortality ranged up to 95% on some reefs
- Many old colonies killed (1000 years old)
- 1999 results: 10% mortality globally

Predictions -- Global Climate Change Model

Hadley Climate Centre UK



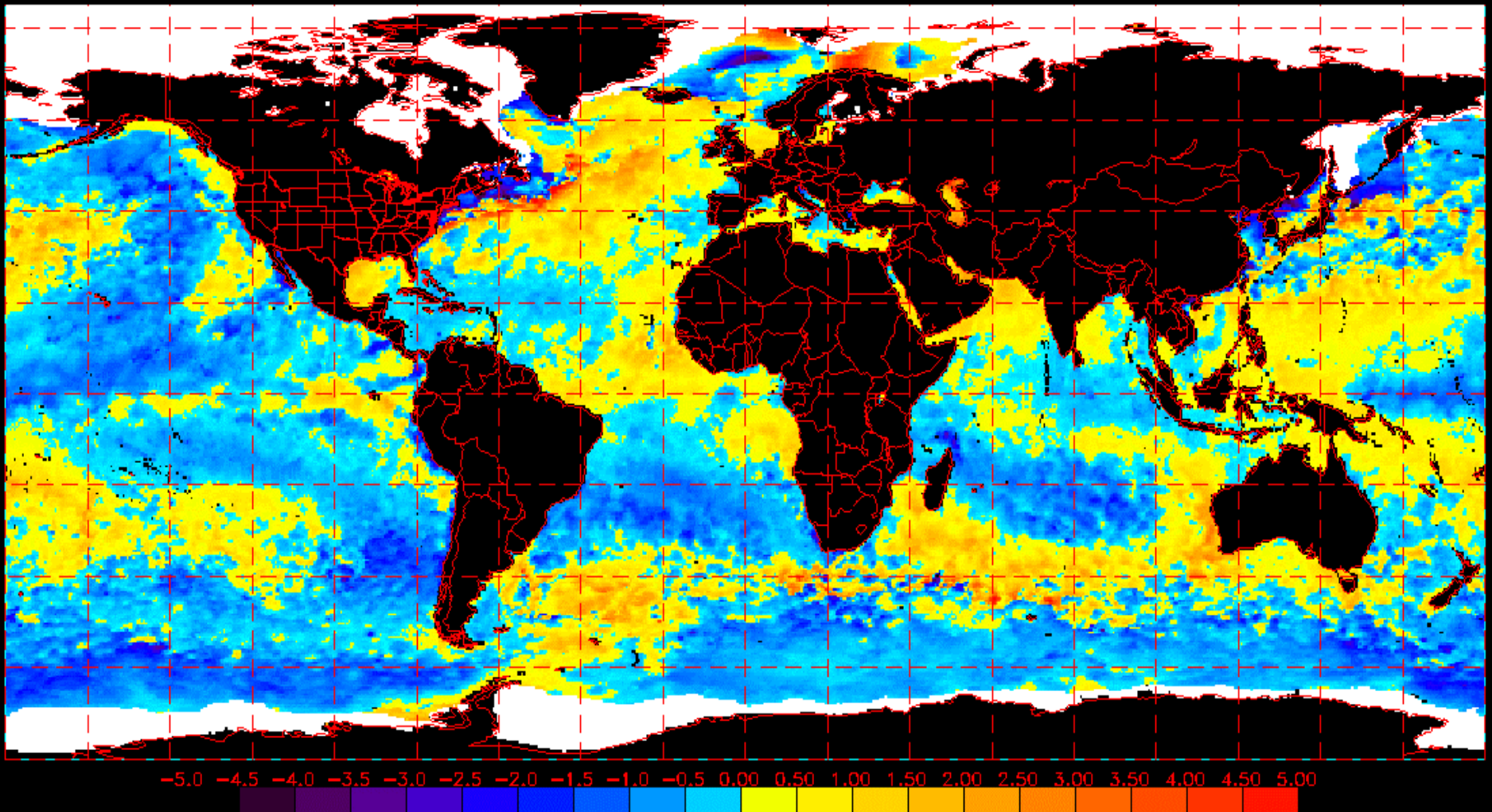
If global warming predictions are correct,
coral reefs are in serious trouble



