Lessons from the COAs on Sustainable Blue Economy and Scientific Knowledge, Research Capacity Development and Transfer of Marine Technology

United Nations Division for Sustainable Development Goals
Department of Economic and Social Affairs
Meeting of the Communities of Ocean Action
From Commitments to Action: Implementing SDG14
30–31 May 2019
Incheon, Republic of Korea

BIOROCK REGENERATES COASTAL ECOSYSTEMS FOR THE NEW BLUE ECONOMY

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Global Coral Reef Alliance

www.globalcoral.org https://sidsdock.org/

SIDSDOCK

SMALL ISLAND DEVELOPING STATES

ISLAND ENERGY FOR ISLAND LIFE

"It is an initiative among member countries of the Alliance of Small Island States (AOSIS) to provide the Small Island Developing States (SIDS) with a collective institutional mechanism to assist them transform their national energy sectors into a catalyst for sustainable economic development and help generate financial resources to address adaptation to climate change."

MARINE ECOSYSTEMS ARE DYING:

Coral reefs

Mangroves

Sea Grasses

Salt Marshes

Oyster reefs

Beaches

Coastal fisheries

Open ocean fisheries

SOME KEY OCEAN FACTS

Most corals have died from global warming and pollution

Half of mangroves, seagrasses, and saltmarshes, the world's most cost-effective carbon sinks, have been destroyed

Beaches are eroding rapidly and coastlines flooding

Shorelines smothered with harmful algae blooms

Wild fisheries in advanced collapse due to overfishing, and destruction of ecosystem capacity to recover caused by pollution and global climate change

Aquaculture fisheries now equal wild caught harvests

There is now as much plastics as fish in the sea

Global warming and sea level rise impacts have barely begun, much worse lies ahead: the ultimate steady state response to today's 400 ppm CO_2 is 17 C warmer and sea levels 23 meters higher than now!

They are being killed simultaneously from top-down overharvesting and from bottom-up ecosystem collapse caused by global climate warming and pollution

Marine protected areas cannot protect marine ecosystems from climate change or regenerate fish stocks if the habitat is gone

New methods that greatly accelerate settlement, growth, survival, and resistance to stress of all marine organisms are essential to restore marine ecosystem services like fisheries, shore protection, biodiversity, tourism

Coral reefs are the world's most valuable ecosystems

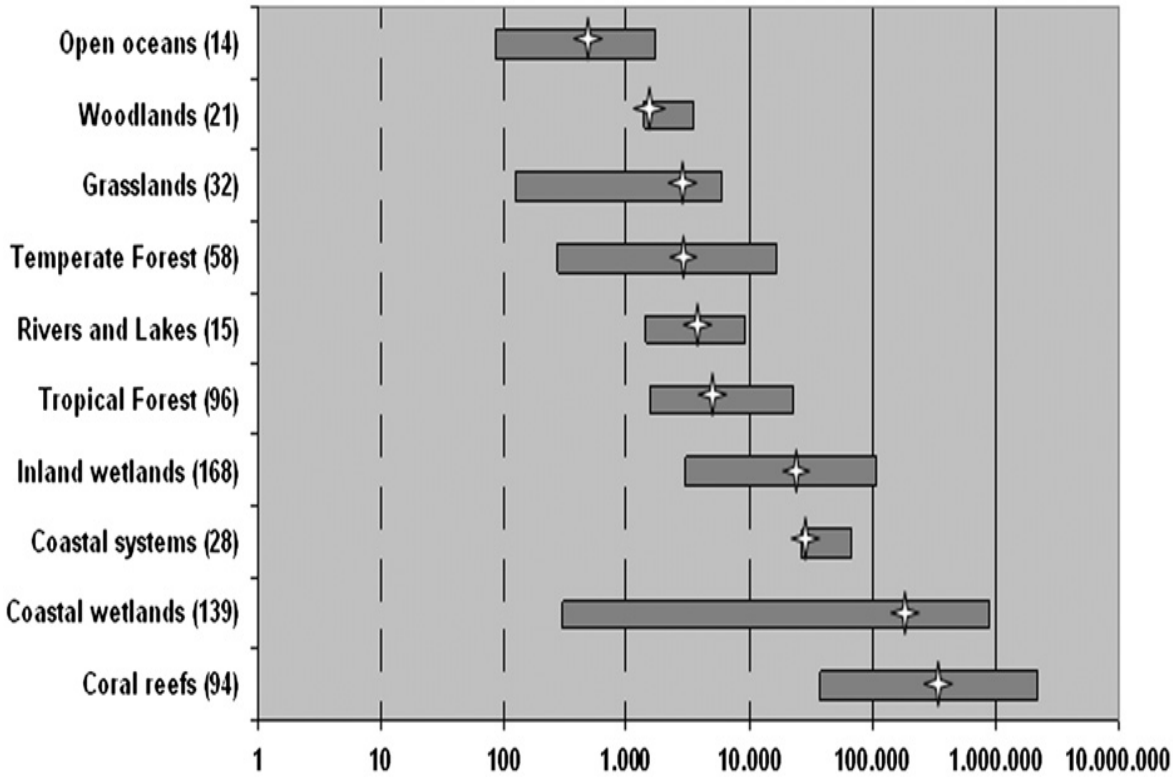


Fig. 3. Range and average of total monetary value of bundle of ecosystem services per biome (in Int. $/ha/yr 2007/PPP-corrected)). *The total number of values per biome is given between brackets; the average of the value-range is shown as a star. For exact values see* Table 3.

