BIOROCK MALDIVES: Results Photogallery

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APPLICATIONS OF BIOROCK TECHNOLOGY IN THE MALDIVES

Saves coral reefs from bleaching and preserved biodiversity where all other methods failed

Regenerates severely eroded beaches naturally and rapidly, unlike all other shore protection methods

Can save the Maldives by growing faster than sea level rise

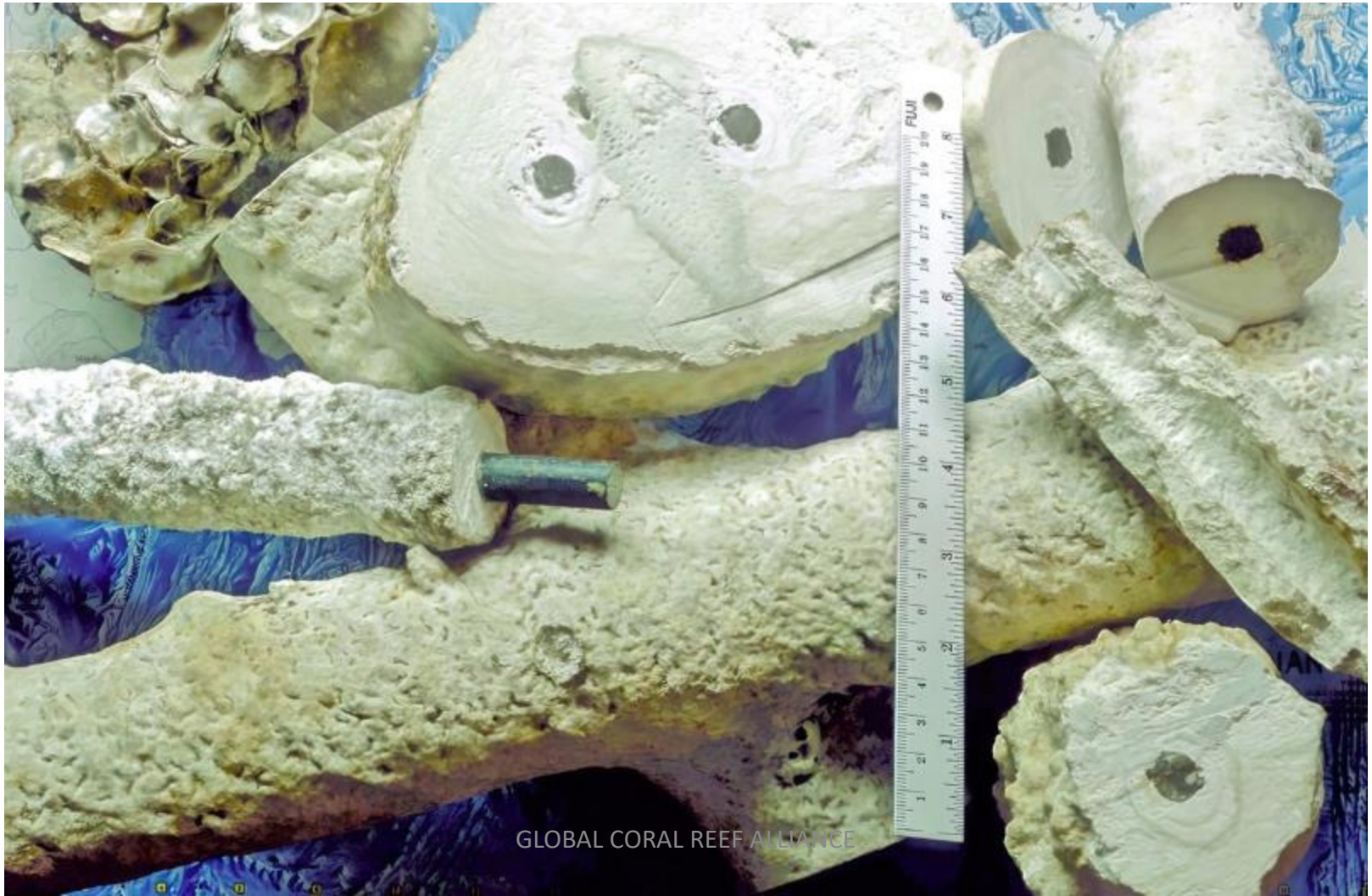
Perfect for sustainable mariculture and tuna stock enhancement

Grows harder, cheaper, carbon-negative building materials

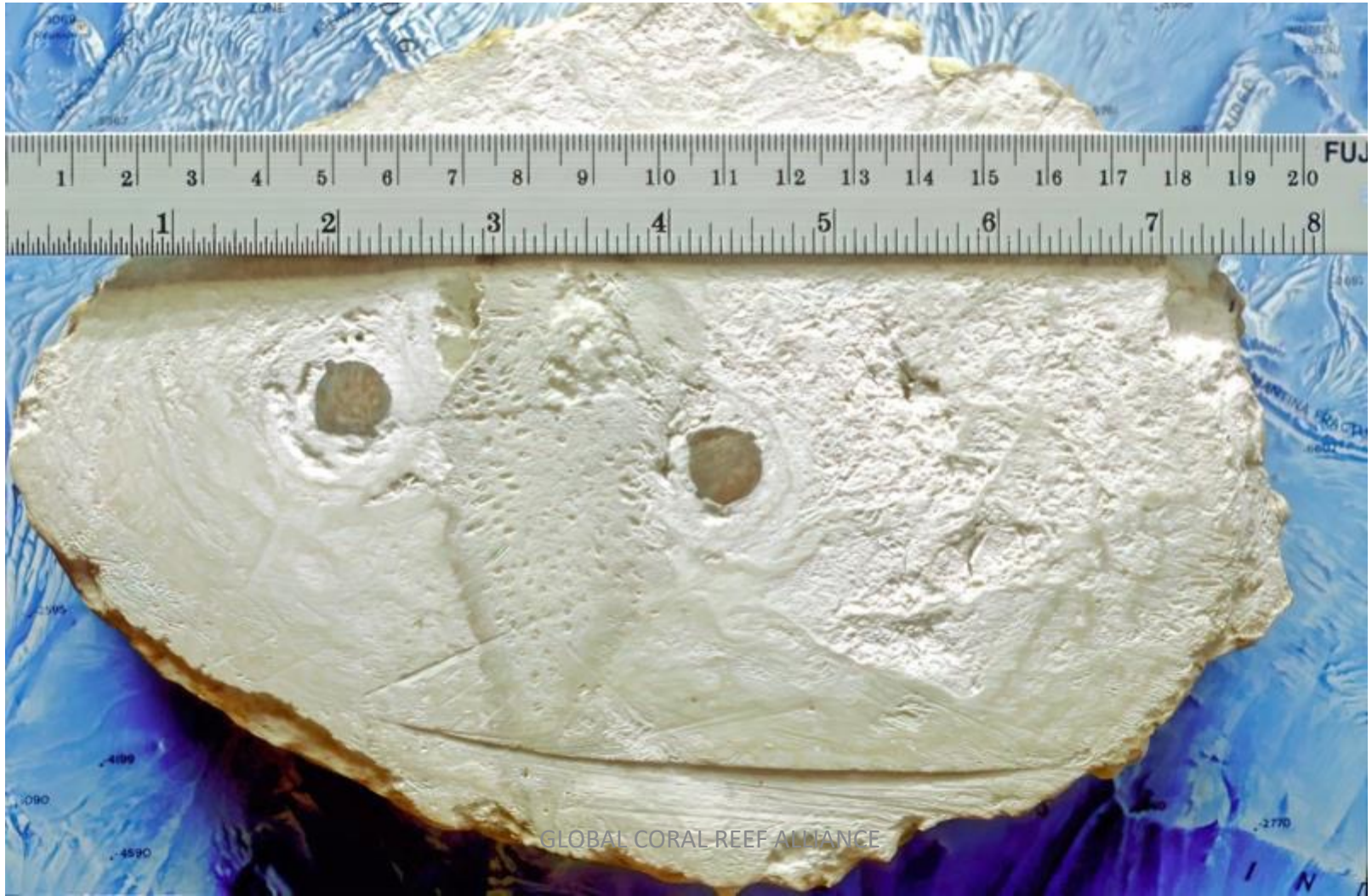
Locally developed technology to generate a sustainable Maldivian Blue Economy

Biorock limestone grown in Maldives is 2-3 times harder than ordinary concrete. Notice complete lack of rusting on steel. Photo 1999 by Wolf Hilbertz.

Biorock limestone will last as long as the pyramids. These pieces grew in the Maldives over two years. Photo 1999 by Wolf Hilbertz



This piece of Biorock grew so fast that it overgrew a coral that had been growing between two bars. Photo 1999 by Wolf Hilbertz

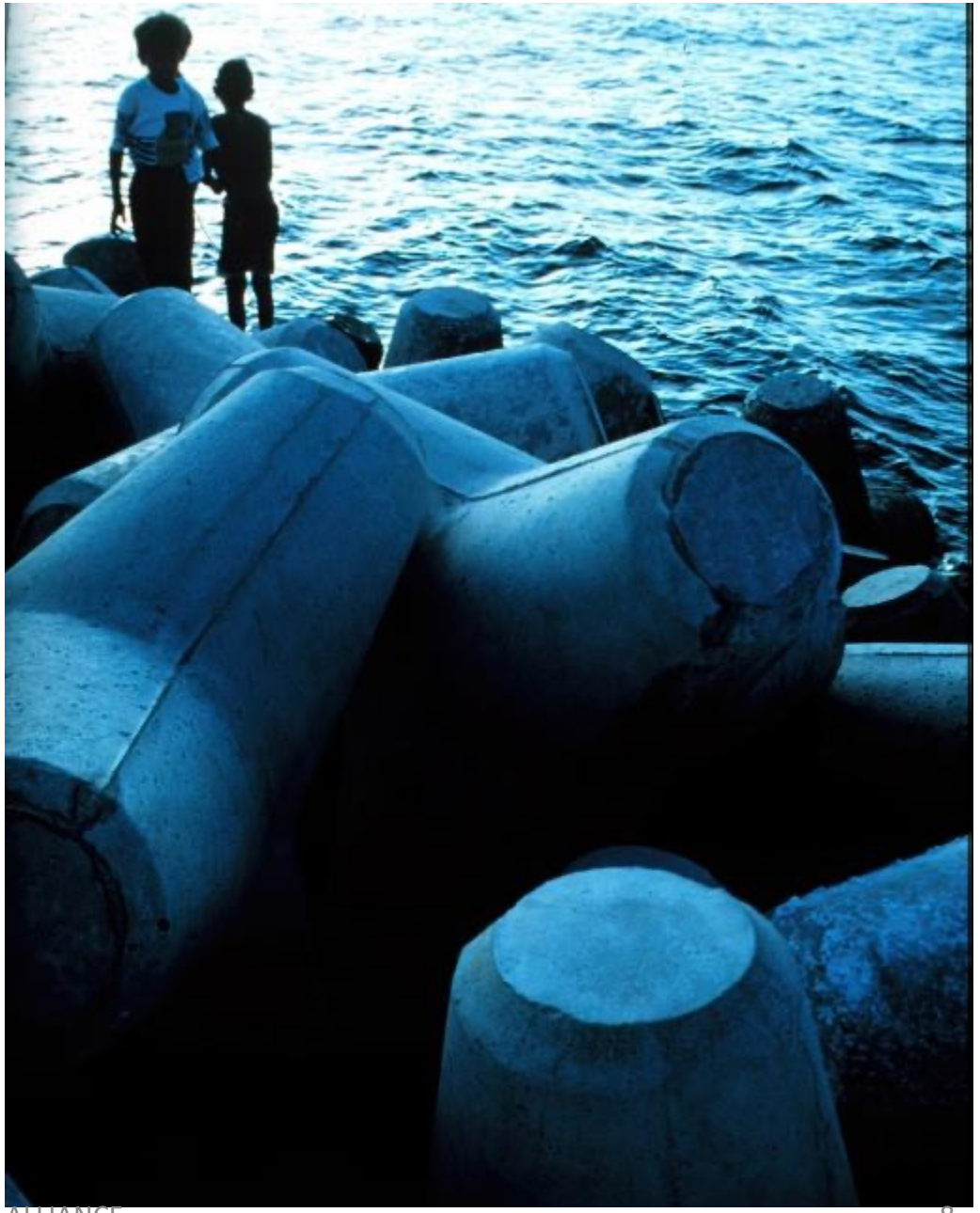


Recent Maldivian house built from dead coral skeletons. Photo 1996 by Wolf Hilbertz

