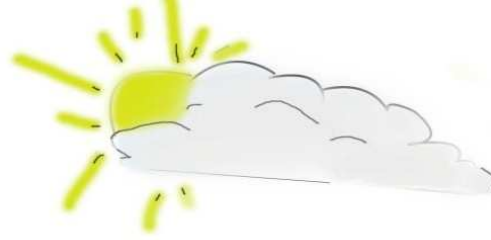




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# Coral Reefs and Other Vulnerable, Valuable Ecosystems

**Lauretta Burke, World Resources Institute (WRI)**

*Expert Group Meeting on Oceans,  
Seas and Sustainable Development:  
Implementation and follow-up to Rio +20  
United Nations, New York, April 18<sup>th</sup>, 2013*

# Key Messages

(for coral reefs and associated ecosystems)

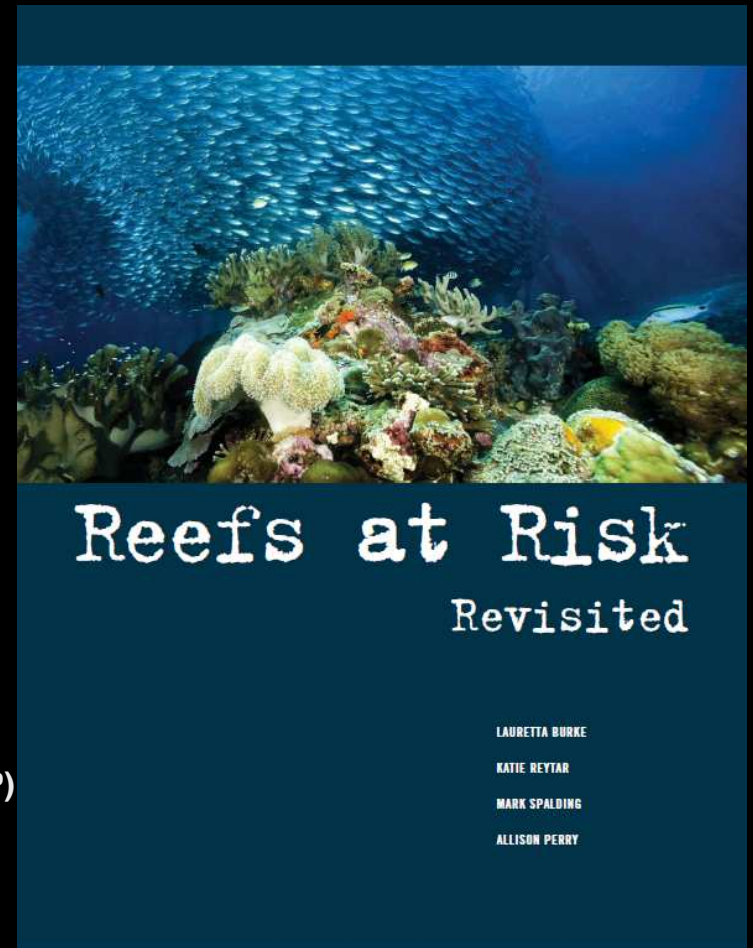
1. Coral reefs are valuable
2. Coral reefs are extremely threatened
3. Many coastal communities will suffer due to coral degradation and loss
4. Current coastal management efforts are insufficient
5. Coral reef ecosystems are resilient
6. International efforts help some
7. More / persuasive information is needed
8. Example - Economic values can be useful
9. Example - Management scorecards highlight progress





## Contributing Institutions

- Atlantic and Gulf Rapid Reef Assessment (AGRRA)
- Coastal Oceans Research and Development in the Indian Ocean (CORDIO)
- Conservation International (CI)
- Coral Reef Alliance (CORAL)
- Healthy Reefs for Healthy People
- Institut de Recherche pour le Développement (IRD)
- International Society for Reef Studies (ISRS)
- International Union for Conservation of Nature (IUCN)
- National Center for Ecological Analysis and Synthesis (NCEAS)
- Oceana
- Planetary Coral Reef Foundation
- Project AWARE Foundation
- Reef Check
- Reef Environmental Education Foundation (REEF)
- SeaWeb
- Secretariat of the Pacific Community (SPC)
- Secretariat of the Pacific Regional Environment Programme (SPREP)
- U.S. National Aeronautics and Space Administration (NASA)
- U.S. National Oceanic and Atmospheric Administration (NOAA)
- University of South Florida (USF)
- University of the South Pacific (USP)
- Wildlife Conservation Society (WCS)
- World Wildlife Fund (WWF)