SIDS: the first and worst victims of global climate change

Coral reefs passed the tipping point for mass coral bleaching in the 1980s, and can take NO further warming

1.5 C warming is a death sentence for corals and

suicide pact for low lying islands

60% of all global ecosystem service value economic losses due to coral reef decline in less than 0.1% of the ocean (before bleaching mortality of recent years)

Coral reef countries, most of them SIDS, are already suffering economic losses nearly a thousand times higher than the global average

SOLUTIONS NEEDED TO:

Save coral reefs from global warming using methods that greatly increase settlement, growth, survival, and resistance to extreme environmental stress

Save beaches and coasts from global sea level rise by regenerating coral reefs

Restore coastal ecosystem carbon sinks by regenerating mangroves

Produce cheaper, harder construction materials from the sea that absorb CO2 instead of producing it

Grow back entire ecosystems that increase biodiversity, absorb pollution, grow their own food without external input, and provide beneficial ecosystem services

RECHARGING ENTIRE ECOSYSTEMS WITH BIOROCK TECHNOLOGY:

We use completely safe extremely low voltage (SELV) trickle charge direct current, like a battery

We build structures of any size or shape in the sea from ordinary construction steel

The steel never rusts because of the electric charge, then we grow solid limestone rock over it very slowly (1-2 cm year) to get material 2-3 time harder than concrete

Biorock is the only marine construction material that is growing, gets stronger with age, and repairs itself

We can grow limestone building materials from the sea that are cheaper than imported cement

We can grow even harder cements that absorb CO2 from the air as they set, unlike Portland Cement which generates 5-10% of CO2

All forms of marine life are attracted by the electrical field, and settle and grow at record rates, many times faster than normal (except only sharks which won't bite in electrical fields that confuse them)

They branch and grow much more densely with rare perfection of form, like a fruit tree on the best soil

They survive severe environmental stresses from high temperature and pollution that would normally kill them

In Maldives, Thailand, and Indonesia we kept whole reefs alive when everything around them bleached and died

We call it tickle charge, because we see all forms of life smile, including turtles that get a charge by sleeping on Biorock reefs!

Biorock works in all salt water ecosystems, coral reefs, oyster reefs, mussels, sea grass, salt marsh, mangroves

Biorock grows entire ecosystems with all its components, producing their own food for sustainable mariculture

Can be designed specifically for sustainable mariculture of lobster, fishes, oysters, giant clams, pearl oysters, etc.

By growing reefs in front of severely eroded beaches we grow the beaches back naturally at record rates, by reducing wave erosion and growing new sand

Whole islands can be protected and grown

Floating coral reefs can be grown for ocean fishes

Power can be provided by sun, wind, waves, and tidal currents

BIOROCK IS A SIDS BLUE TECHNOLOGY

Invented in Jamaica, but not used there for 25 years

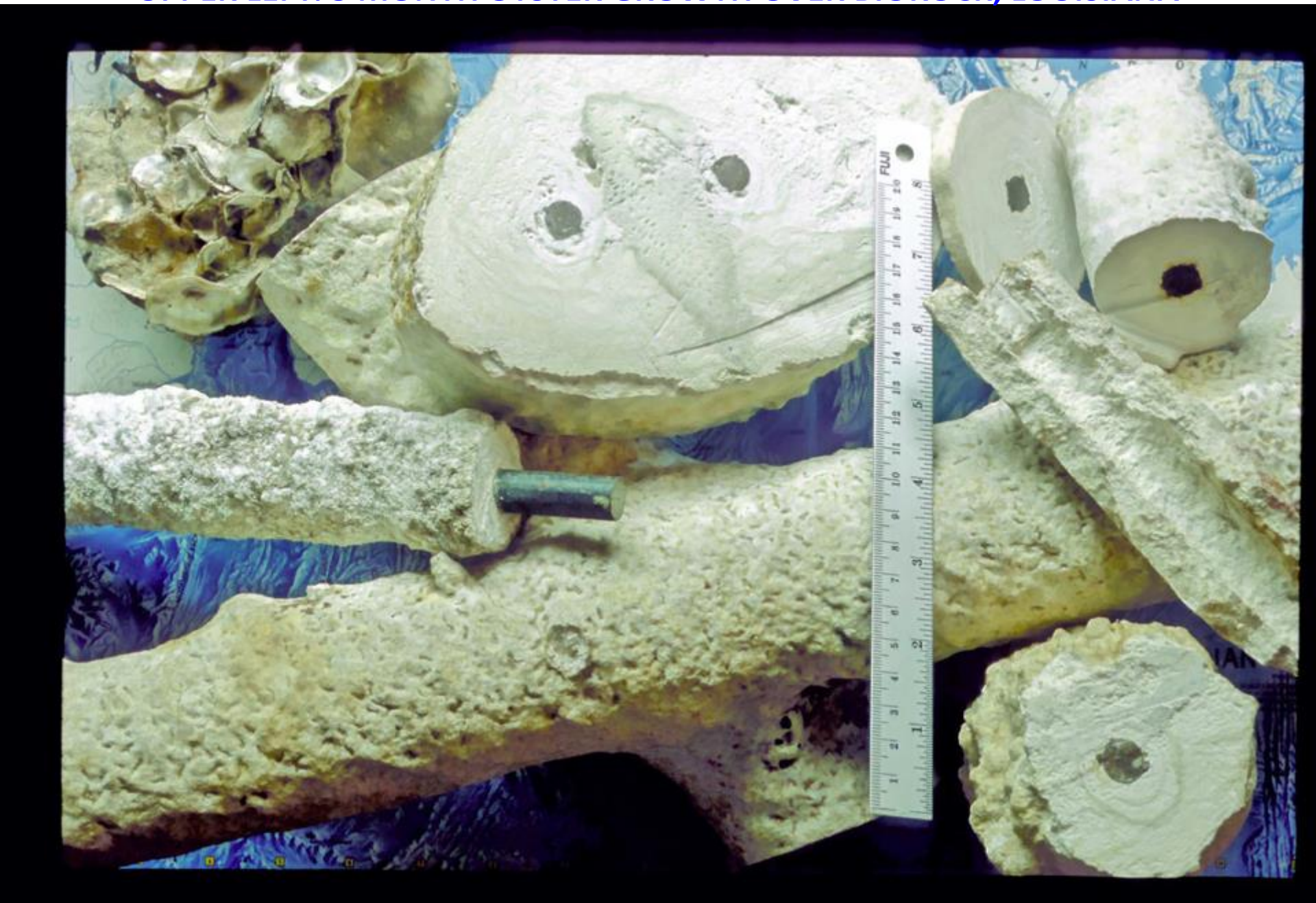
Pilot projects in Jamaica, Cuba, Bahamas, Dominican Republic, Antigua, Grenada, Carriacou, Tobago, Maldives, Seychelles, Marshall Islands, Federated States of Micronesia, Palau, Fiji, Vanuatu, Papua New Guinea and many other countries

