Reef Star Universe in Varadero: Project Kick-Off & Initial Progress

Créditos: Ocean Culture Life

CORALES DE PAZ
BUCEO CON PROPÓSITO

In Partnership with:

MARS

Sheba

SEI

SVENSKA POSTKODLOTTERIETS STIFTELSE

Local Allies:

CARDIQUE

CARTAGENA Divers

SepioDive

Dear donors,

After nearly two years of dedicated planning and preparation, we are proud to share that in **March 2025, we completed the first installation of the Mars Assisted Reef Restoration System (MARRS) in Colombia** — a milestone that marks the beginning of a journey toward healthier, more resilient reef ecosystems in Cartagena.

This achievement was only possible thanks to the incredible teamwork of both organizations and individuals: **the Mars Sustainable Solutions** team, who traveled to Colombia to guide the process; the **Stockholm Environment Institute** (SEI) and the **Svenska Postkodlotteriets Stiftelse**, whose support was key in engaging the Bocachica community members; the **Corporación Autónoma Regional del Canal del Dique** (CARDIQUE); the local **community of Bocachica**; and a passionate group of **citizen science volunteers** — all of whom gave their energy and deep care to successfully install **100 Reef Stars** on our restoration site.

We also want to extend a **special thank you to all the individuals and small businesses** who, through their generous adoption of Reef Stars, became part of this collective dream.

The methodology

This project is the first implementation of the Mars Assisted Reef Restoration System (MARRS) in Colombia, starting with the iconic Varadero Reef. As a pilot, it aims to demonstrate the methodology's effectiveness under local conditions and lay the groundwork for scaling coral restoration across other degraded reefs in the country.

- **Phase 1:** Installation of the first 150 Reef Stars
- **Phase 2:** Installation of 300 Reef Stars by the end of 2025
- **Phase 3:** Installation of remaining 100 Reef Stars by March 2026
- **Phase 4:** 1.5 years of ecological monitoring, site maintaincance and evaluation of new sites in Colombia for future implementation.

This structured, long-term intervention is possible thanks to the **training, technical guidance, and supply chain methodology provided by Mars Sustainable Solutions. Their proven MARRS** technique enables restoration that is agile, scalable, and efficient, while also being deeply rooted in community and environmental stewardship.

Through this partnership, Corales de Paz is building capacity through technical training and knowledge transfer — ensuring that these practices can be replicated and scaled in future projects. Moreover, our collaboration with SEI and Svenska Postkodlotteriets Stiftelse is making it possible to deepen community engagement and foster stronger stewardship of natural resources in Bocachica.

The project also includes the development of a **results-driven monitoring plan, culminating in annual progress reports** that will track reef health indicators and guide adaptive management strategies.

The community

In parallel, the project is working to build the capacity of the Bocachica community to become long-term stewards of the reef. Through close collaboration between Corales de Paz and SEI, we have developed a plan that ensures community representation and alignment with local needs and priorities.

A central component of this pillar is the certification and training of local divers:

- Four community members will be trained from Open Water Diver to Reef Check EcoDiver,
- Two already-certified divers will complete the EcoDiver certification.
- **Ultimately, the community will have six certified EcoDivers.**

In addition, community outreach will be strengthened through the "Héroes Submarinos" workshop and educational activities, aiming to raise awareness and **cultivate ocean literacy** among local youth and residents.

Over time, **trained community members will be progressively integrated into the monitoring team.**

Créditos: Nathalie Ramírez

The location

Varadero Reef is one of the most extraordinary coral ecosystems in the Colombian Caribbean. Located in the heavily impacted Bay of Cartagena, this reef has **managed to survive despite centuries of sediment-rich discharges from the Canal del Dique**. Scientific studies have shown that Varadero maintains an **average coral cover of around 45%**, a figure rarely seen in such degraded environments. Its resilience has earned it global recognition as a **Mission Blue Hope Spot of Biodiveristy**.

However, Varadero is under serious threat. Plans to modernize Cartagena's port include **dredging a new shipping lane directly through the reef, which would cause irreversible damage and worsen the water conditions** that corals already struggle to survive in. These interventions are not just a risk to biodiversity — they undermine a **living laboratory that holds valuable clues about coral survival under extreme conditions.**

The Reef Star Universe Project in Varadero was born from this critical moment. **Our goal is to rehabilitate and safeguard this ecosystem, using the proven MARRS** and empowering local communities to become long-term stewards of the reef.

Fuente: López-Victoria et al., 2023

March 2025 milestone: Laying the first foundation

Créditos: Ocean Culture Life

Community engagement highlights

In the lead-up to our pilot installation, we laid important groundwork to ensure local involvement and transparency.