# *Interconnected habitats*





Photo credit: Coral Reef Adventure/MacGillivray Freeman Films

# 275 million people are highly reef-dependent

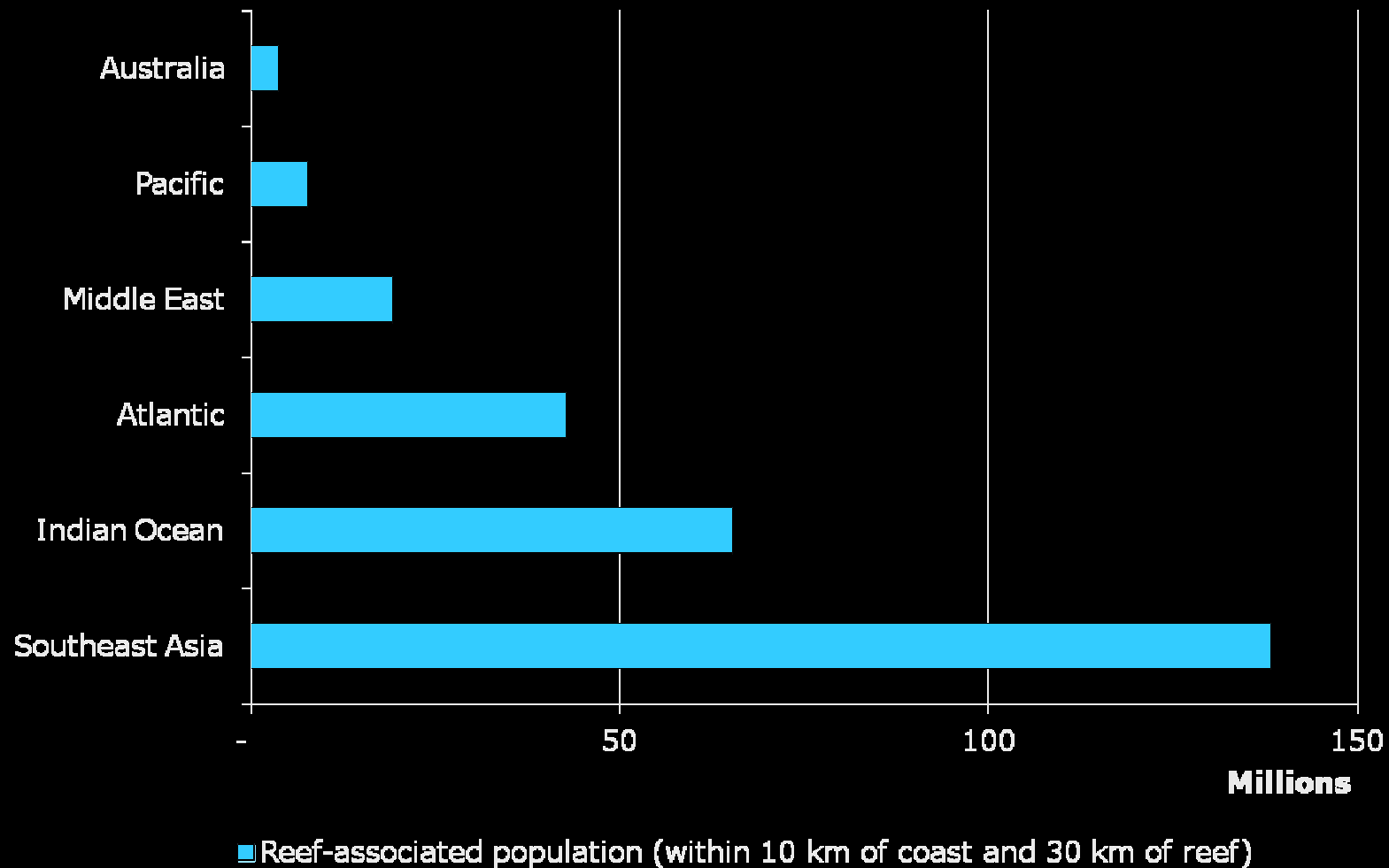




Photo Credit: Crispin Zeeman



Photo credit: Konstantin Tkachenko





Photo credit: Klaus Stiefel/Flickr



Photo credit: Steve Lindfield



Photo credit: Krishna Desai

## 2. Local Threats

- Coastal development
- Sediment and pollution
- Marine pollution and damage
- Overfishing
- Destructive fishing