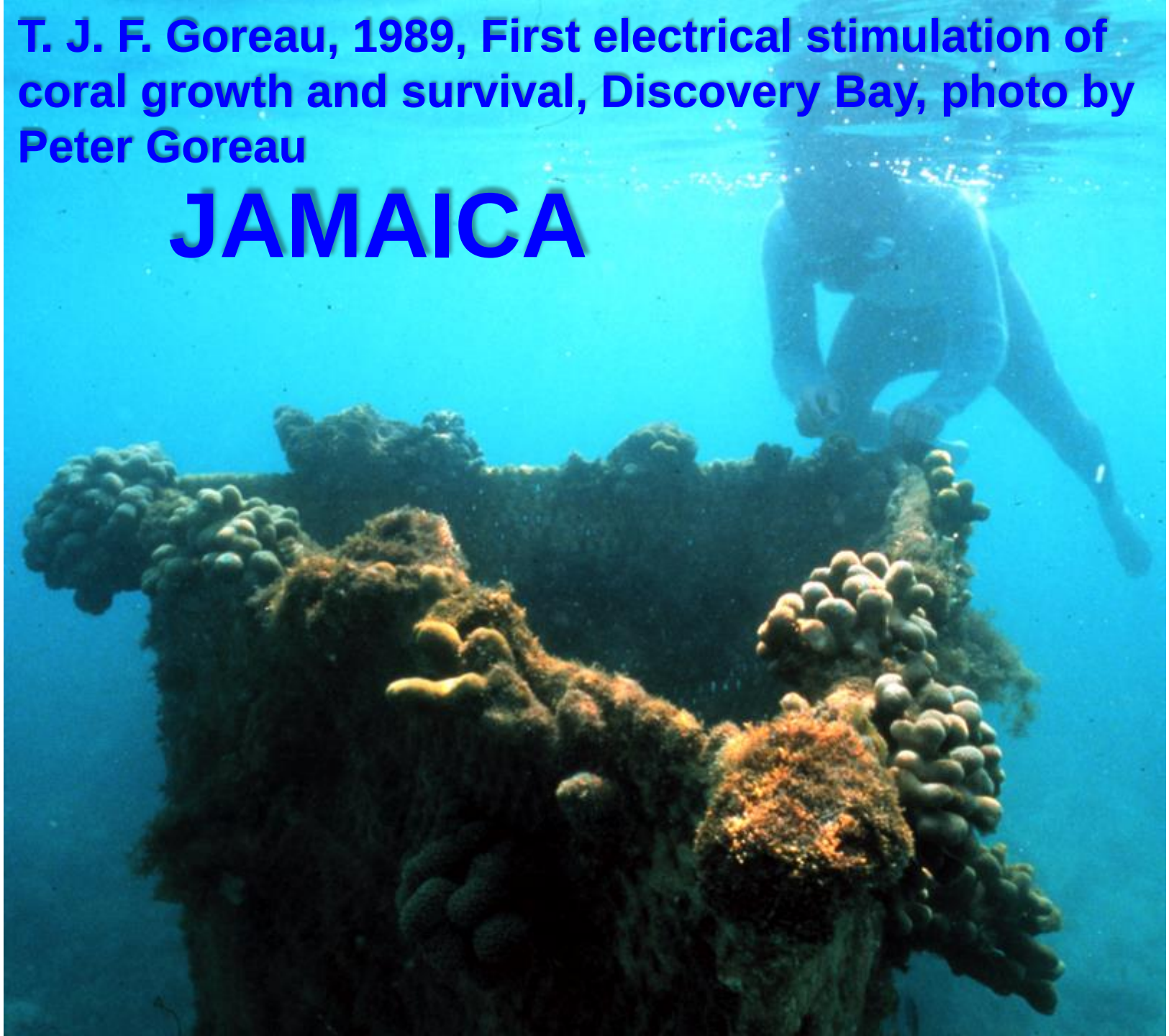
Not being used in SIDS because of lack of funding and support from governments and international agencies, but being eagerly copied by the rich countries: Americans, Europeans, Australians, and Arabs, because it works!

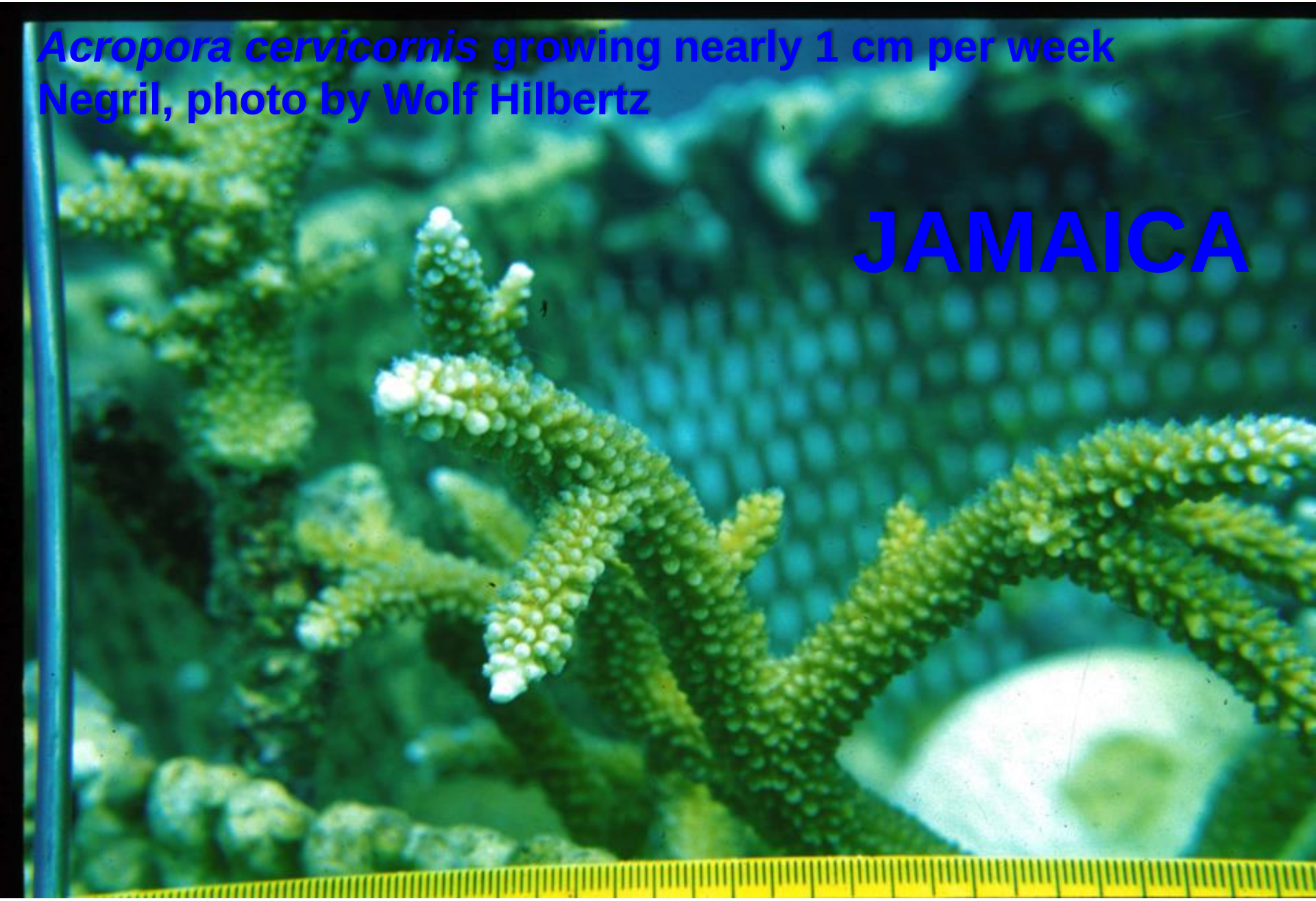
Nobody believes what we do is possible until they see it themselves!