Corals are now cemented together with expensive imported Portland cement, a major source of CO2. In the old days quicklime cement was made from burned corals. Photo 1996 by Wolf Hilbertz

The Male Seawall cost around $13 million per kilometer. Photo 1996 by Wolf Hilbertz

The natural beach at Male is gone. Photo 1996 by Wolf Hilbertz



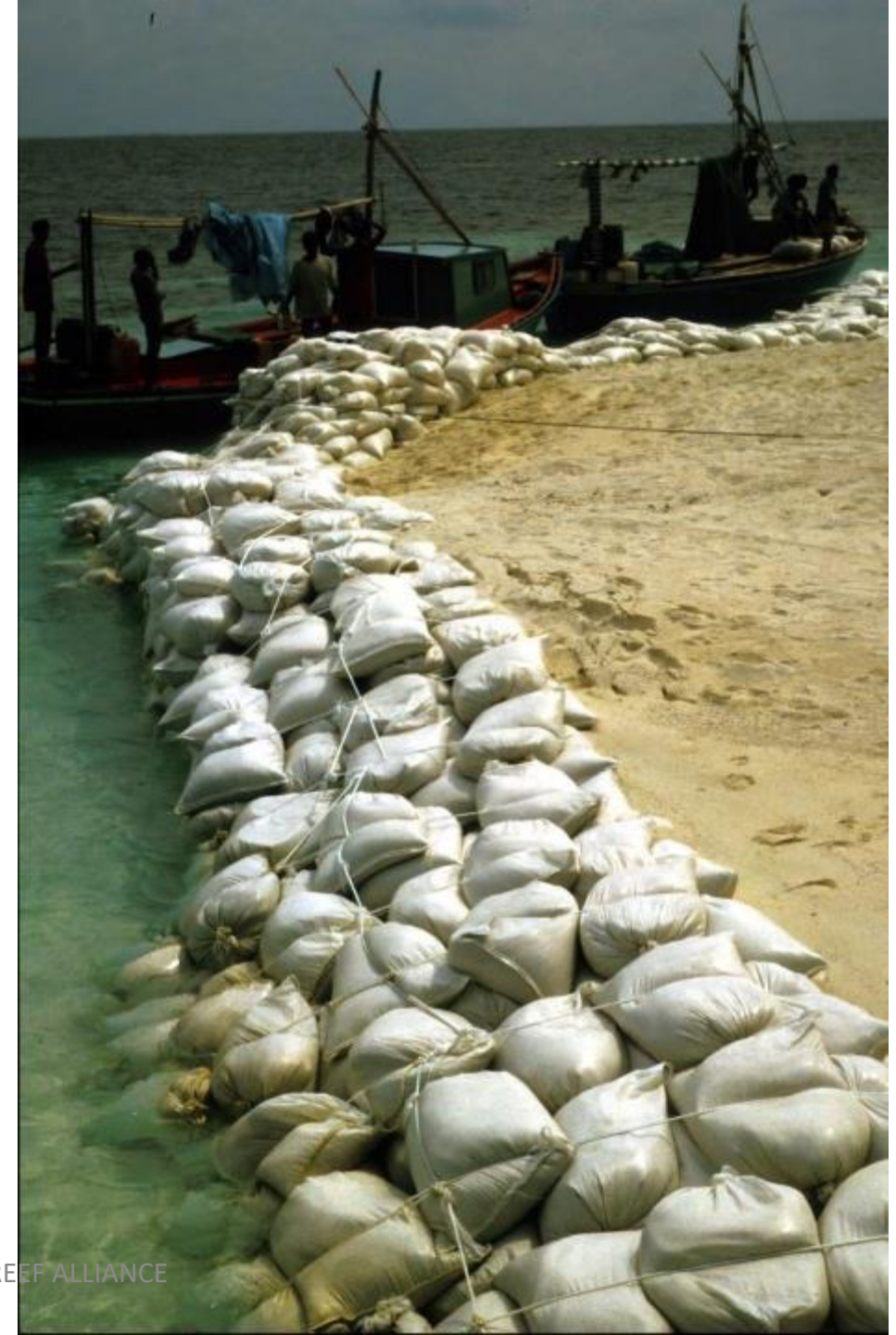
Seawalls around Furanafushi are made of dead coral covered with plastic coated gabion wire. Photograph 1996 by Wolf Hilbertz

These seawalls reflect waves and cause sand to be scoured away in front of, and then underneath them, until they eventually collapse. Photograph 1996 by Wolf Hilbertz.

Expensive plastic coated wire soon cracks in ultraviolet light, and the rusting steel stains the limestone. Photograph 1996 by Wolf Hilbertz

Sandbags had to be moved from end of Ihuru island to the other twice a year, at high labour and energy cost. Photograph 1996 by Wolf Hilbertz

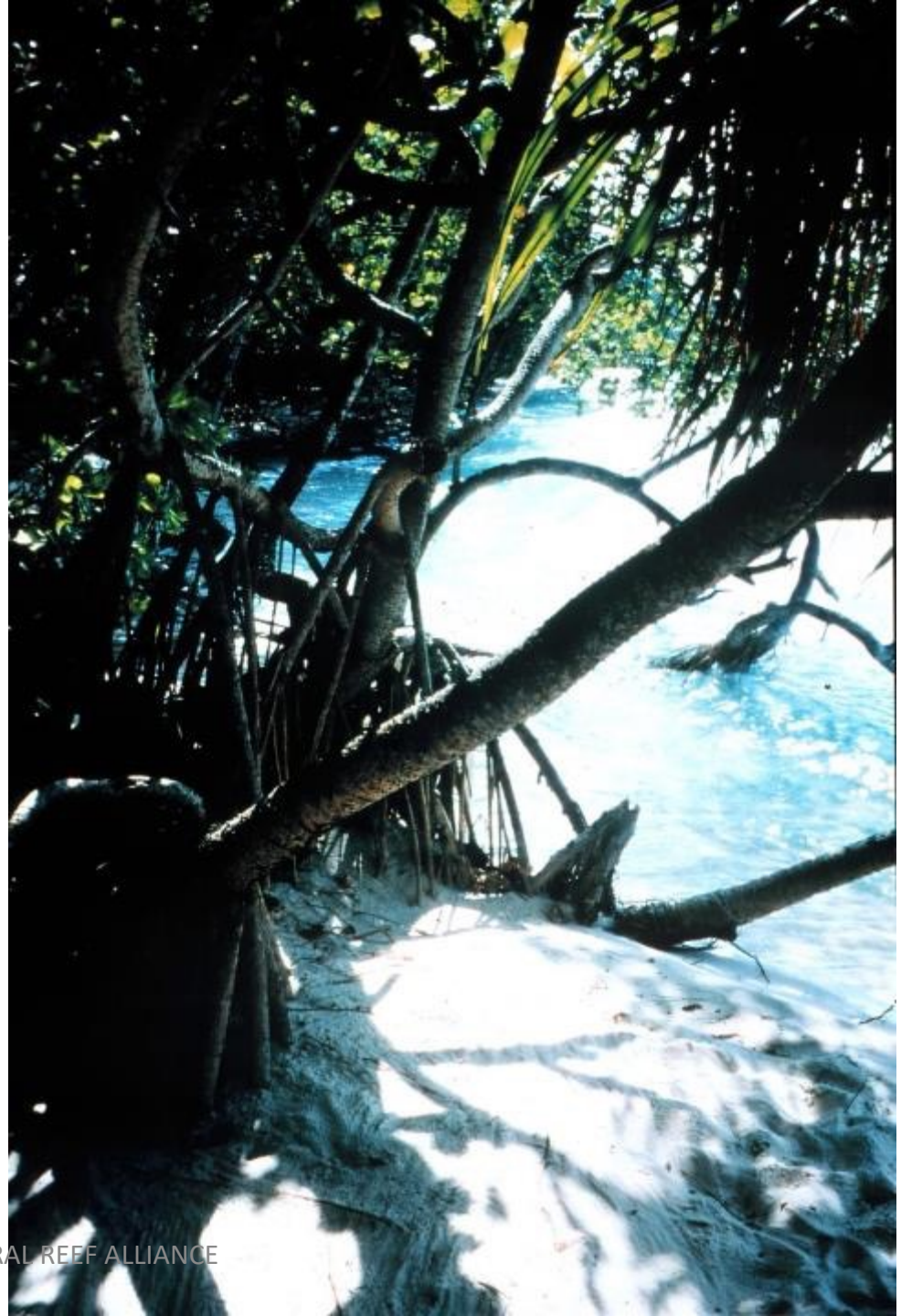
Sandbags piled up to prevent beach erosion. Photograph 1999 by Wolf Hilbertz



Before the project began, the south beach had washed away and trees were falling into the sea. Photograph 1996 by Wolf Hilbertz.