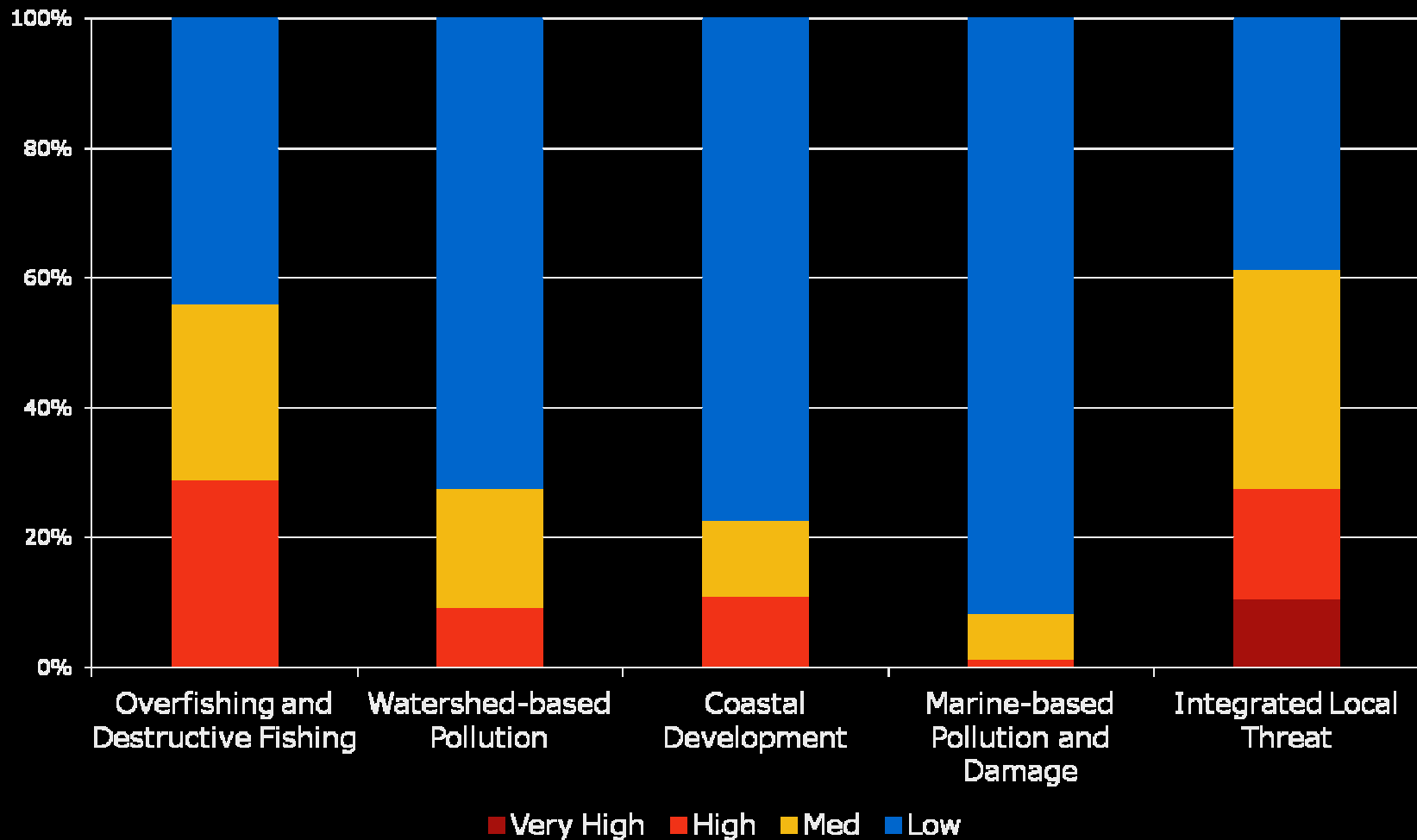
## Global Threats

- Warming seas
- Ocean acidification

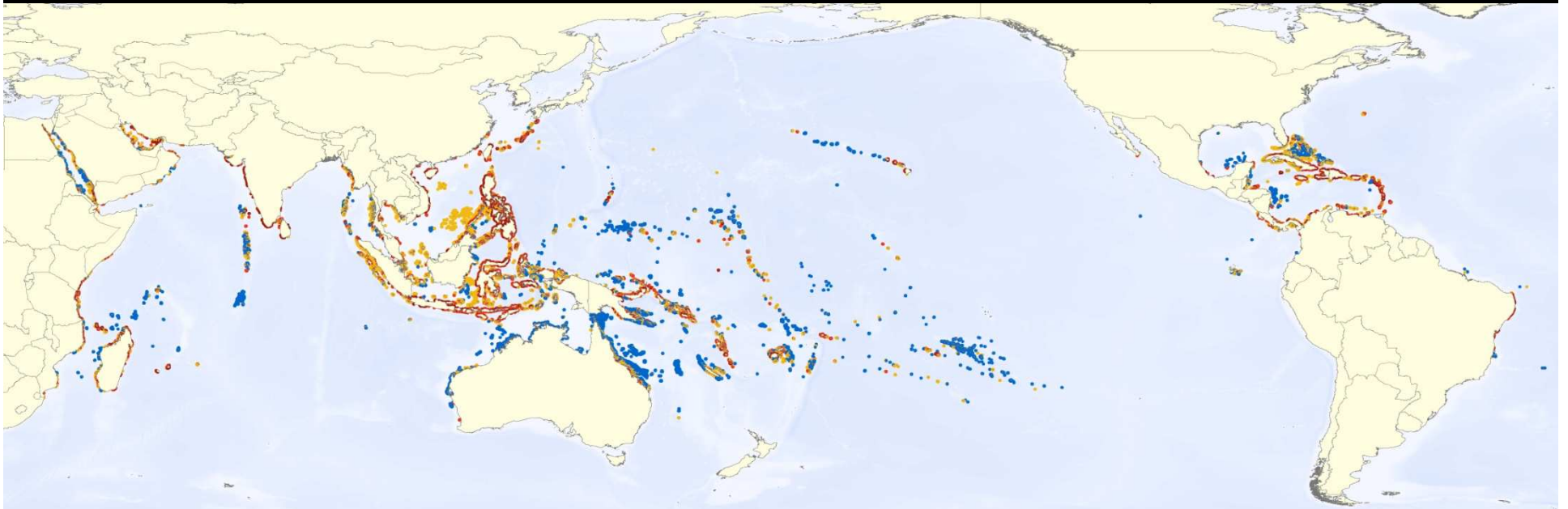


Photo credit: Steve Lindfield

# More than 60% of reefs are threatened by local activities



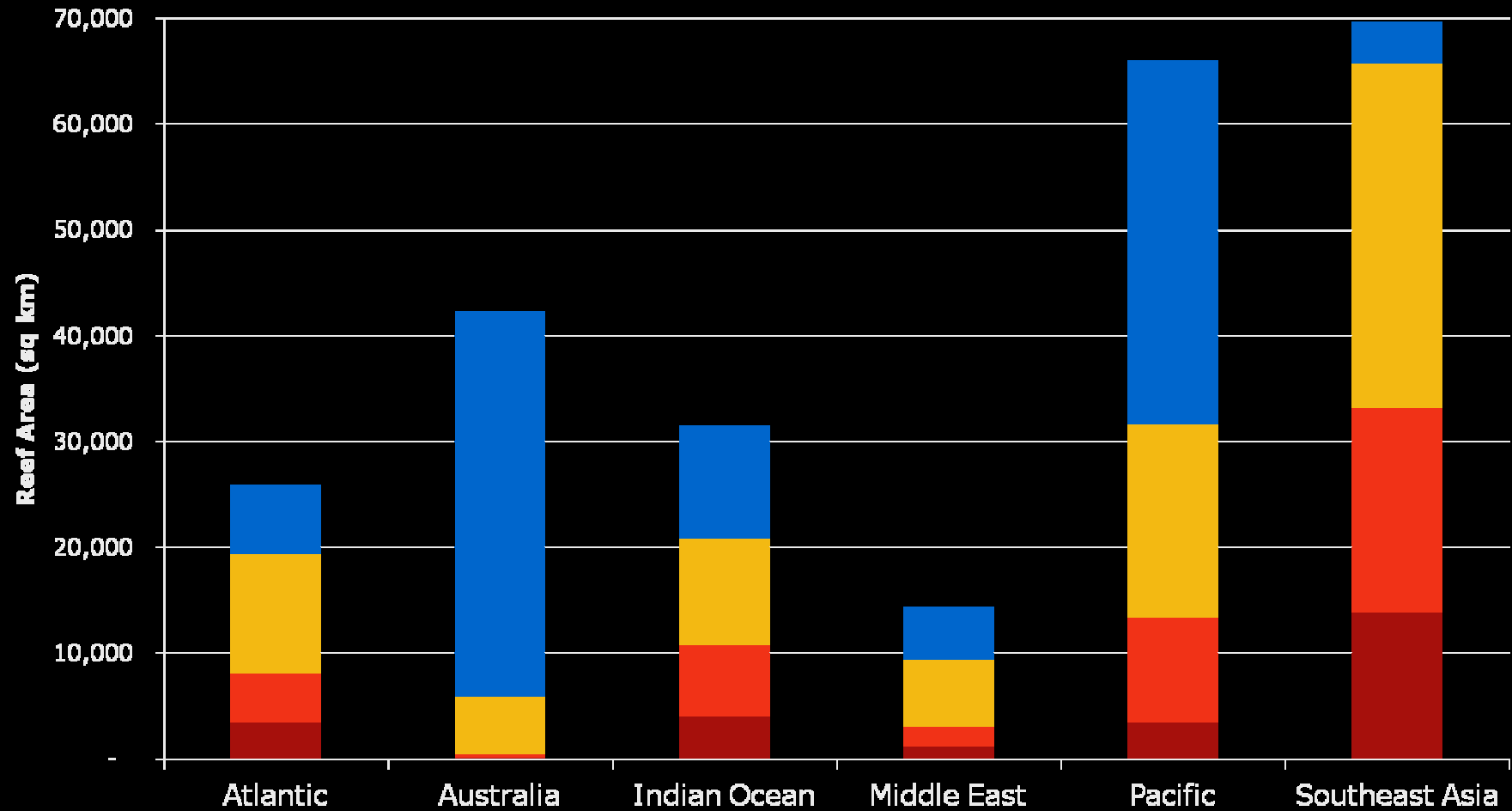
# Integrated local threats to coral reefs



■ Low   ■ Medium   ■ High   ■ Very High

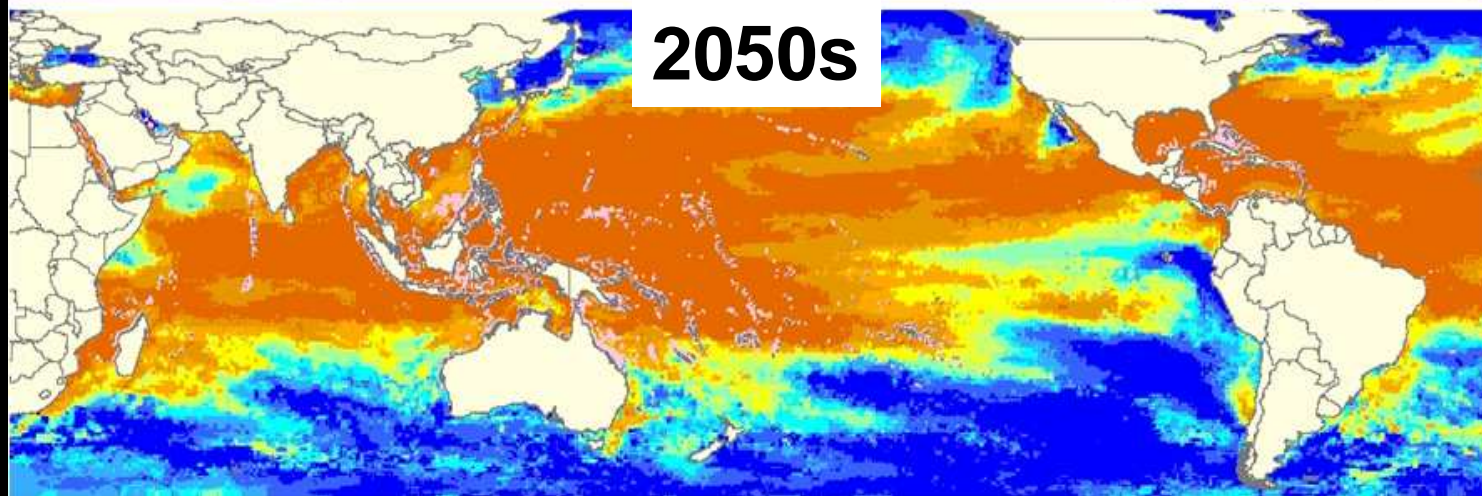
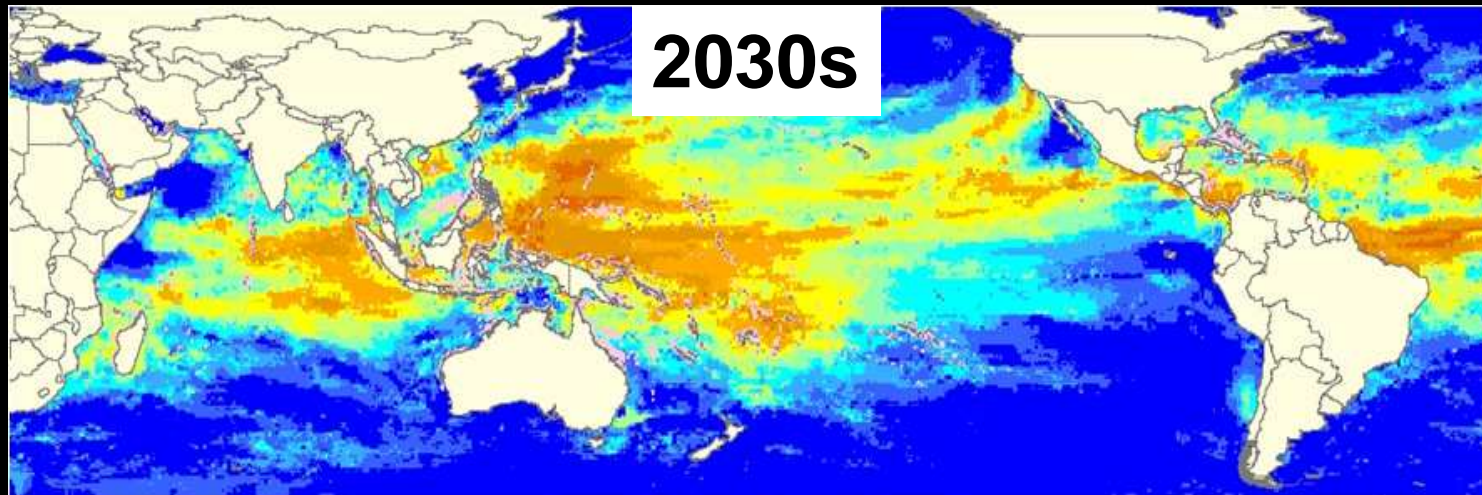
# Integrated local threat by region (by reef area)