Jamaica fossil sea level 130,000 years ago, when temperature was 1-2 C higher, sea level was 7-8 meters higher, hippopotamuses and crocodiles lived in London, England, and CO2 was 40% lower than it is today!
ANCIENT SEA LEVEL NOTCH
SEA
FOSSIL CORAL

TWO YEAR OLD BIOROCK MATERIAL, MALDIVES
UPPER LEFT: 3 MONTH OYSTER GROWTH OVER BIOROCK, LOUISIANA




T. J. F. Goreau, 1989, First electrical stimulation of coral growth and survival, Discovery Bay, photo by Peter Goreau
JAMAICA

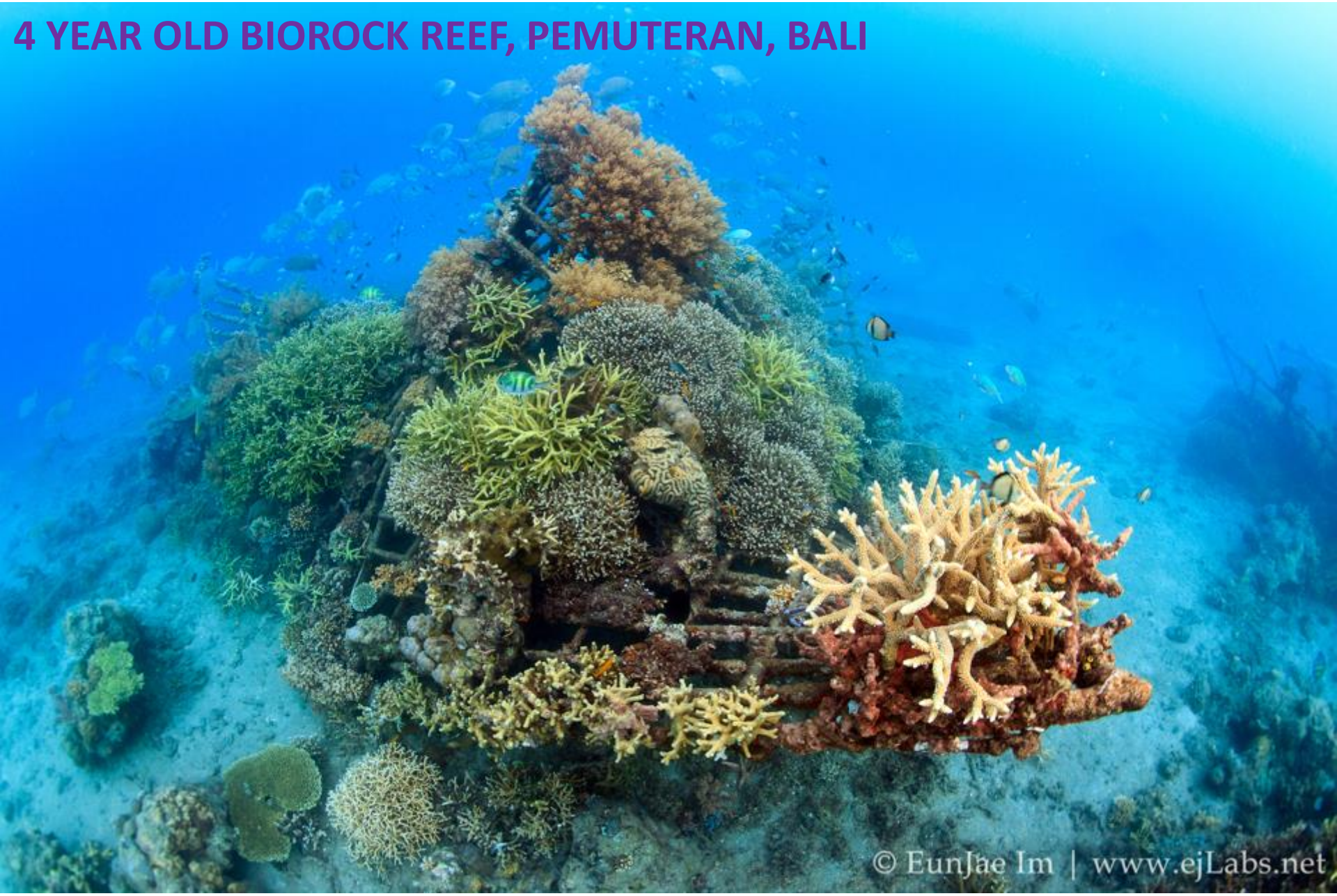

Acropora cervicornis growing nearly 1 cm per week
Negril, photo by Wolf Hilbertz
JAMAICA