Coconut tree falling into the sea at Ihuru. Photograph 1996 by Wolf Hilbertz

Pandanus falling into the sea. Ihuru, 1996, photograph by Wolf Hilbertz

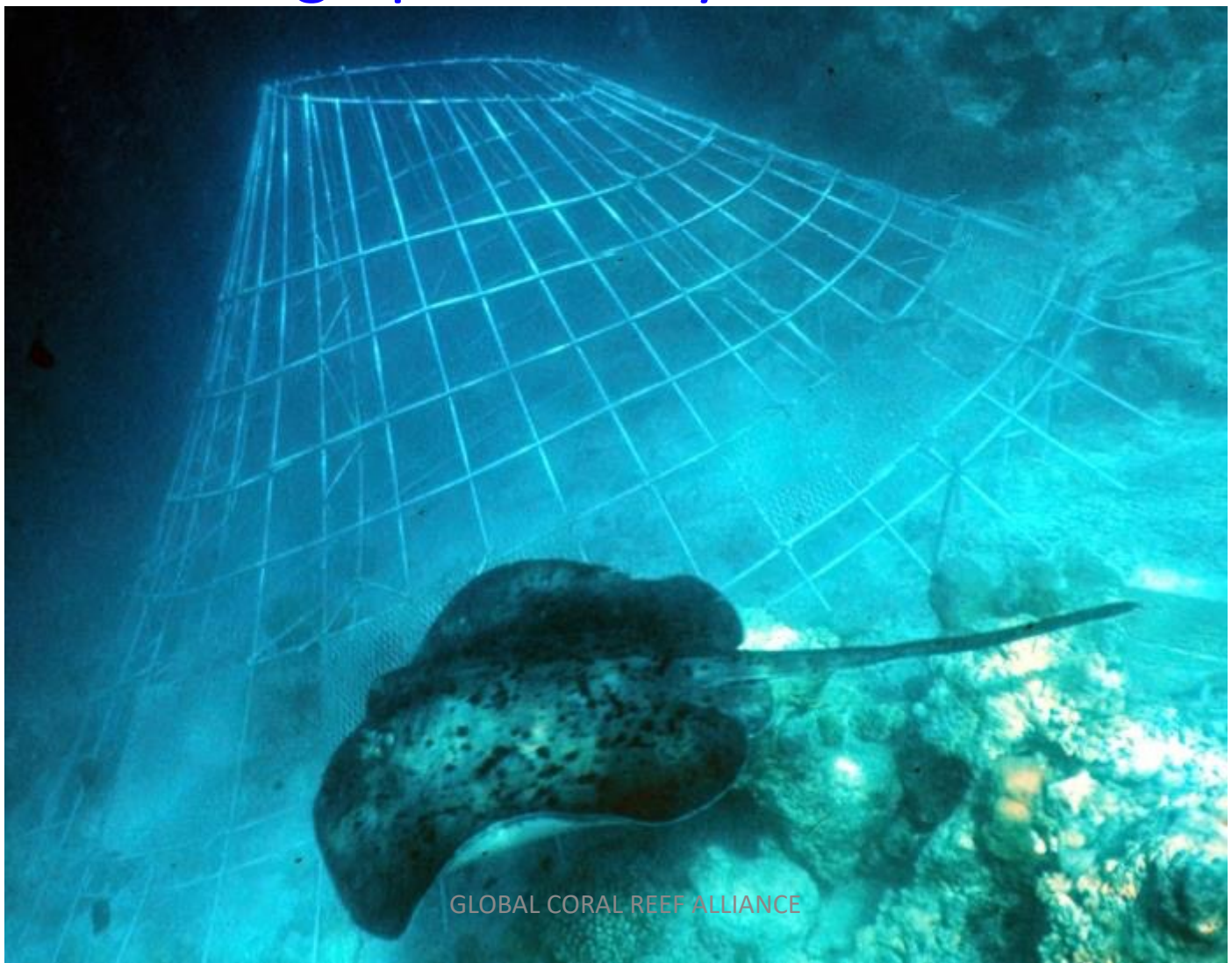


Eroded north beach, Ihuru, 1996 Photo by Wolf Hilbertz

The Ihuru Barnacle under construction. Photo 1996 by Wolf Hilbertz

The Ihuru Barnacle at the start. Photograph 1996 by Wolf Hilbertz

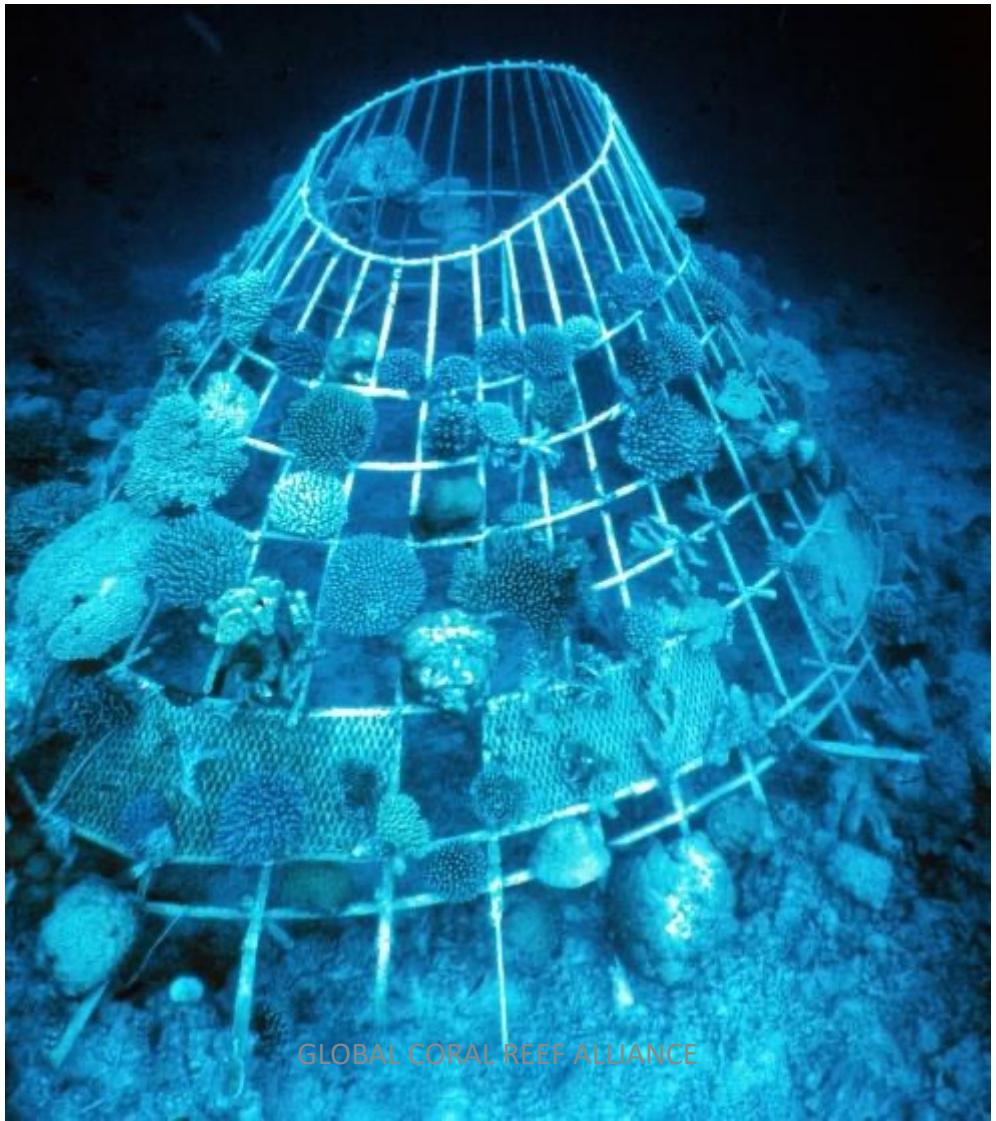
The Barnacle quickly turned white as it started to grow limestone, and the first sting rays were attracted to it. Photograph 1996 by Wolf Hilbertz



Schools of fish were quickly attracted to the structure. Photograph 1996 by Wolf Hilbertz

Different fishes crowded into the structure at night. Photo 1997 by Wolf Hilbertz

Corals transplanted onto the structure immediately began to grow quickly. Photo 1997 by Wolf Hilbertz



Night divers see different fishes than in the daytime. Photo 1997 by Wolf Hilbertz

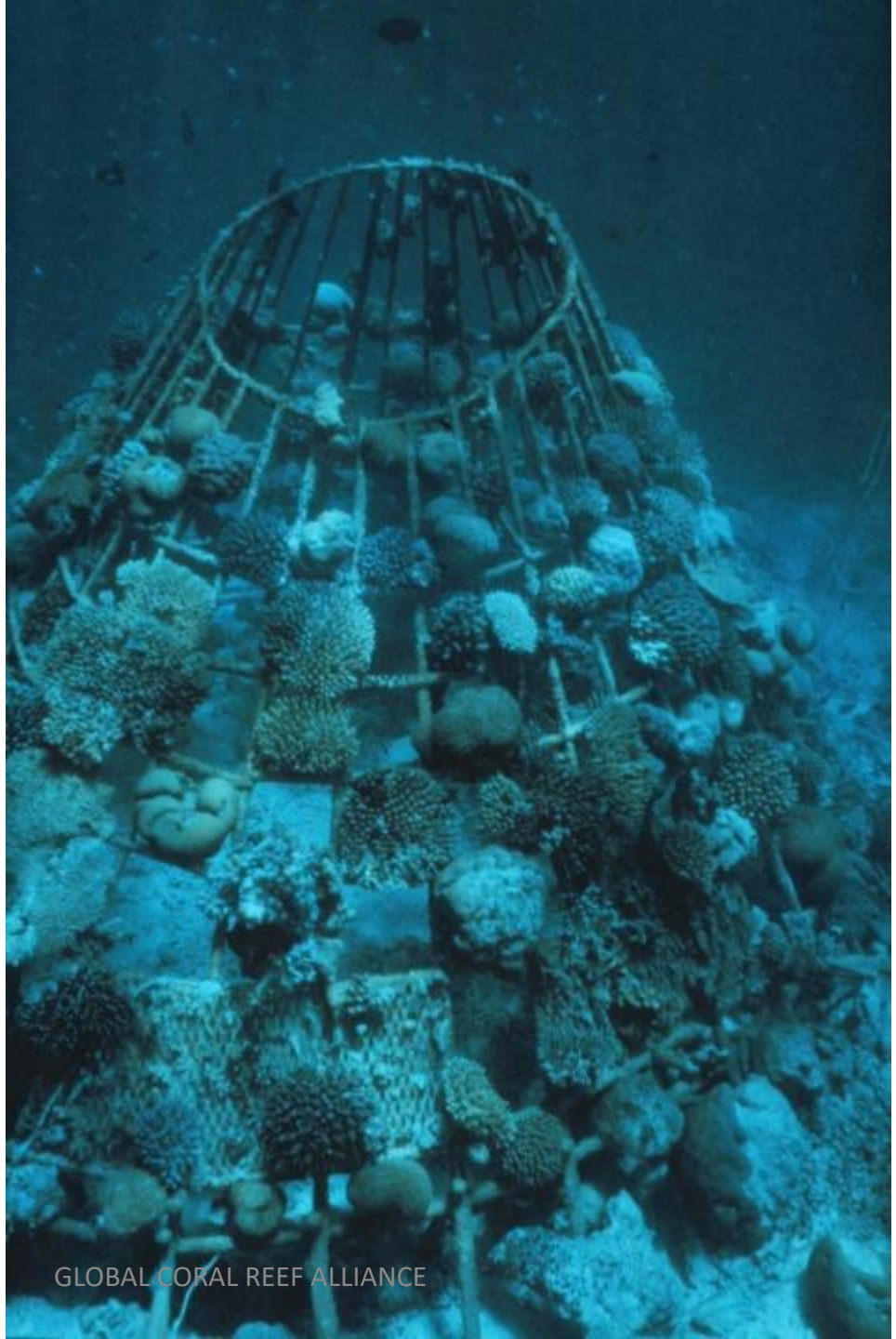
Transplanted corals grew and rapidly filled in the structure. Photo 1997 by Wolf Hilbertz