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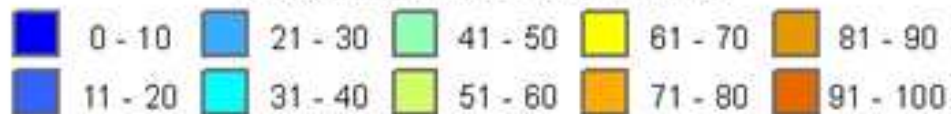


Very High High Medium Low

# Projections of thermal stress (2030 and 2050)



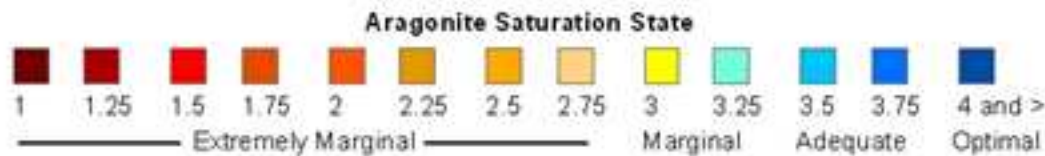
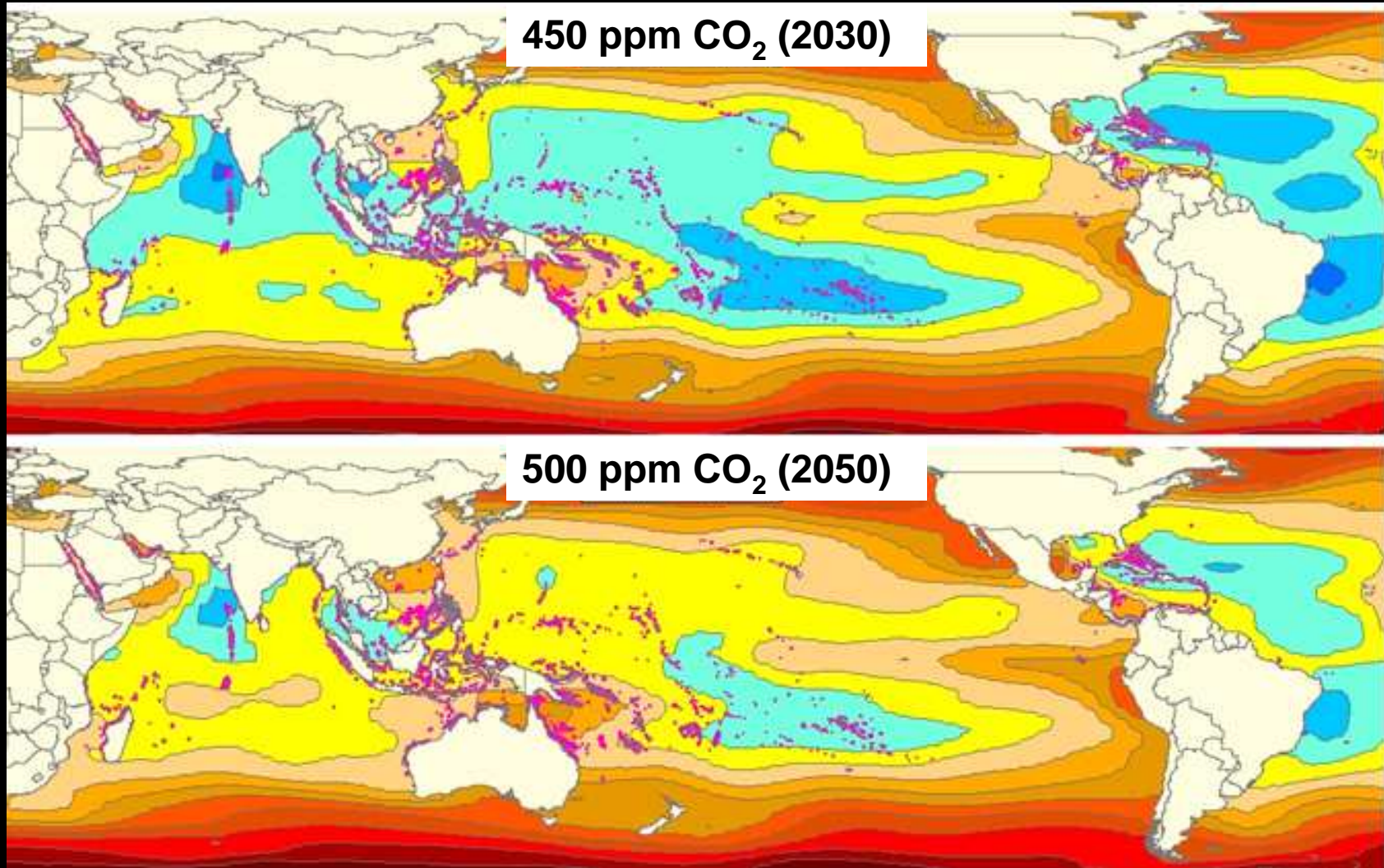
Frequency (Percent of Years) of NOAA  
Bleaching Alert Level 2 Events



Source: Simon Donner, 2009.