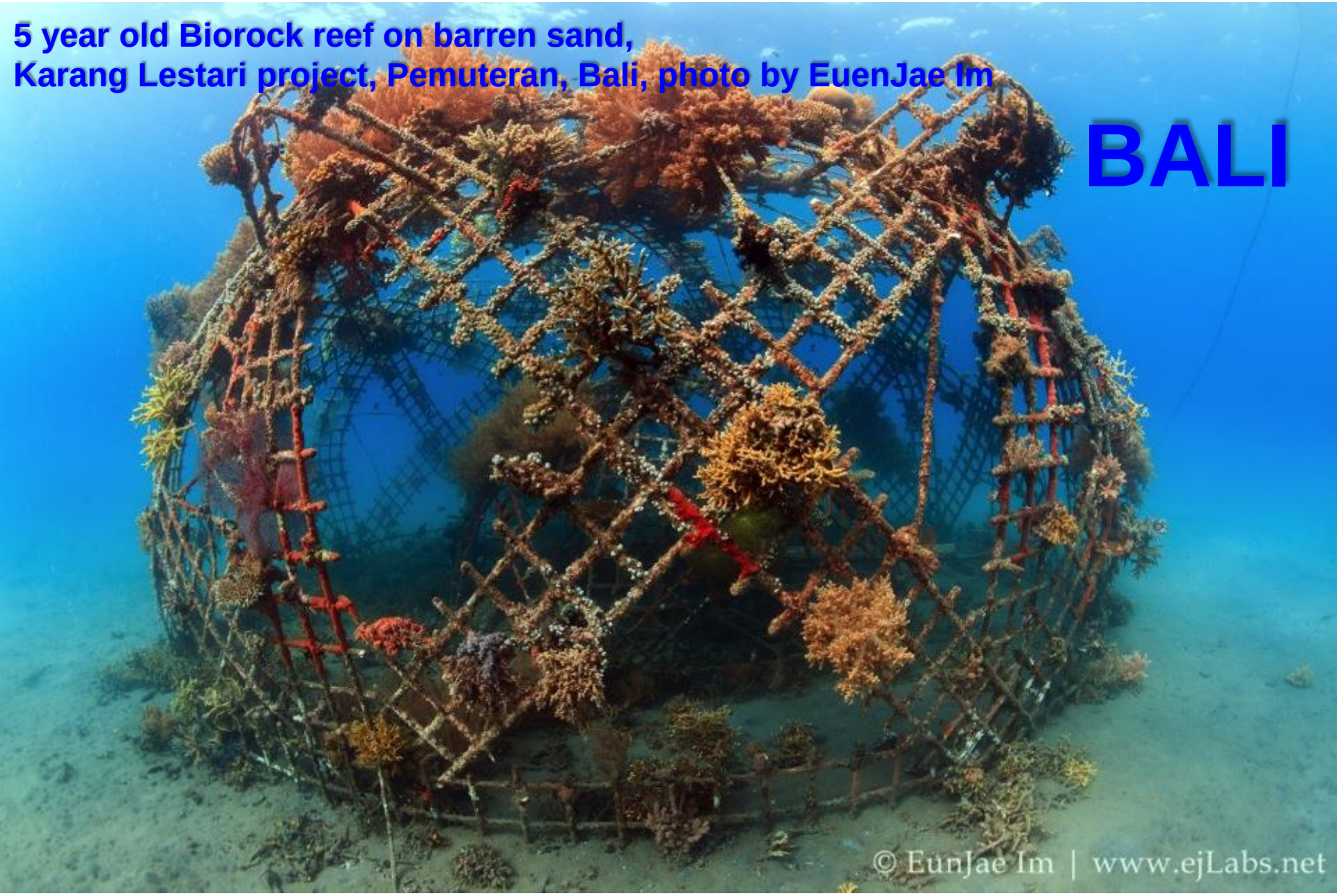
Bali: Biorock reef hit by boat:
No rusting on steel 11 years in the water

One year later, damage heals itself

4 YEAR OLD BIOROCK REEF, PEMUTERAN, BALI

4 YEAR OLD BIOROCK REEF, PEMUTERAN, BALI




5 year old Biorock reef on barren sand,
Karang Lestari project, Pemuteran, Bali, photo by EuenJae Im
BALI
© EunJae Im | www.ejLabs.net