On February 21, 2025, we held an open community presentation to introduce the project, explain its goals, and invite volunteers to participate in the first installation event. The session was **attended by 19 local community members,** along with representatives from CARDIQUE, SEI, and Corales de Paz.

A follow-up meeting on March 17, 2025, was held with the Community Council and Fishermen's Association of Bocachica to deepen the dialogue, agree on participant roles, and coordinate logistics for the upcoming Reef Star deployment. **This session drew 17 local representatives and two members of the Corales de Paz team.**

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The process begins by building the Reef Stars

Everything begins with the design and construction of a **welding jig** — a key tool that **ensures all Reef Stars,** the hexagonal steel structures at the heart of the MARRS technique, **are built to the same dimensions.**

This uniformity allows them to be precisely connected underwater, **forming a strong and stable reef network** capable of withstanding waves, tides, storms, and even natural disasters.

Once the stars are welded, a coating of rust converter, resin and sand is applied to help the **structure prevent oxidation, adapt to its environment and enhance its longevity.**

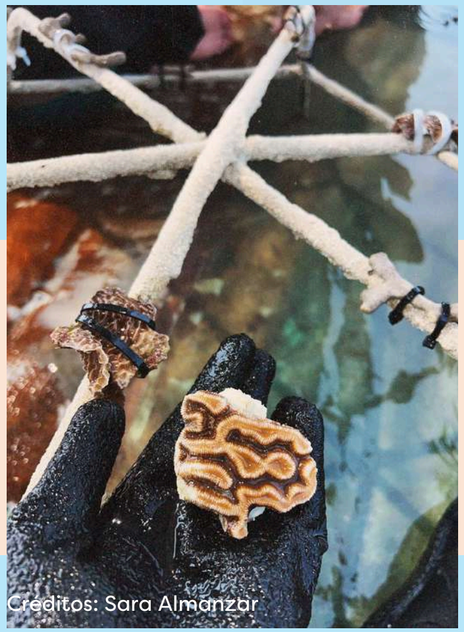
Finally, the structures are left to dry.

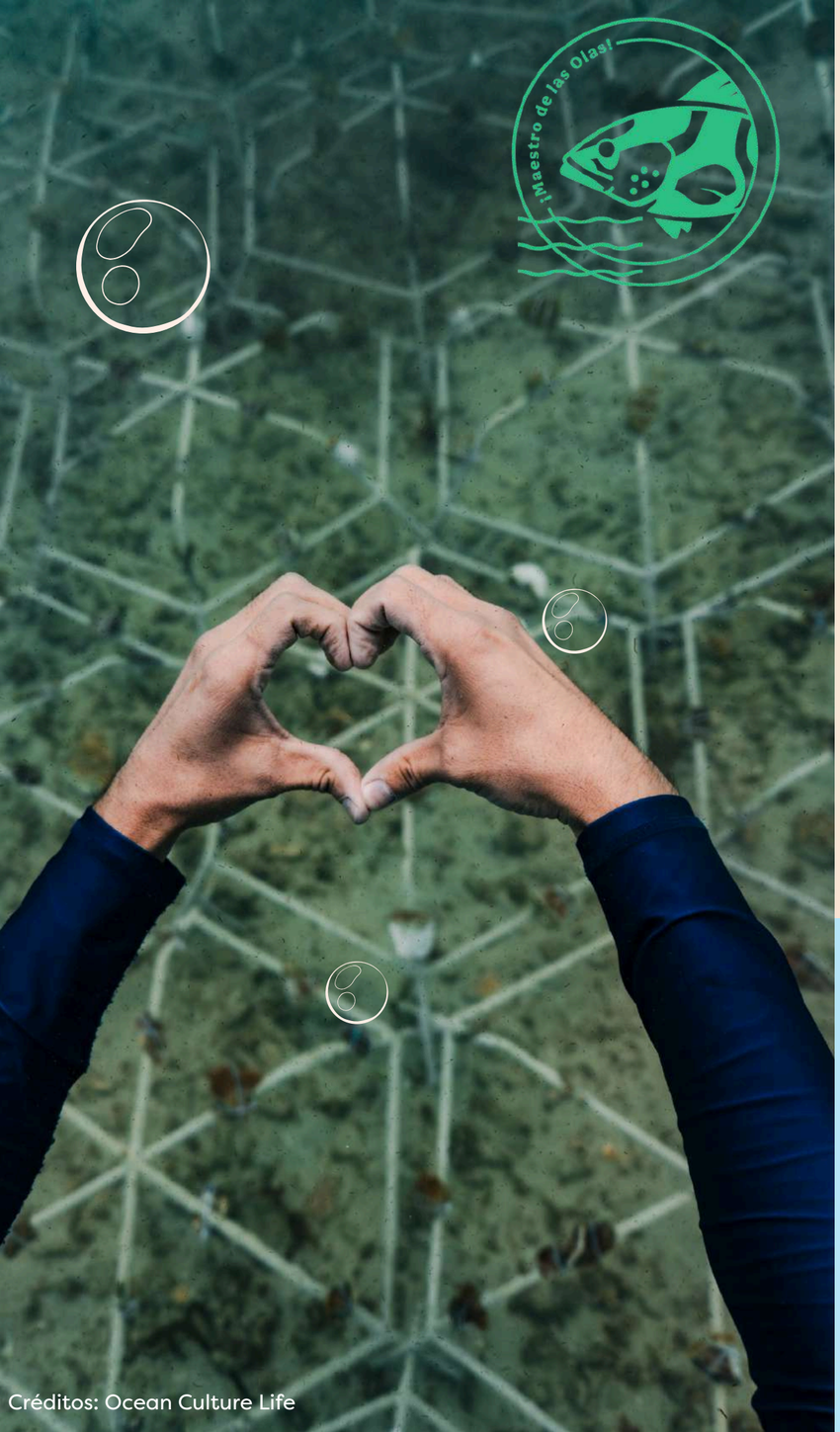
Followed by coral collection and attachment