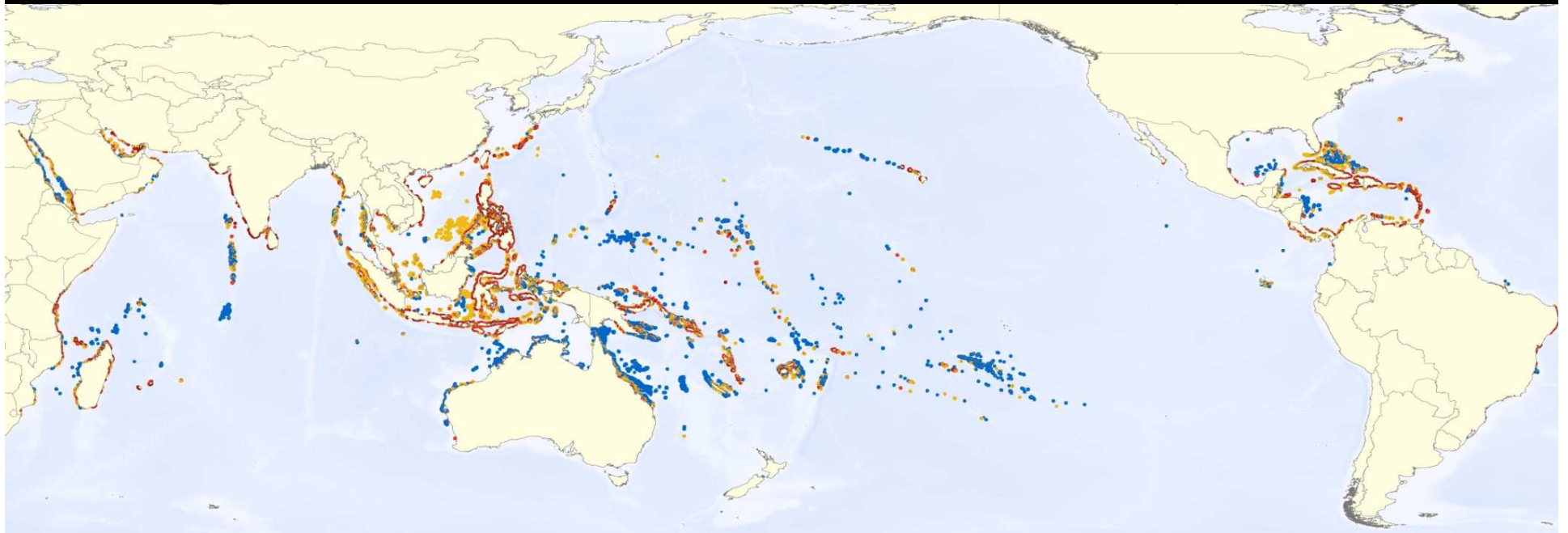


# Projections of ocean acidification (2030 and 2050)



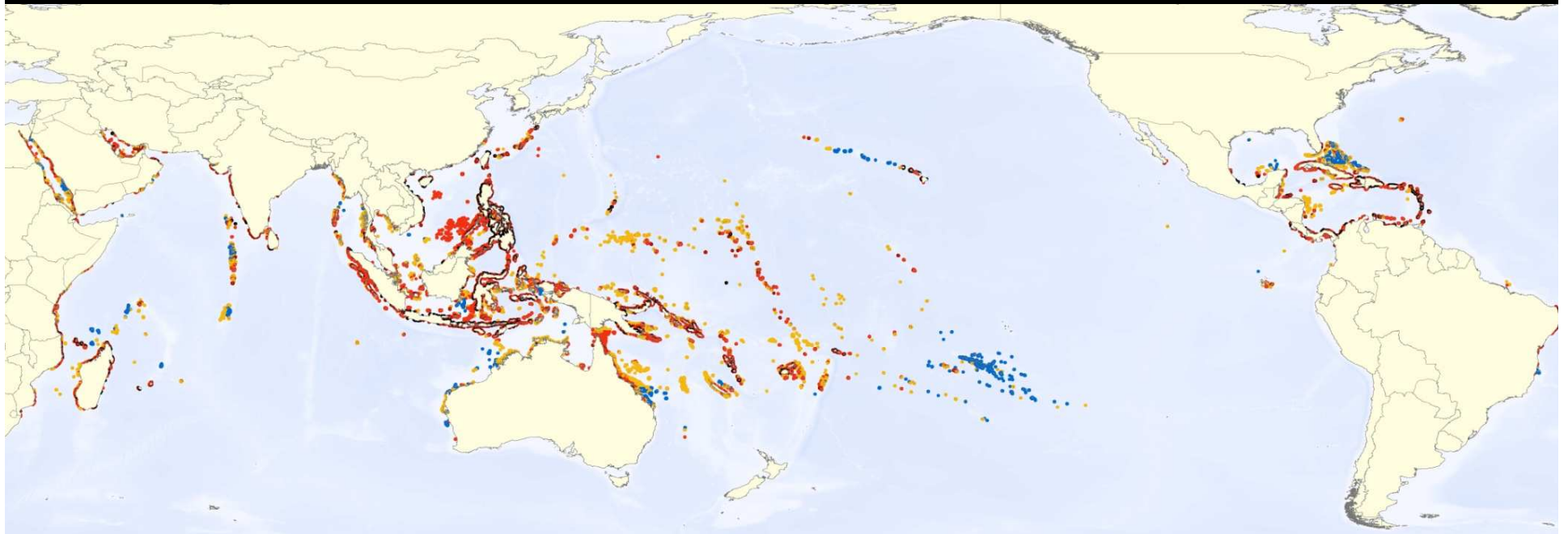
Source: Cao and Caldeira, 2008.