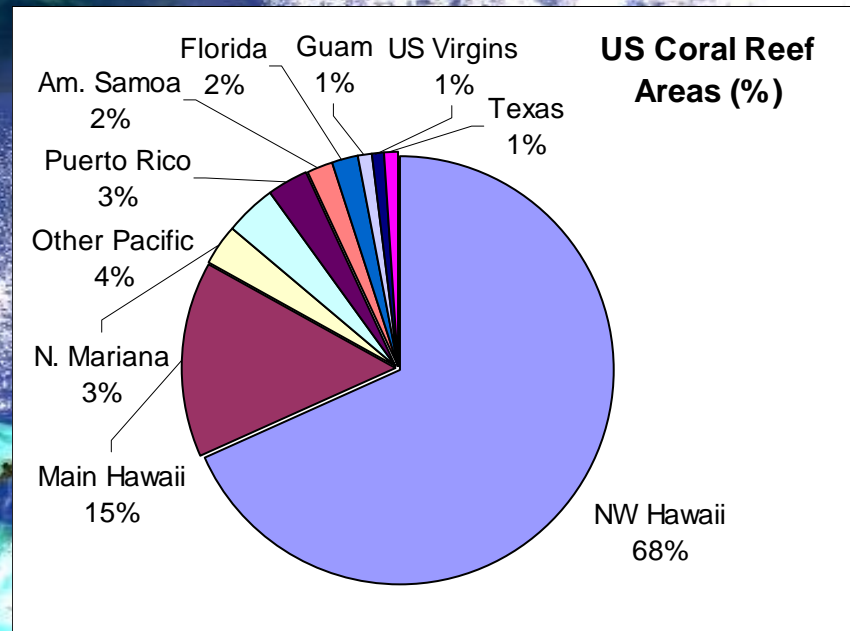
New evidence: April 2000

Major bleaching event in Fiji -- up to 65%

NOAA/NESDIS 50KM GLOBAL ANALYSIS: SST - Climatology (C), 4/11/2000
(white regions indicate sea-ice)



US reefs suffer also from bleaching, overfishing and pollution -- mainly nutrients



Reef Check findings 1997-99

- First scientific documentation of global extent of coral reef crisis in 1997
- Tracked 1998 global bleaching, 10% mortality confirmed in 1999
- High-value species missing from most reefs, but some improvement in numbers in 1999
- **Red Sea reefs -- healthiest in the world**
- Many remote reefs just as bad as those near cities
- Most marine parks are not working well
- Coral reefs -- a sensitive indicator of global warming





Where is Reef Check going?

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- Standard methods and global network
- Train more leaders and expand network
- Support from media -- more PR for coral reefs
- Reef Check TV documentary



Work with governments

- 1999 -- US government drafted Coral Reef Action Plan
- Each country with reefs needs a plan to monitor and manage coral reefs
- How to monitor hundreds of reef sites needed in each country?
- No country including US, can afford a highly intensive program

Community involvement

- Involving the community in monitoring is the only way forward
- Most cost-effective
- Builds stewardship
- Builds support for government management efforts

International donors

World Bank, UN, US AID

- Slow to appreciate value of the internet as a two-way street for information flow
- Slow to use the internet to train people and to gather data
- Still stuck in “demonstration site mode” pouring millions \$\$ into individual sites
- Pay people to monitor and then leave and expect it to continue and magically replicate

Reef Check Monitoring and Management Model

- Pay part-time trainers and scientists
- Provide “seed funding” to volunteers
- Monitoring is simple and fun so will be repeated
- International donors have borrowed RC methods for training purposes
- But are not yet interested in funding a major effort



The Crossing



More corporate partners and team sponsors:

Quiksilver International www.quiksilver.com

DiCaprio Foundation (see Reef Check at
www.LeonardoDiCaprio.com)

“Adopt a Reef” program started in 2000



Simple Reef Solutions



- Properly managed **tourism**
- Well designed **aquaculture**
- More, larger, well-managed **marine parks**
- **Energy conservation, reduced logging**
- Community-based monitoring and management -- **Reef Check**

West Coast Marine Health Check?

The California commercial abalone harvest reached a record 5.4 million pounds in 1957. Since then, commercial harvests declined dramatically to about 461,376 pounds in 1993. NOAA, 1997
One species has disappeared.



Diver harvesting sea urchins



California Red Abalone

The coral reef crisis is global.
We need your help to get the word
out about the crisis and the simple
solutions.



The End