Barnacle at night. Photo 1997 by Wolf Hilbertz

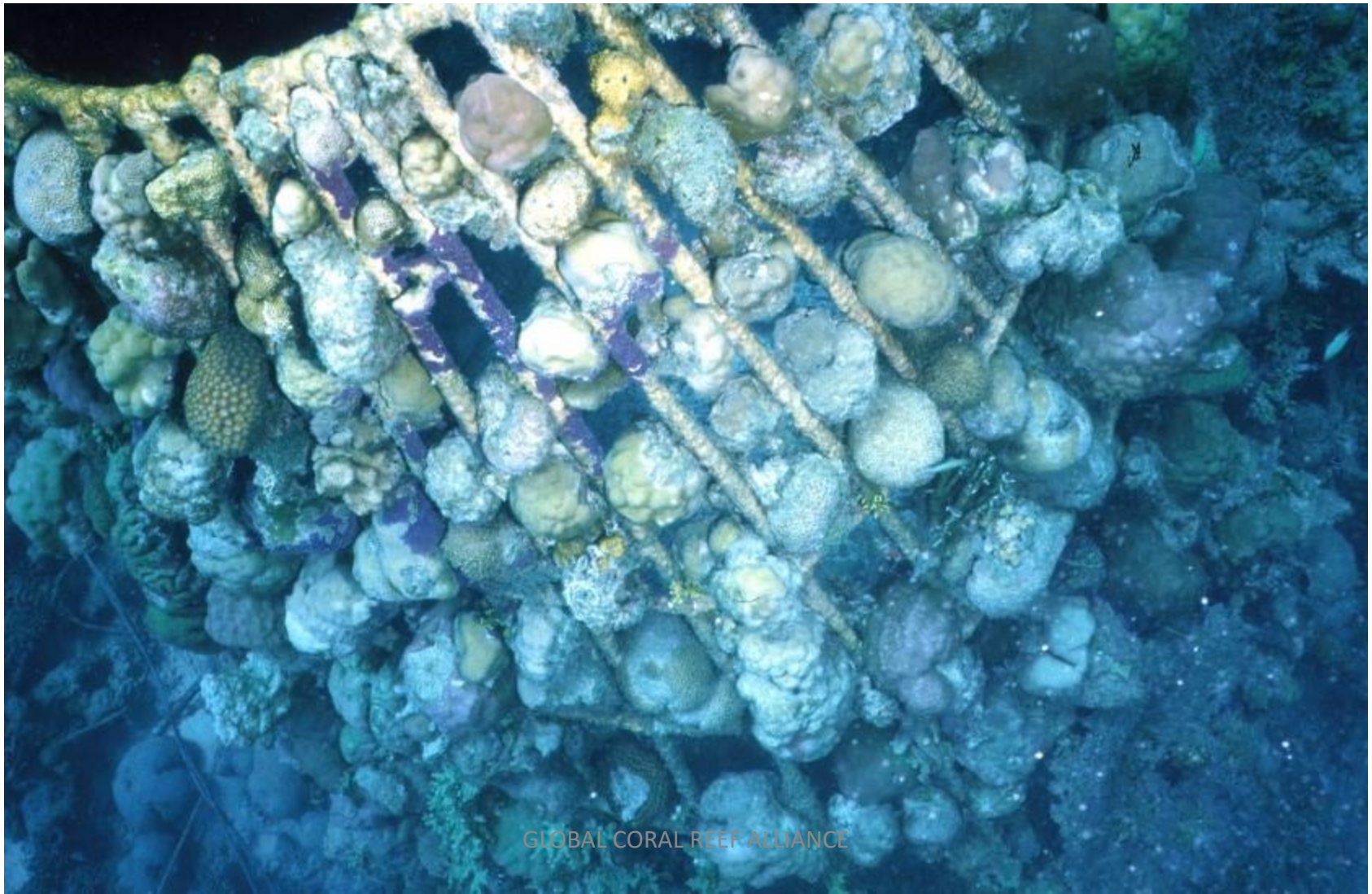
Barnacle at dusk. Photo 1997 by Wolf Hilbertz

Barnacle at dusk from inside.
Photo 1997 by Wolf Hilbertz

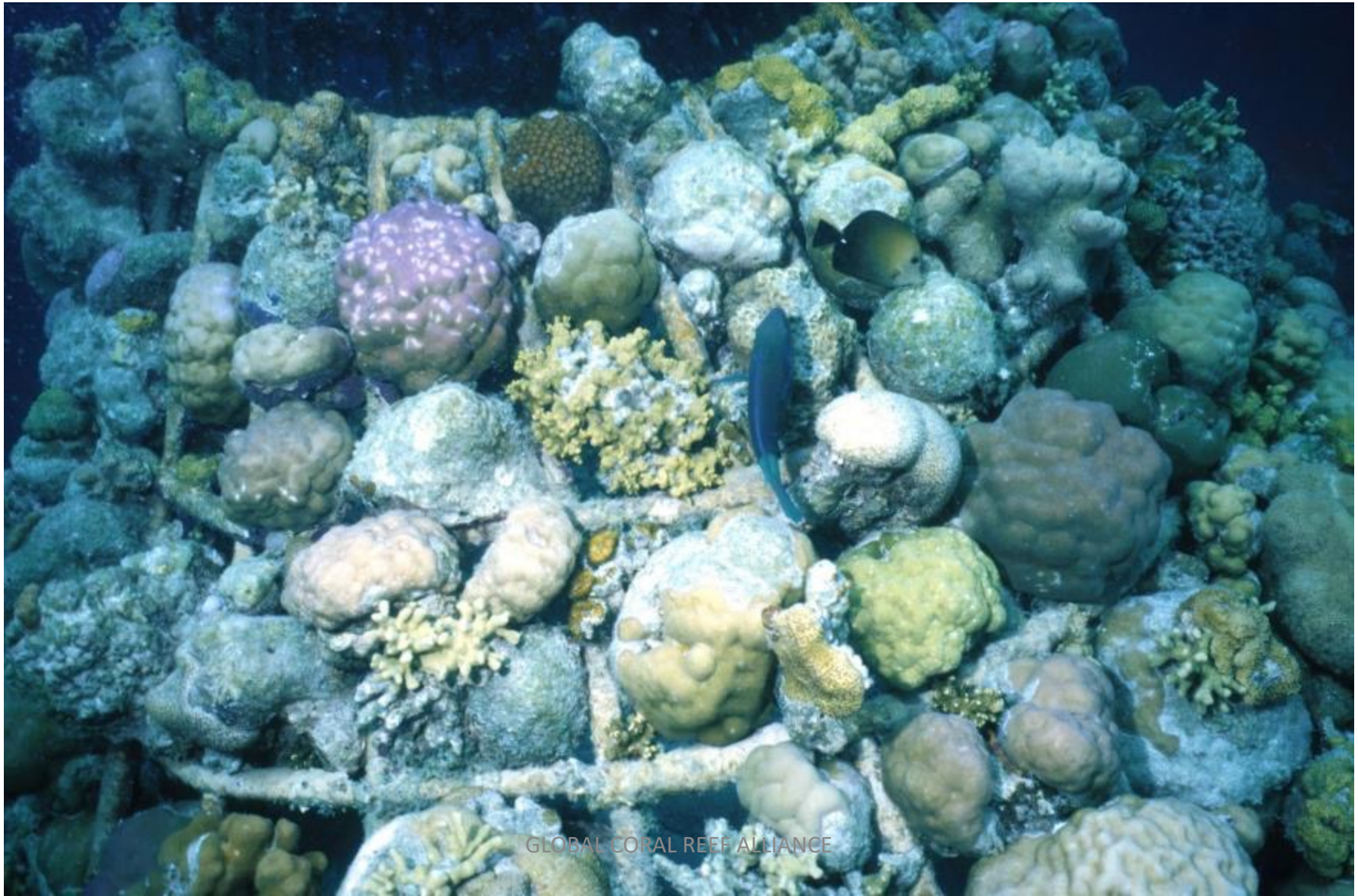
Barnacle before bleaching. Photo 1997 by Wolf Hilbertz



Barnacle after bleaching.
Photo 1999 by Wolf Hilbertz



After bleaching, Photo 1999 by Wolf Hilbertz



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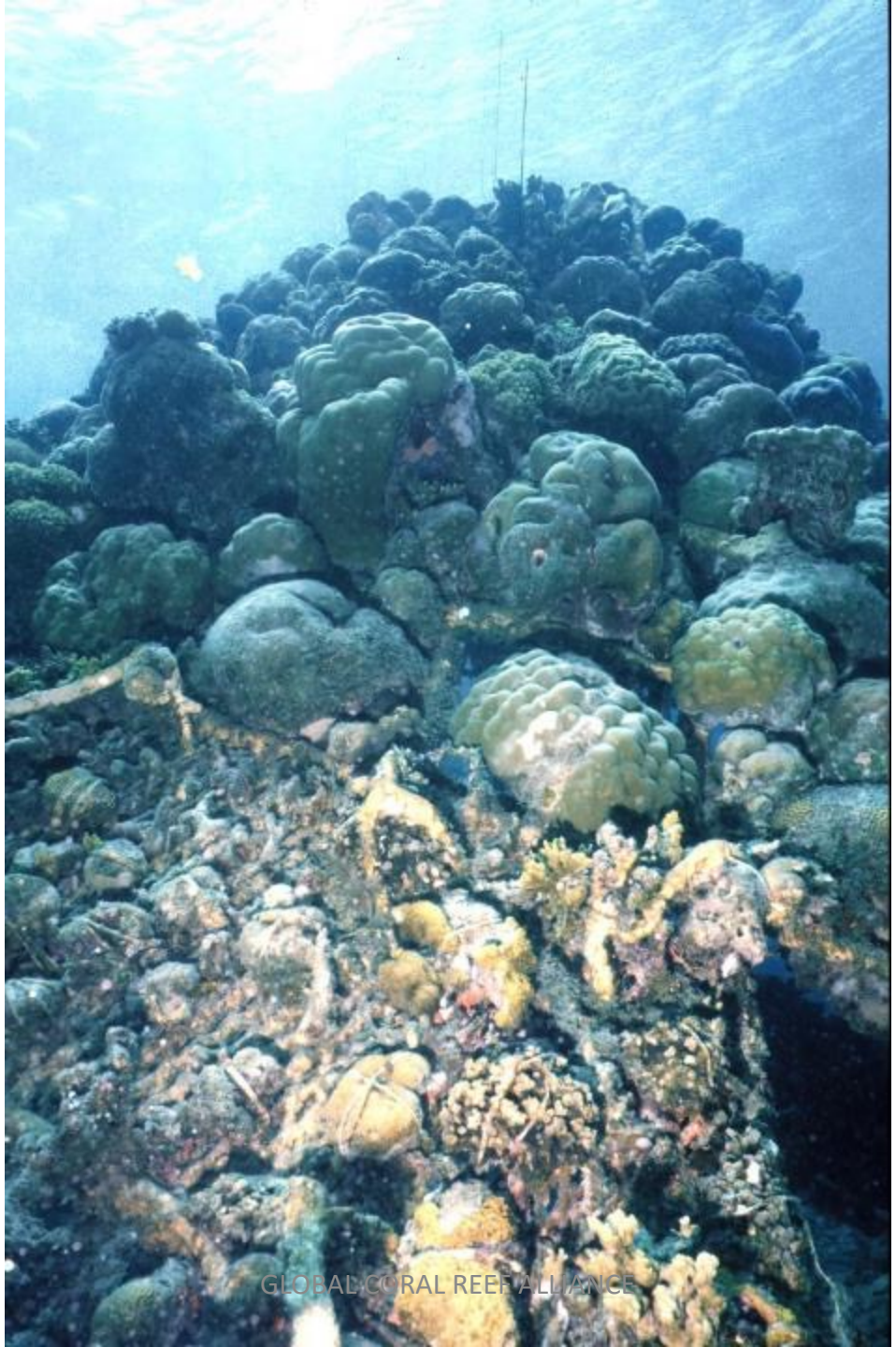