# Integrated threat from local activities: today



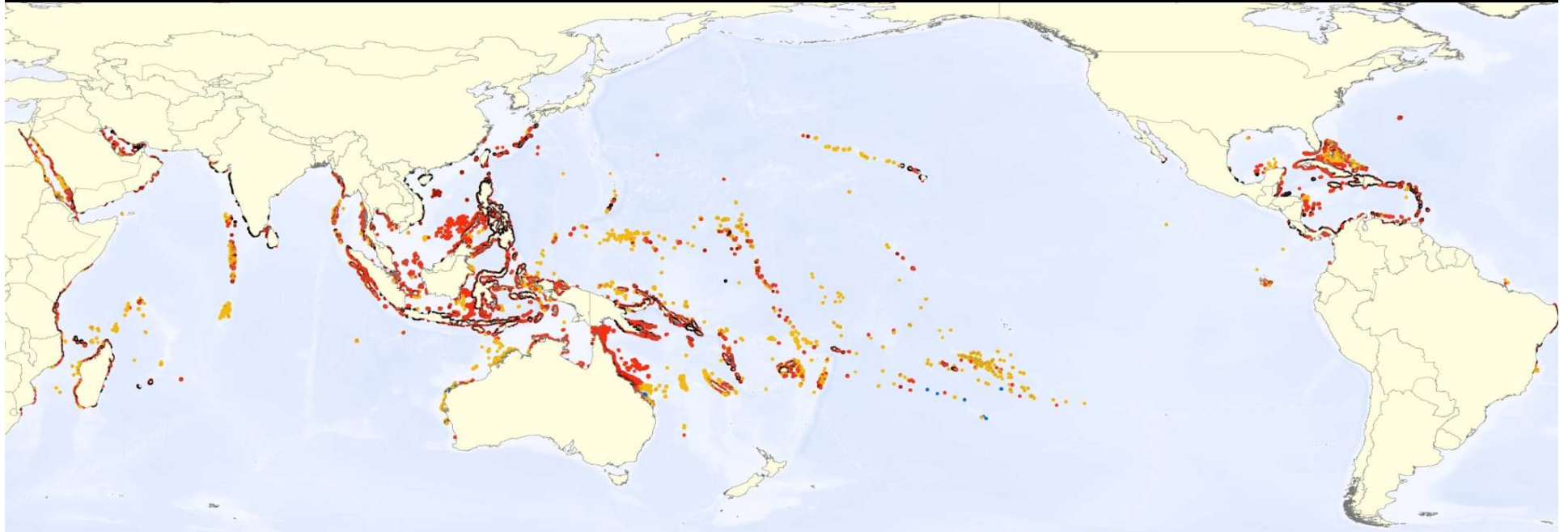
■ Low   ■ Medium   ■ High   ■ Very High

# Integrated local and global threat: 2030



■ Low   ■ Medium   ■ High   ■ Very High   □ Critical

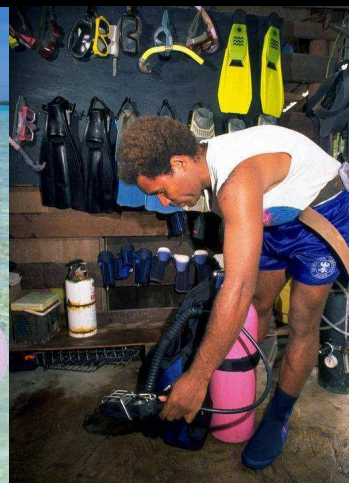
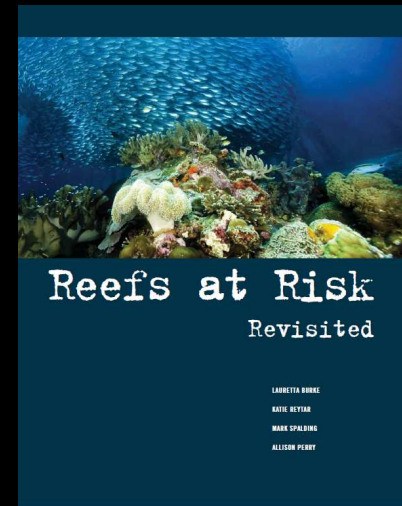
# Integrated local and global threat: 2050



■ Low ■ Medium ■ High ■ Very High □ Critical

# 3. Social and Economic Vulnerability Assessment

*Where are threats to reefs likely to have the most serious social and economic consequences for reef nations?*



# Vulnerability of 108 countries and territories

## 1. Reef threats

## 2. Reef-dependence

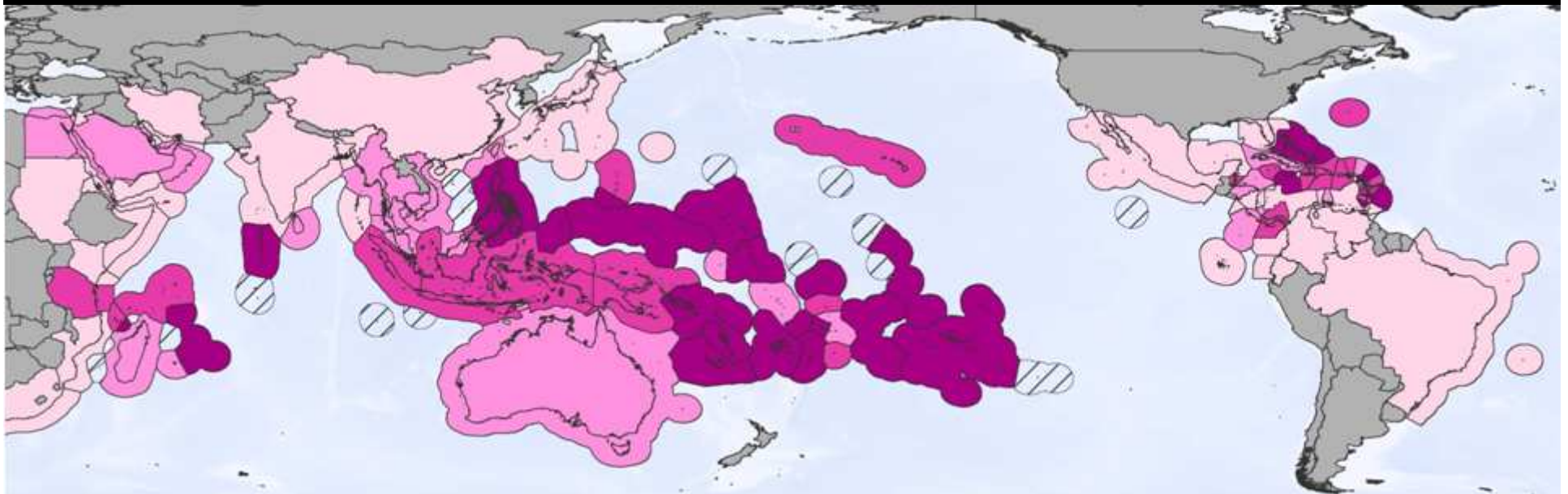
- population
- fisheries employment
- exports
- nutritional dependence
- tourism
- shoreline protection



## 3. Adaptive capacity

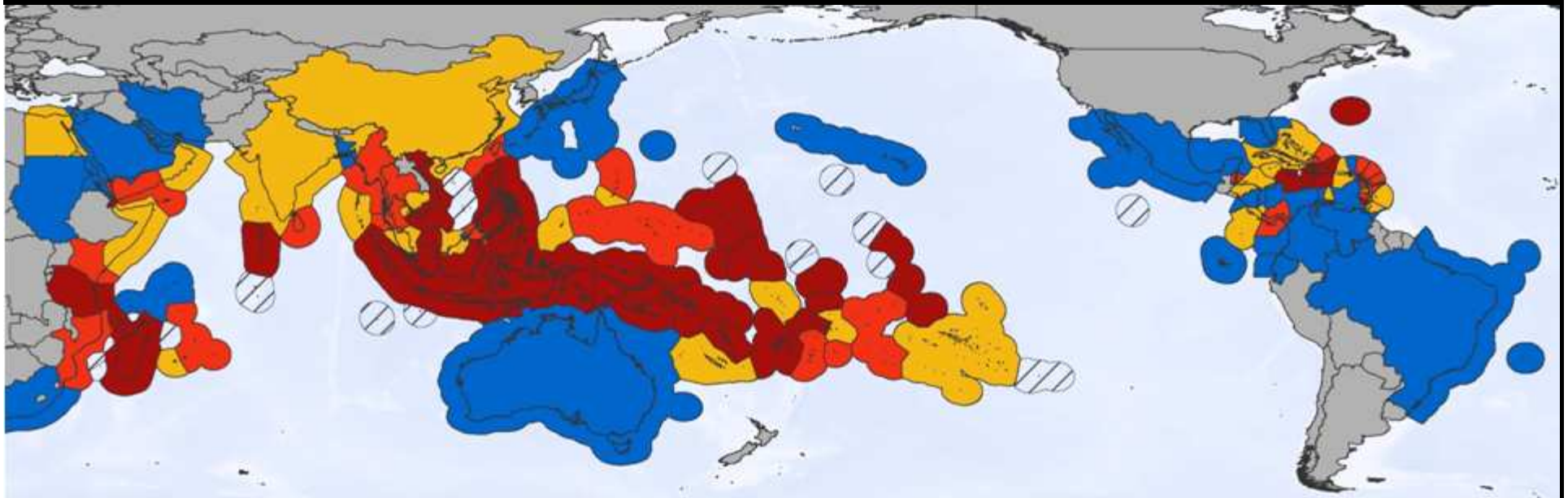
- economic resources
- education
- health
- governance
- access to markets
- agricultural resources