PEMUTERAN, BALI

2000

~1% live coral

2010

~99% live coral

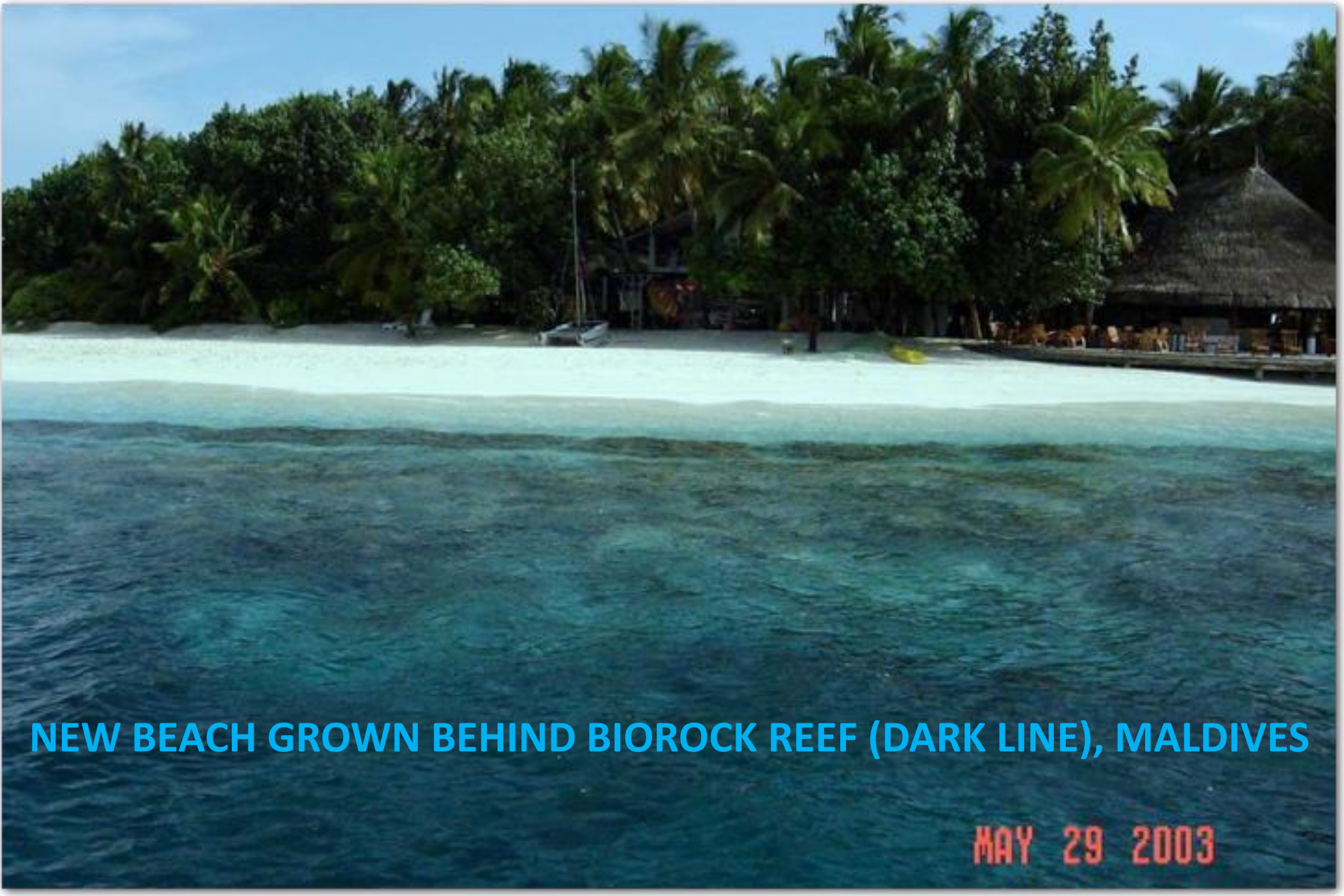
SOLAR POWERED SEAGRASS GROWTH ON BARE ROCK IN MEDITERRANEAN, CLOSE UP OF PROLIFIC ROOT GROWTH

RAPID RESTORATION OF SEVERELY ERODED BEACH, MALDIVES

BEFORE

AFTER

15 meter wide new beach grew behind the Biorock reef in 2-3 years. At the start of the project the building in the back was collapsing into the ocean and the hotel said they would have to destroy it.