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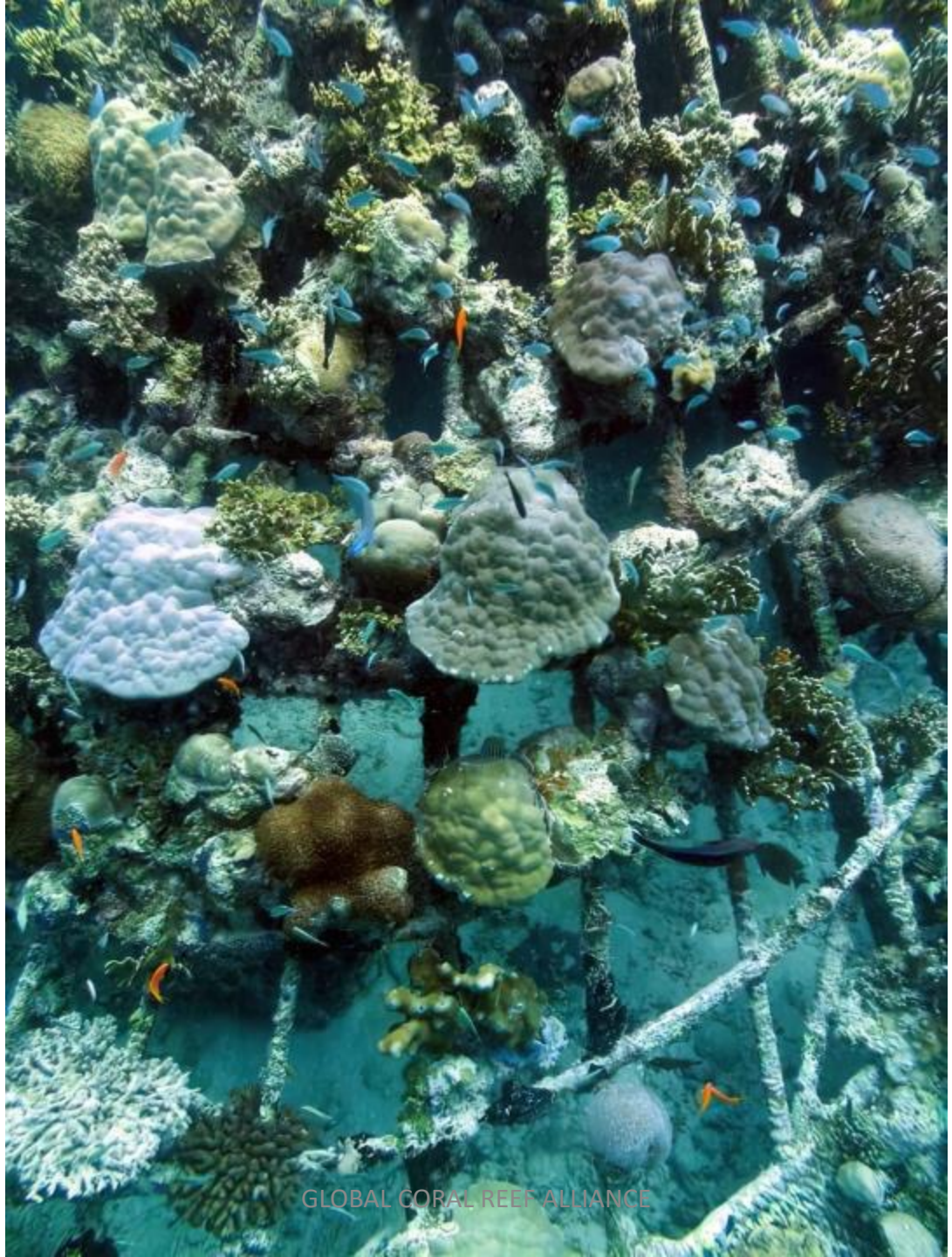
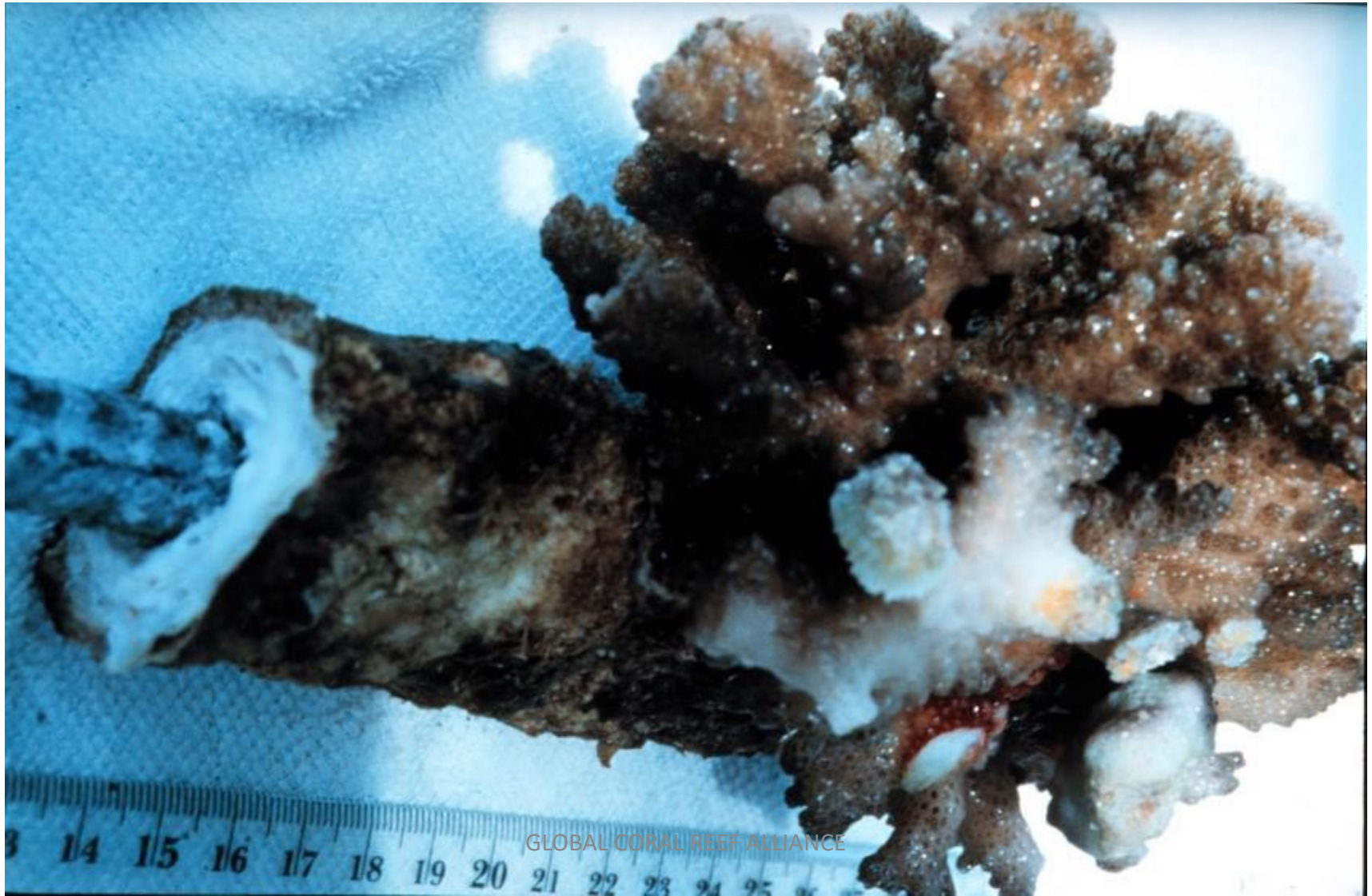


Coral that spontaneously grew on Barnacle Biorock reef. Photo 1999 by Wolf Hilbertz



One of three structures called the Trinity. Photograph 1997 by Wolf Hilbertz

Trinity. 1999, photo by Wolf Hilbertz

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Trinity. 2009, photo by Dr. Norman Quinn