# Social and economic dependence on coral reefs



Low Medium High Very High No Reefs Uninhabited with Reefs

# Social and economic vulnerability to reef degradation

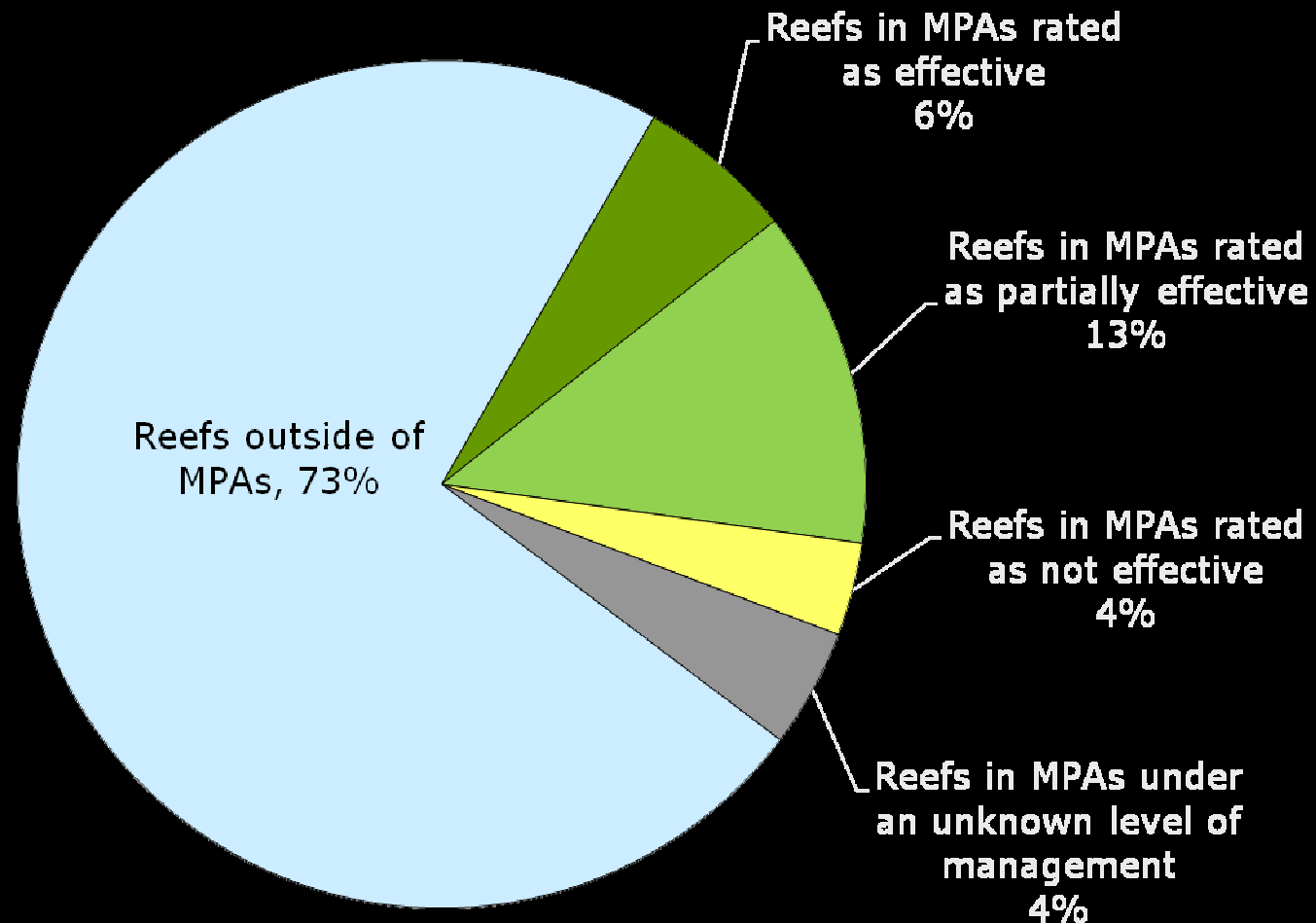


Low Medium High Very High No Reefs Uninhabited with Reefs



# 4. MPAs / Management Effectiveness

(27% of reefs in MPAs)



*Reef management effectiveness is a function of both management and environmental factors. This chart is based on data from 1996-2000.*

# 5. Reasons for hope



Photo credit: Steve Lindfield

# Actions needed:

- Reduce local pressures
  - Enforce existing regulations!!!
- Manage for climate change
- Tackle GHG emissions



Photo credit: GBRMPA

## 6. Rio + 20 Outcome

- ◆ **176.** We also recognize the significant economic, social and environmental contributions of coral reefs,
- ◆ in particular to islands and other coastal States,
- ◆ as well as the significant vulnerability of coral reefs and mangroves to impacts, including from climate change, ocean acidification, overfishing, destructive fishing practices and pollution.
- ◆ We support **international cooperation** with a view to **conserving coral reef and mangrove ecosystems** and realizing their **social, economic and environmental benefits,**
- ◆ as well as facilitating **technical collaboration** and **voluntary information-sharing.**

# International Initiatives

- ◆ Regional Seas Conventions
  - legally binding
  - primary implementers of ICRI
  - Support monitoring, training and capacity building
  - important for validating funding requests, including GEF
- ◆ ICRI
  - promotes information exchange (GCRMN)
- ◆ GPA on LBS

# 7. More Information is needed (also more persuasive)

- ◆ Recycling data
- ◆ Lack of information
- ◆ Information to influence decisions

## 8. Economic Valuation: Coastal Capital





## 3 Goods and Services Evaluated

Fisheries

Tourism

Shoreline Protection

Benefits:

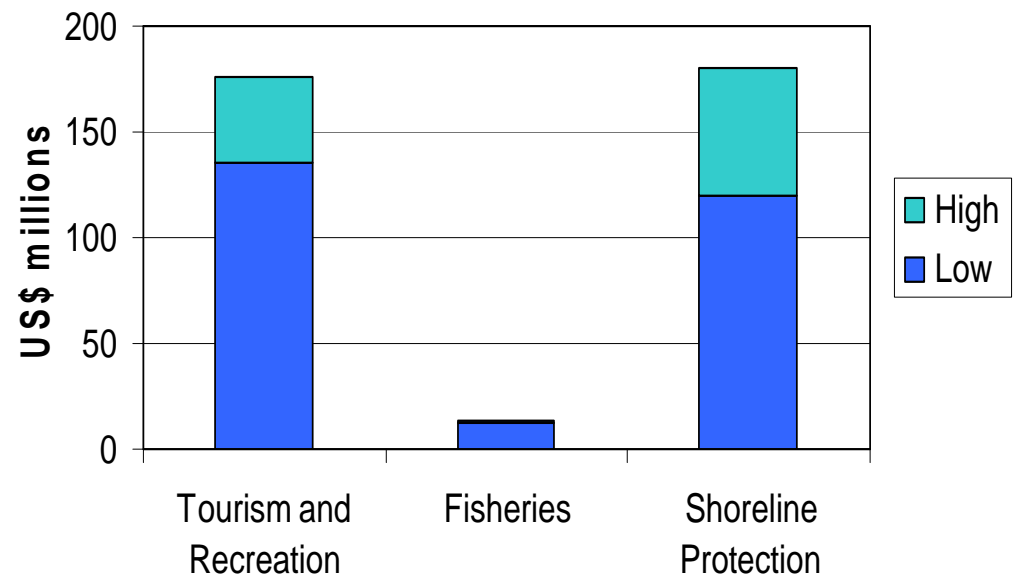
- *Tangible*
- *Relevance to national and local economies*
- *Data available*



Annual economic contribution  
of coral reefs in Belize is between  
US \$270 and \$370 million in 2007



**Coral Reef Goods and Services -  
(Annual Values)**



# Influence in Belize



# Influence Review - Enabling Conditions

- local demand for valuation
- a clear policy question
- strong local partnerships
- access to decision-makers
- good governance with high transparency
- study areas with a high dependence on coastal



- Precision and method over-rated
- Transparency about assumptions is key



# 9. Assessment of Coastal Management: Eco-Audit of the MAR

## 2011 ECO-AUDIT of the Mesoamerican Reef Countries

Are we protecting our most valuable natural asset?