NEW BEACH GROWN BEHIND BIOROCK REEF (DARK LINE), MALDIVES

RAPID RESTORATION OF SEVERELY ERODED BEACH, SULAWESI, INDONESIA

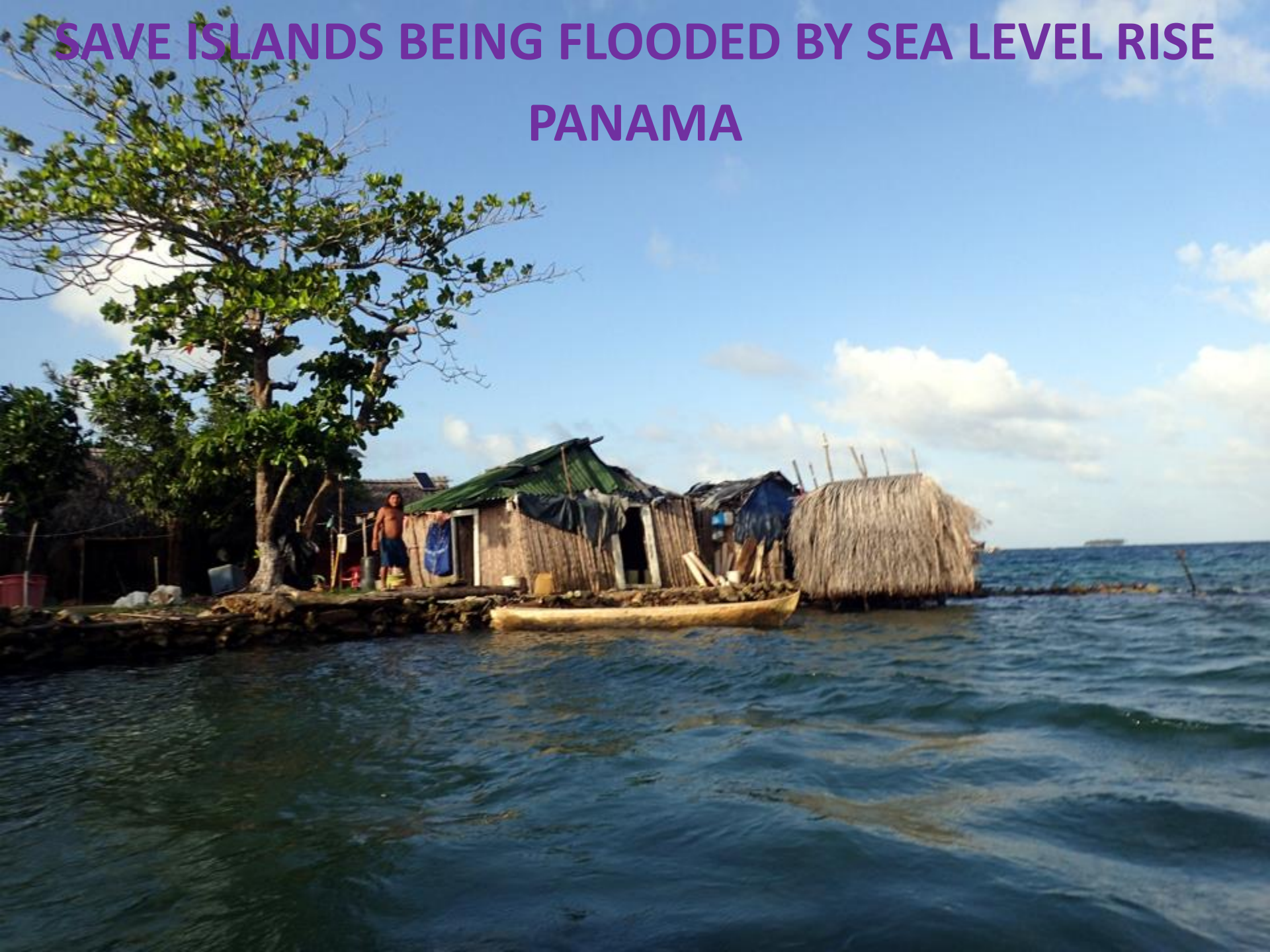
Before

Before


After. Same building and tree.
80% of beach growth took place
In just three months, and has
continued ever since.

SAVE ISLANDS BEING FLOODED BY SEA LEVEL RISE

PANAMA



SOLAR POWERED SALT MARSH RESTORATION AT SUPERFUND TOXIC WASTE SITE, NEW YORK CITY


PROLIFIC SEAGRASS AND CORAL GROWTH
SULAWESI, INDONESIA

BIOROCK MANGROVE RESTORATION SITE IN BORNEO FOR SUSTAINABLE ENERGY PRODUCTION, ORANGUTAN SANCTUARY, AND MOST COST-EFFCTIVE CARBON SINK

BOTTOM-UP COMMUNITY-BASED MANAGEMENT

All projects need to be maintained.
We work directly with ocean communities to train them how to restore and manage their own resources.
Bottom-up management is crucial because top-down management has a disastrous record of failure as soon as funding dries up.

Yayasan Karang Lestari (Indonesian Protected Coral Foundation) specially honored at UN Oceans Conference for turning environmental disaster into economic opportunity by restoring their coral reefs, fisheries, and tourism resources through community-managed Biorock reef restoration projects. Awarded UNDP Equator Award for Community Based Development and Special Award for Oceans and Coastal Management

EQUATOR INITIATIVE 15YEARS

Federal Ministry for Economic Cooperation and Development

ROYAL NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

UNDP
Empowered lives. Resilient nations.

In celebration of World Oceans Day at the UN Ocean Conference, you are cordially invited to a high-level event and reception on

Local Action, Global Impact

8 June 2017

UN Delegates Dining Room
UN Conference Building
4th Floor

Please RSVP to
https://localactionglobalimpact.eventbrite.com

THE OCEAN CONFERENCE
UNITED NATIONS, NEW YORK, 5-9 JUNE 2017

14 LIFE BELOW WATER

World Oceans Day

UNDP SPONSORED COMMUNITY RESTORATION TRAINING IN VANUATU FOR A FISHING VILLAGE WHOSE REEF WAS DREDGED FOR AN AIPORT IN 1943 AND NEVER RECOVERED

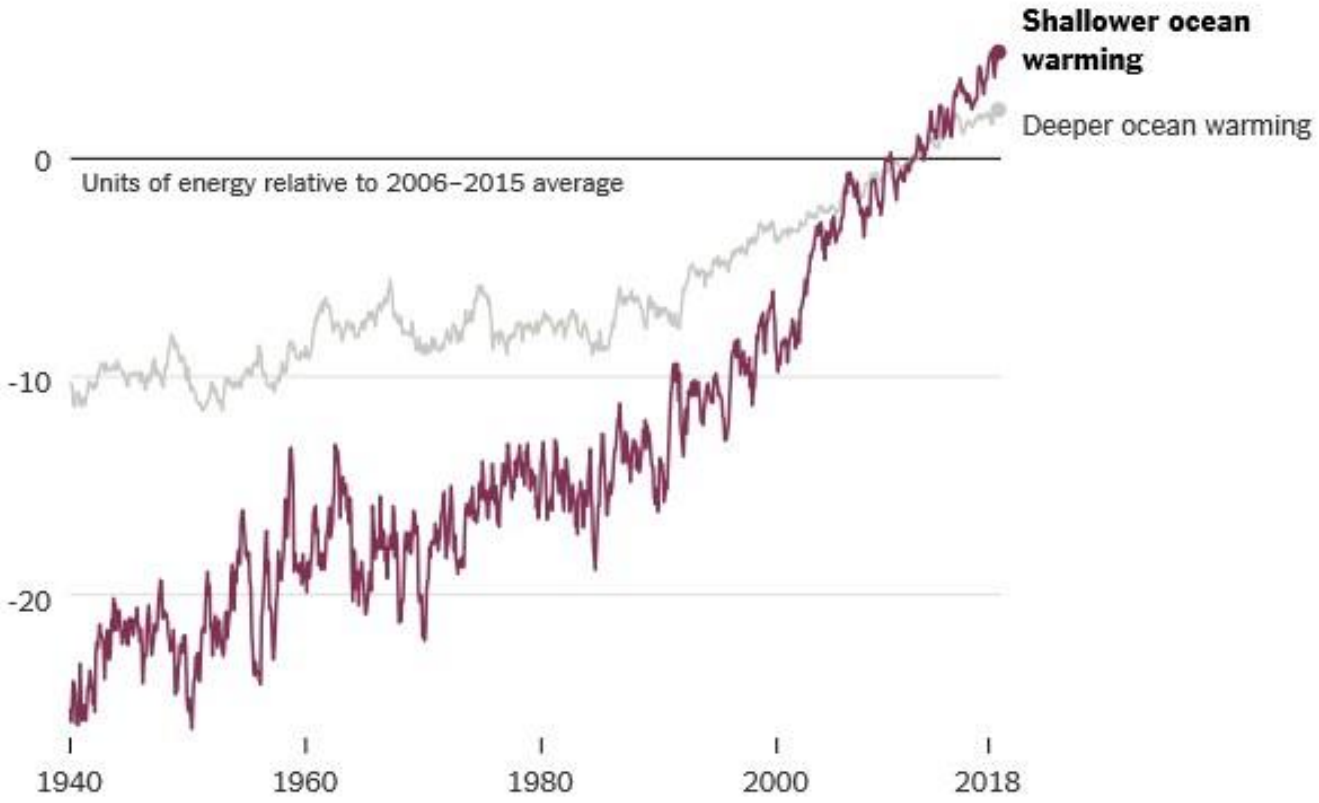
TRAINING THE NEXT GENERATION TO REGENERATE THEIR REEF FISHERIES, VANUATU, 2016

OCEAN WARMING HAS GREATLY ACCELERATED IN THE LAST 15 YEARS

There is now very little time left to save coral reefs, beaches, and the species and people who depend on them from global warming and sea level rise