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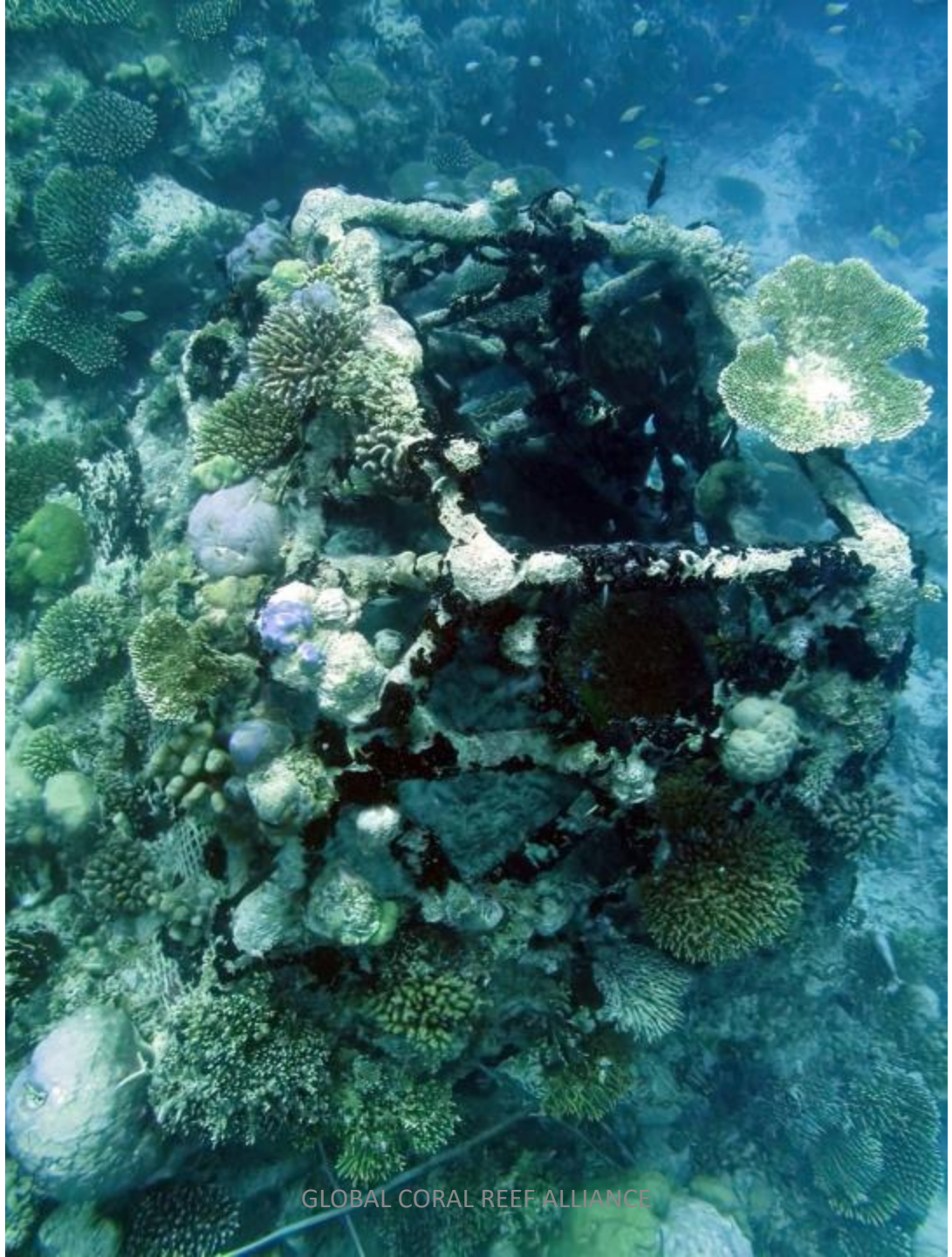


The Necklace being installed.
Photo 1997 by Wolf Hilbertz

Azeez Hakeem transplanting corals. Photo 1997 by Wolf Hilbertz

Newly transplanted corals. Photo 1997 by Wolf Hilbertz

Before bleaching. Photo 1997 by Wolf Hilbertz

Before bleaching. Photo 1997 by Wolf Hilbertz

Before bleaching. Photo 1997 by Wolf Hilbertz

Before bleaching, 1997, Photo by Wolf Hilbertz

Before bleaching. Photo 1997 by Wolf Hilbertz

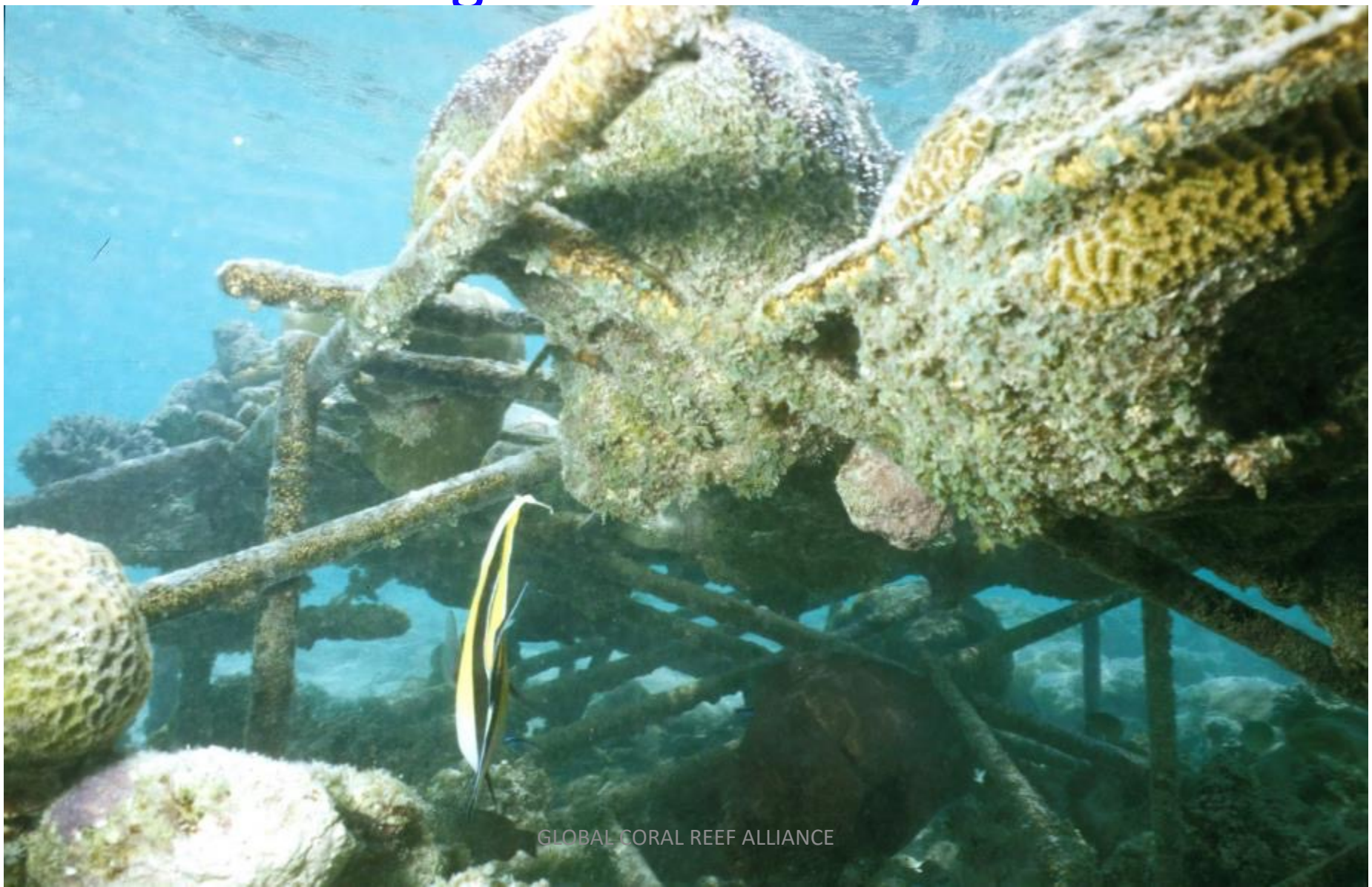
Before bleaching. Photo 1997 by Wolf Hilbertz

After bleaching many corals died on top, but survived underneath. Photo 1999 by Wolf Hilbertz

After bleaching, corals recovering from underneath. Photo 1999 by Wolf Hilbertz

After bleaching. Photo 1999 by Wolf Hilbertz

After bleaching. Photo 1999 by Wolf Hilbertz



After bleaching. Photo 1999 by Wolf Hilbertz

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After bleaching, Photo 1999 by Wolf Hilbertz

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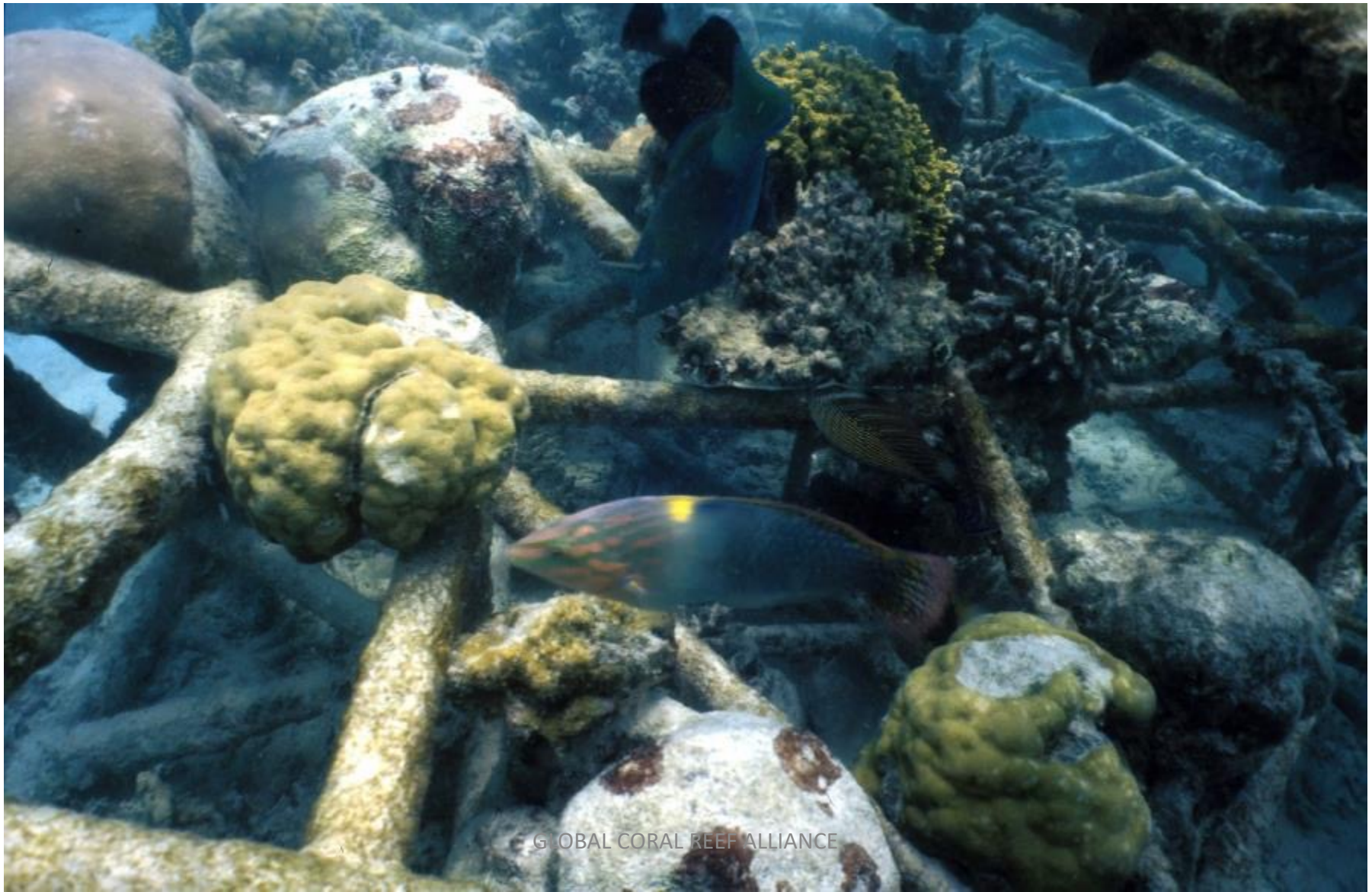
After bleaching. Photo 1999 by Wolf Hilbertz

After bleaching. Large moray eel shares hole with sea cucumbers. Photo 1999 by Wolf Hilbertz