The Mesoamerican Reef (MAR) provides a diverse array of goods and services to the people of Belize, Guatemala, Honduras, and Mexico. It is our shared heritage. Unfortunately, the health of the reef is declining, as documented by the 2008 and 2010 Report Cards published by the Healthy Reefs Initiative. The decline stems, at least in part, from inadequate management of threats to coral reefs. This Eco-Audit **evaluates** our efforts to protect and sustainably manage the region's coral reefs; **celebrates** management success stories; and **documents** the extent to which recommended management actions have been implemented in Belize, Guatemala, Honduras, and Mexico. It seeks to **catalyze** faster, more effective management responses and to **increase accountability** within the public and private sectors and among nongovernmental organizations (NGOs).

### AN INNOVATIVE, RIGOROUS PROCESS

The Healthy Reefs Initiative (HRI), in collaboration with the World Resources Institute (WRI) and local partners, developed and implemented this first-ever multinational Eco-Audit of the Mesoamerican Reef Countries.

#### Evaluation criteria are comprehensive and inclusive.

Twenty-two standardized management indicators were developed across seven themes, such as fisheries management and coastal zone management. The Eco-Audit draws on input from a variety of NGOs, governmental agencies, and the private sector, and includes transparently verified and publicly available results. In September and October 2011, HRI and WRI convened four national workshops, whose purpose was for participants to collectively rank each indicator and to compile documents to verify the rankings.

#### Analysis is objective, science-based, and validated.

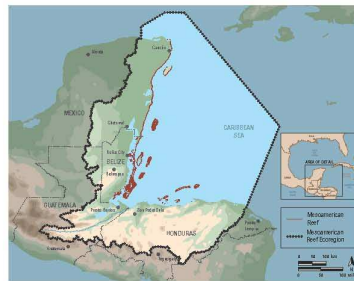
HRI and its regional partners are committed to maintaining audit standards that are unbiased, fact-based, transparent, and replicable. The financial and management auditing firm of PricewaterhouseCoopers Costa Rica (PwC) reviewed the methodology and provided feedback on the processes, indicators, and quality of the verification documentation.

#### Data quality will be enhanced over time.

This first Eco-Audit establishes a baseline regarding the status of reef ecosystem management efforts. The results are intended to guide data collection and compilation for future Eco-Audits, which will occur every two years. These biennial Eco-Audits and the biennial HRI Reef Report Cards will occur in alternating years, thereby providing a routine accounting of reef health and efforts to improve it. As data collection becomes more complete and the database grows, we anticipate that the Eco-Audit will evolve, becoming more quantitative and comprehensive in its evaluation of management efforts.

### A CALL TO ACTION

The results of the Eco-Audit are intended to instill a sense of urgency, accountability, and shared purpose among all institutions—NGOs, governments, and the private sector—with a stake and responsibility for maintaining the MAR as a healthy, biologically vibrant, and economically viable resource for generations to come. The audit seeks to hold high-level decision-makers accountable, while identifying actions needed to protect the MAR.



Mesoamerican Reef Ecoregion Map

### WHAT IS AN ECO-AUDIT?

An eco-audit is a systematic multinational evaluation of the implementation of recommended reef management actions by governments, NGOs, and the private sector. This Eco-Audit includes 22 indicators across 7 themes and over 300 supporting documents within the following components:

- An orientation document that provides an overview of each indicator, including its justification, ranking criteria, and data collection methods (McField and Kushner 2011)
- Detailed worksheets of Eco-Audit results and observations for each country
- Compilations of all publicly available verification documentation for each indicator by country

These products, along with additional information about the Eco-Audit, are available online at [www.healthyreefs.org](http://www.healthyreefs.org) and [www.wri.org/reefs](http://www.wri.org/reefs).



- Four countries
- Over 40 organizations
- Over 100 individuals
- 22 indicators across 7 themes
- Serves as basis for measuring future progress

Conducted by:










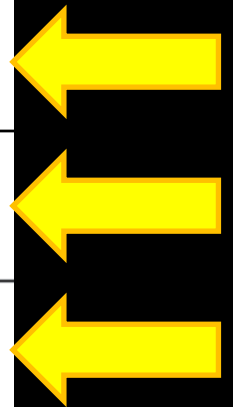
Funded by:



# Regional Average for MAR

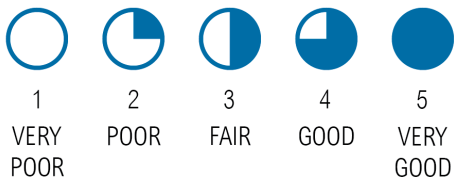
## THEMES

Marine Protected Areas	3.0	
Ecosystem-based Fisheries Management	2.8	
Coastal Zone Management	2.5	
Sanitation and Sewage Treatment	2.3	
Research, Education and Awareness	3.9	
Sustainability in the Private Sector	2.2	
Global Issues	2.5	



# RESULTS BY THEME

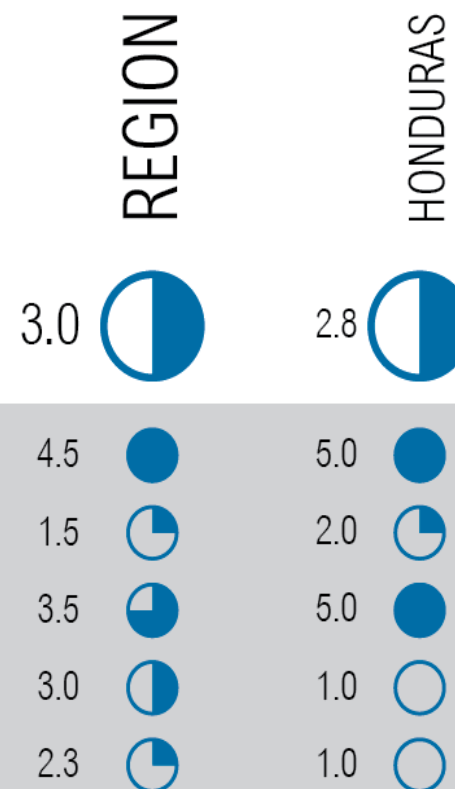
REGION	BELIZE	GUATEMALA	HONDURAS	MEXICO
2.7	3.3	2.2	2.7	2.7
Marine Protected Areas	3.0	3.2	3.0	2.8
Ecosystem-based Fisheries Management	2.8	4.0	2.3	2.3
Coastal Zone Management	2.5	2.0	2.0	4.0
Sanitation and Sewage Treatment	2.3	3.5	1.5	2.0
Research, Education and Awareness	3.9	4.8	3.0	4.0
Sustainability in the Private Sector	2.2	2.0	1.4	2.2
Global Issues	2.5	3.5	2.5	1.5



# Theme – MPAs

## Marine Protected Areas

- Percent of a country's territorial sea included in gazetted MPAs
- Percent of a country's territorial sea included in fully protected zones
- Percent of mapped coral reef area included in fully protected zones
- Percent of MPAs with good management
- Percent of MPAs with good enforcement



### KEY



# Recommendations

- **\$\$\$ Speaks**
  - Invest in economic valuation, focused on specific policy questions
- **Pilot the Management Scorecard concept in other locations**
  - Develop standardized themes, indicators, and criteria
  - Apply widely



# Thank you



Photo credit: Wolcott Henry

[www.wri.org/reefs](http://www.wri.org/reefs)

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