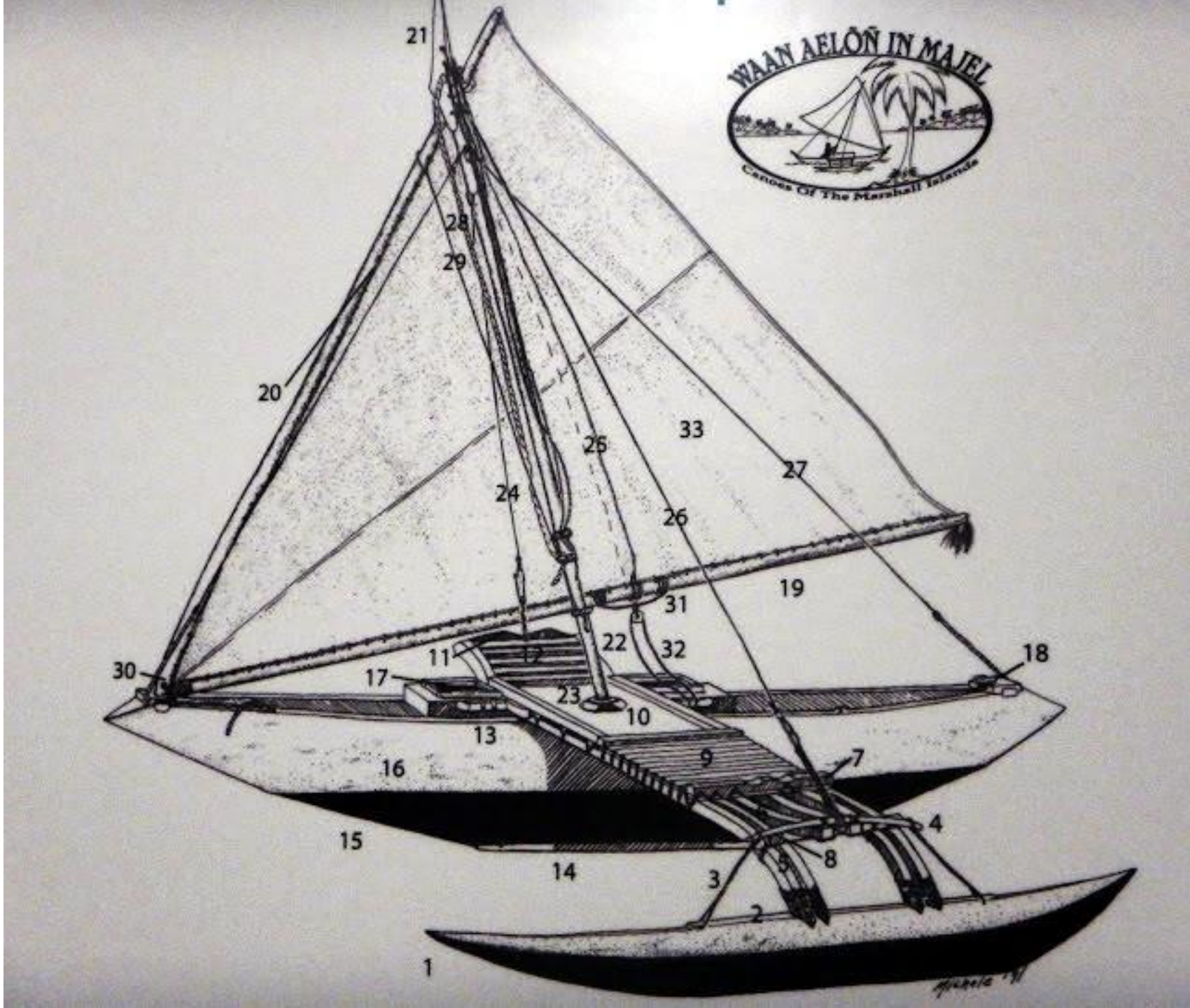
Biorock can regenerate the coastal ecosystems that the Blue Economy requires with urgent large-scale implementation of Biorock Coral Arks, Biorock beach regeneration, and Biorock marine wetland carbon sink regeneration

Global ocean warming has accelerated greatly in the last 15 years



Note: Shallower ocean warming describes depths between 0 and 700 meters. Deeper ocean warming is between 700 and 2,000 meters.

By The New York Times | Source: Lijing Cheng et al., Institute of Atmospheric Physics, Beijing


WAAN AELÕÑ IN MAJEL
Canoes Of The Marshall Islands
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Only the first nuclear bomb on Bikini had any scientific purpose, the other 22 were purely for weapons development. The nuclear radiation makes the islands uninhabitable because you can't eat the fish or coconuts, the basis of the Bikinian diet

BIKINI HOMES 1946, F. W. Goreau

KILI ISLAND IS 75% FLOODED BY SEAWATER

KILI FLOODING, 2015

KILI FLOODING, 2015

KILI FLOODING, 2016

EJIT ISLAND IS 50% FLOODED BY SEAWATER

MAJURO FLOODING, 2015

EJIT SCHOOL MAY 27 2019

SIDS cannot wait any longer for those who can't or won't learn to regenerate our planet's natural life support and climate regulation systems and reverse climate change.

IMMEDIATE ACTION, NOT MORE TALK, IS NEEDED!

THANK YOU!

For more information:

www.globalcoral.org

goreau@globalcoral.org

http://www.globalcoral.org/spectacular-biorock-coral-growth-videos/

http://www.globalcoral.org/biorock-electric-coral-reefs-survive-severe-hurricanes-little-no-damage/