After bleaching. Photo 1999 by Wolf Hilbertz



After bleaching. Photo 1999 by Wolf Hilbertz

After bleaching. Photo 2001 by Wolf Hilbertz

After bleaching. Photo 2001 by Wolf Hilbertz

Very fast growing coral recovering after bleaching. Photo 1999 by Wolf Hilbertz

Fast recovering coral after bleaching. Photo 1999 by Wolf Hilbertz

Very fast growing coral recovering after bleaching. Photo 1999 by Wolf Hilbertz

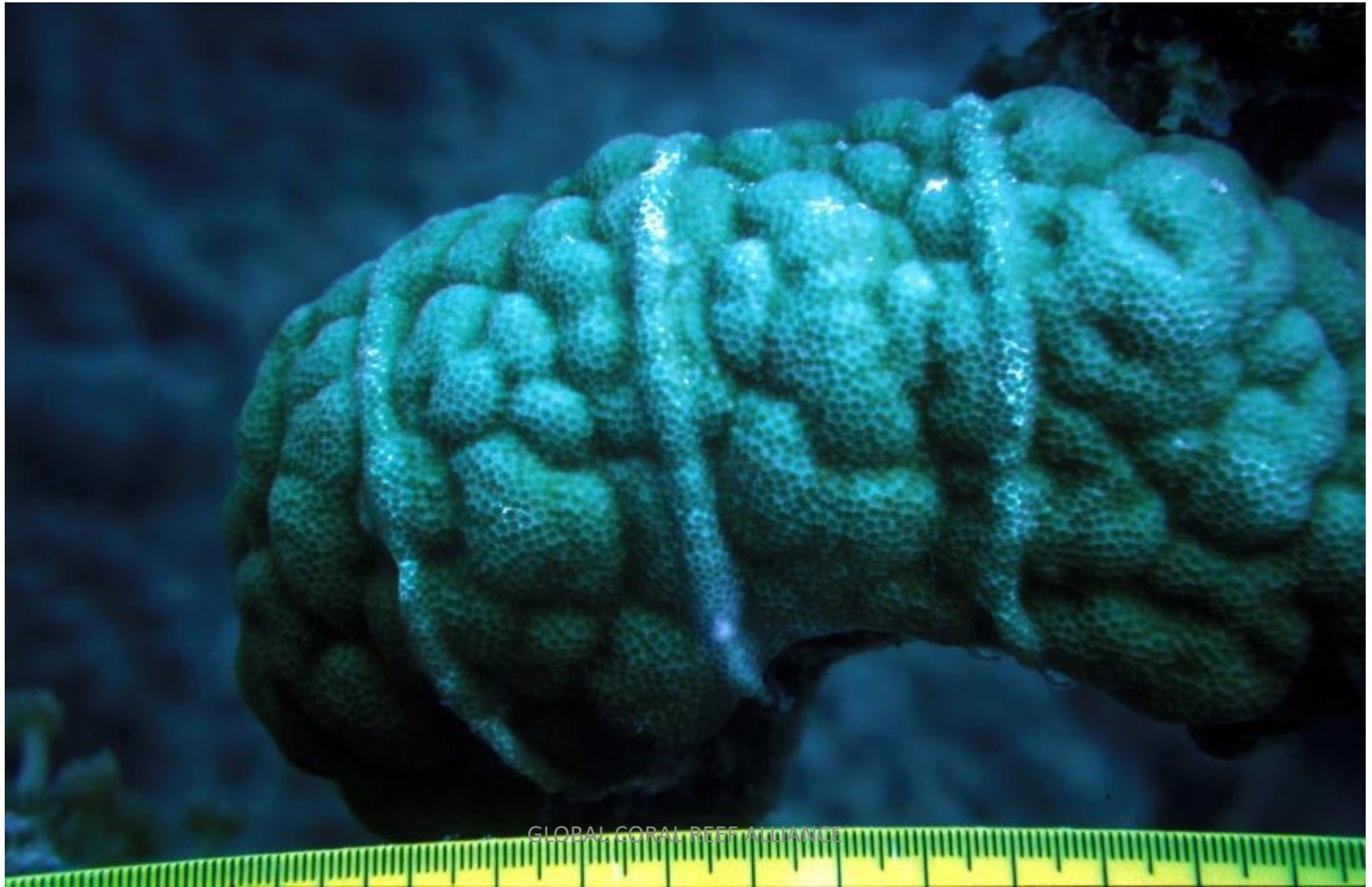
After bleaching. Photo 1999 by Wolf Hilbertz

After bleaching. Power was still on and structure growing. Photo 1999 by Wolf Hilbertz

After bleaching, no power, before tsunami. Photo 2003 by Azeez Hakeem

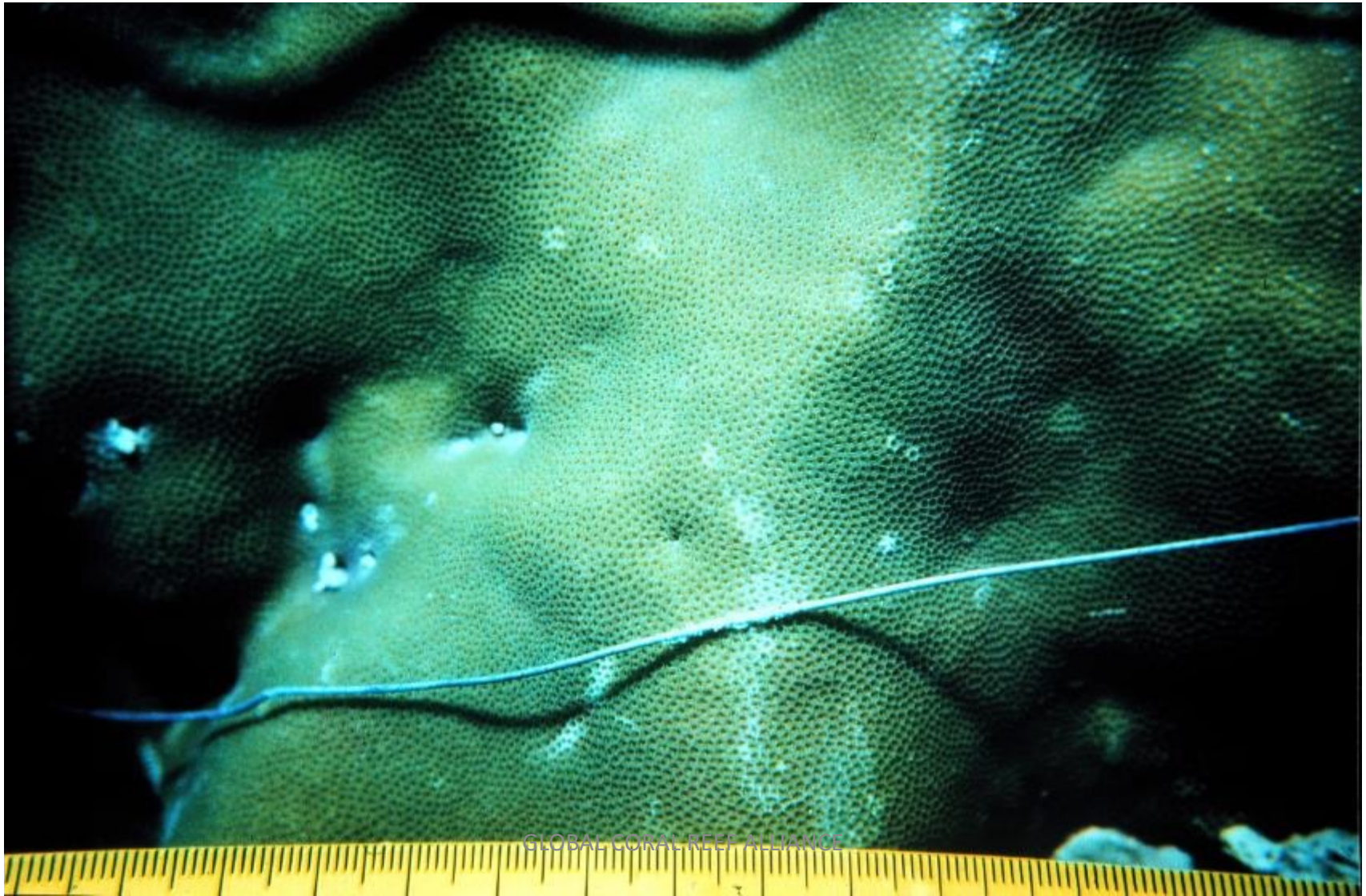
Materials cut from Necklace were measured to be 2-3 times harder than concrete. Photo 1999 by Wolf Hilbertz

Coral quickly overgrows Biorock wire. Photo 1999 by Wolf Hilbertz



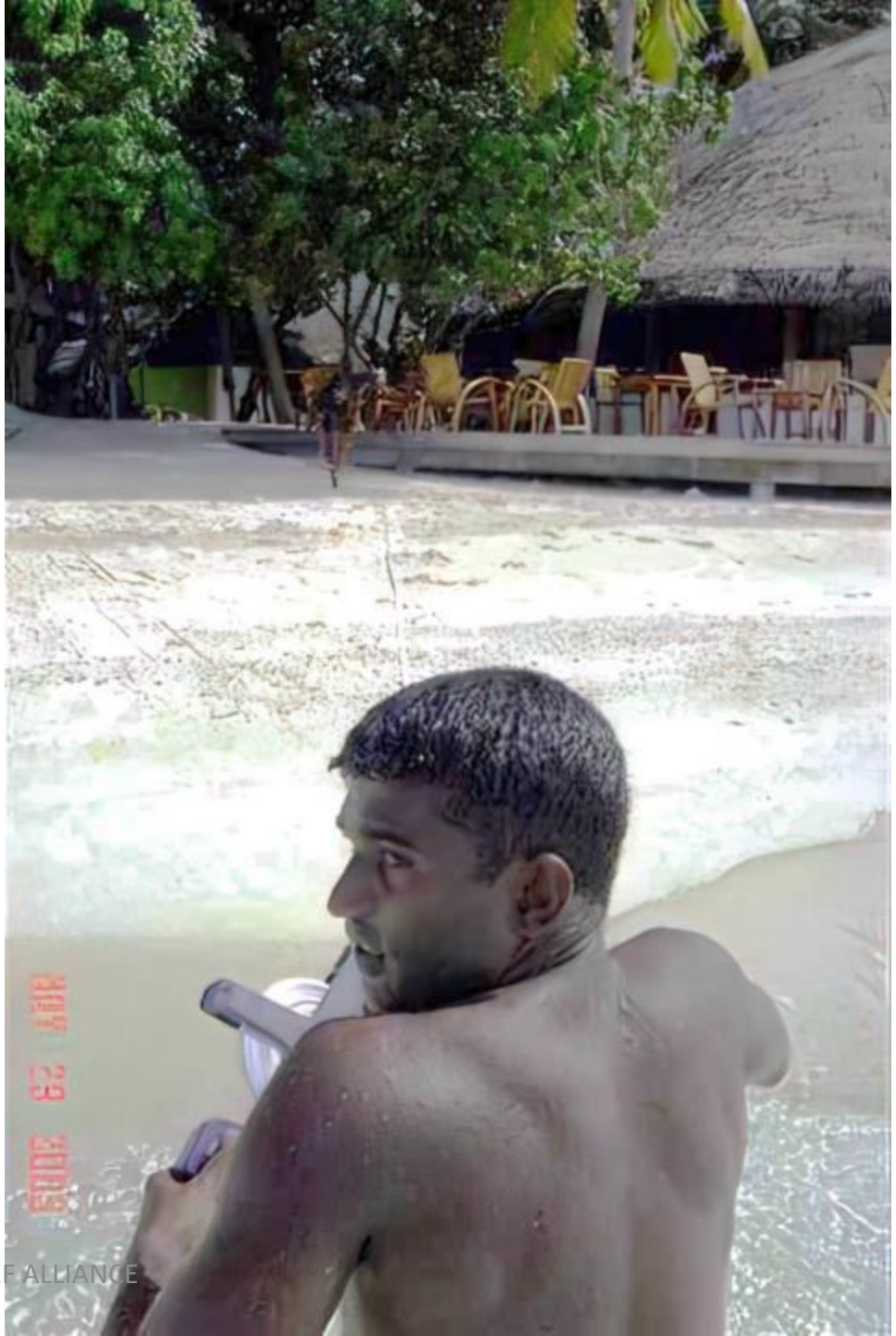
Coral grows around a Biorock wire. Photo 1997 by Wolf Hilbertz

Coral responds in days to electricity in wire. Photo 1997 by Wolf Hilbertz



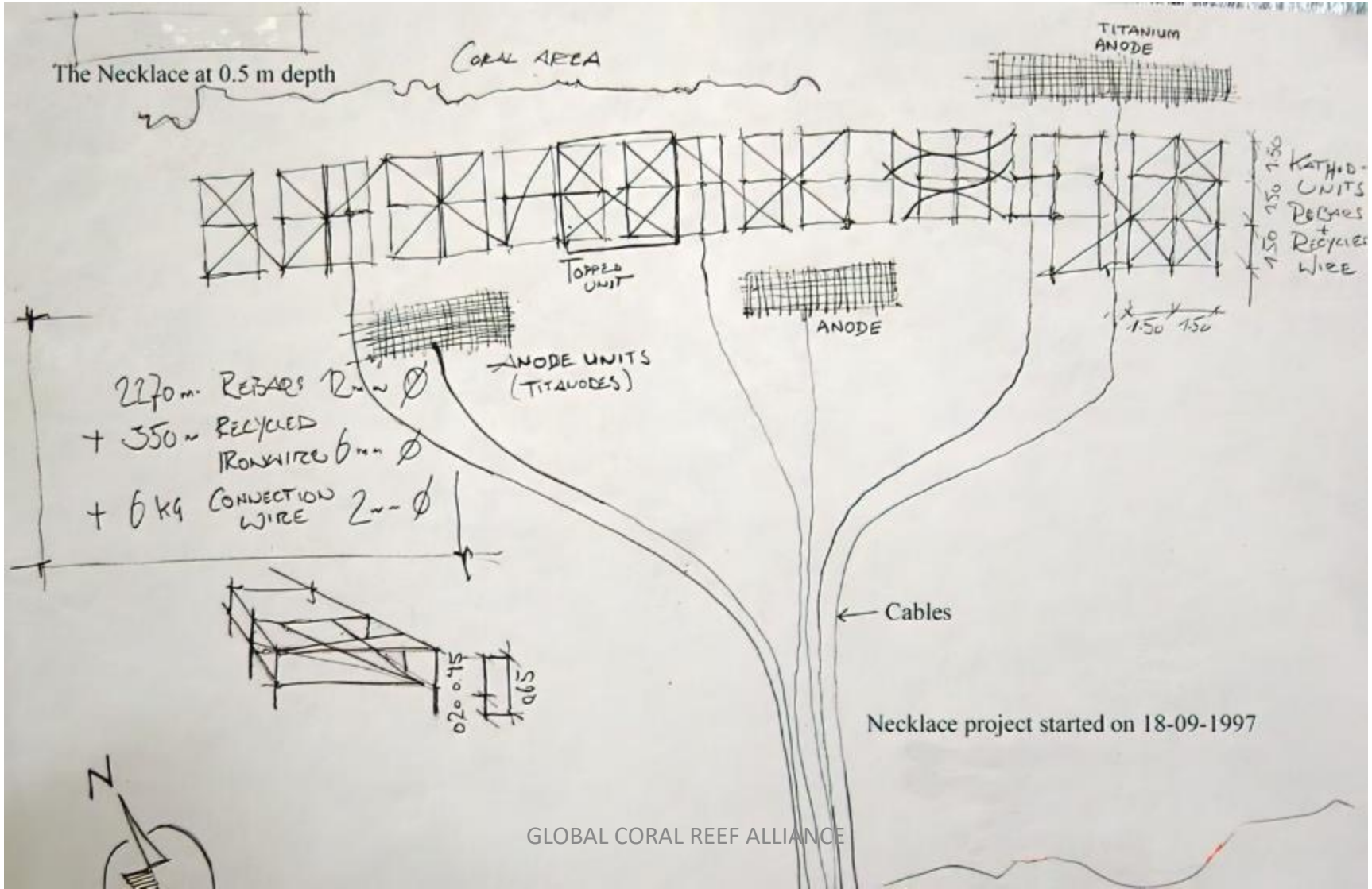
The beach grew 15 meters wider after the Necklace was installed. The Biorock Necklace reef is the dark patch. Photo 2003 by Azeez Hakeem

Before Biorock grew the eroded beach back the building in the back was about to collapse into the sea, had a wall of sandbags in front, and the hotel said they would have to destroy it, since it could not be saved. Photo 2003 by Azeez Hakeem



The new beach with the Biorock reef in front (dark line). The corals in front of it on the reef slope bleached and died in 1998. Photograph 2003 by Azeez Hakeem

Three chargers were used to power the Biorock reef. Photograph 1997 by Wolf Hilbertz



After 11 years, 2009, Photo by Dr. Norman Quinn

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Necklace, 2010, Photo by Azeez Hakeem

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Necklace, 2010, Photo by Azeez Hakeem

Necklace, 2010, Photo by Azeez Hakeem

Necklace, 2010, Photo by Azeez Hakeem, showing thickness of hard limestone rock growth over bar

The new beach 6 years after the tsunami, 2010, Photo by Azeez Hakeem

Lotus deep reef, 1998 before bleaching, Photo by Azeez Hakeem

Lotus, 1998, Photo by Azeez Hakeem

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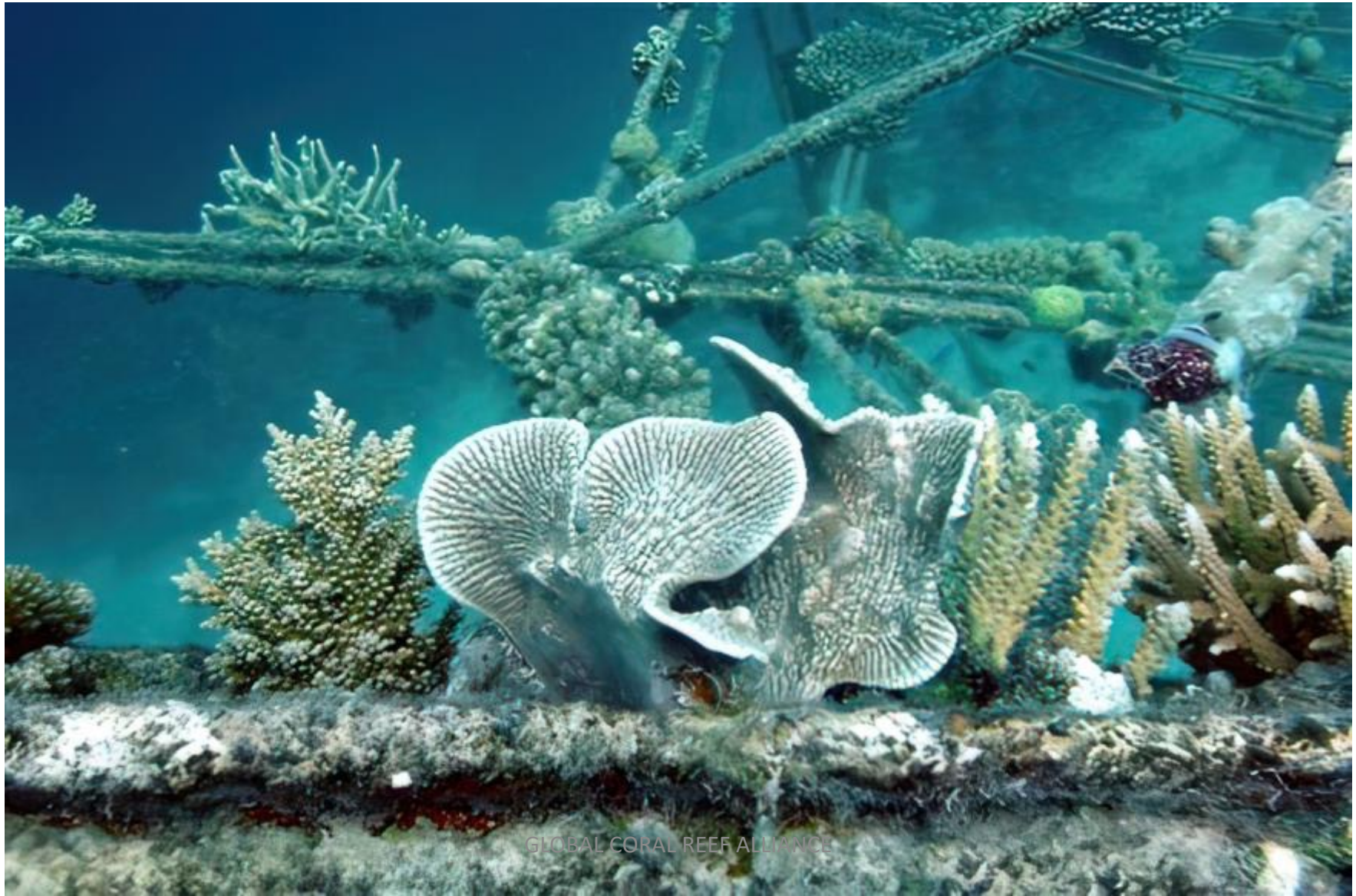

Lotus, 1998, Photo by Azeez Hakeem

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SPECIAL THANKS

Wolf Hilbertz, Azeez Hakeem, & Norman Quinn for beautifully preserving the project in photographs

Maizan Hassan Maniku of the Marine Research Institute of the Maldives Ministry of Fisheries, and Ahmed Mujthaba for making the projects possible

Azeez Hakeem, Master Coral Grower

MORE INFORMATION

https://www.globalcoral.org/maldives-biorock-past-results-future-applications/

https://www.globalcoral.org/maldives-shorelines-growing-a-beach/

https://www.globalcoral.org/climate-proofing-coastlines-with-biorock-technology/

https://www.globalcoral.org/global-warming-triggers-coral-reef-bleaching-tipping-point/

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