Coral fragments are collected from nearby reefs that have been assessed as healthy. During collection, it is important to **prioritize corals of opportunity** as the primary source for the Reef Stars. **Corals of Opportunity are live coral fragments/colonies that are not firmly attached to the substrate**—often dislodged by storms or other disturbances—which makes them ideal for outplanting. Using them has **minimal ecological impact, and by securing them to a new substrate, their chances of survival are improved.**

The next step is to attach **15 coral fragments to each Reef Star**, ensuring they are securely fastened and optimally positioned for growth. Once the fragments are attached, the Reef Stars are handed over to the underwater team for deployment.

When corals of opportunity are insufficient, fragments may be collected from **healthy donor colonies, provided that no more than 10%** of any single colony is harvested to maintain its integrity and minimize environmental impact.


Creditos: Sara Almanzar



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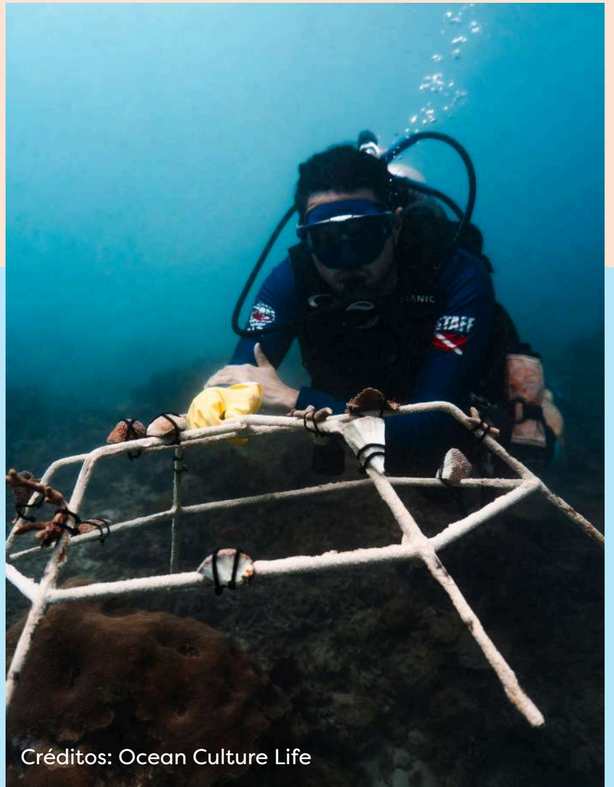
Finally the Reef Stars were installed in their final location

The deployment of the Reef Stars at the installation site is achieved through a **coordinated effort between the surface team and a support group of divers.** Once the Reef Stars are ready, they have to be efficiently handed over to the underwater team to minimize the time that the living coral fragments are outside of their natural environment.

For the installation, the Reef Stars are distributed and set into place following the methodology and protocol established by Mars Sustainable Solutions.

The intallation site was selected a year earlier during a visit by Mars Sustainable Solutions to identify optimal conditions for coral restoration: rubble-dominated sediment, flat terrain, and shallow depth for light penetration. After evaluating four locations—Santa Marta, Isla Palma, Rincón del Mar, and Varadero—Varadero was chosen.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100 Reef Stars were installed

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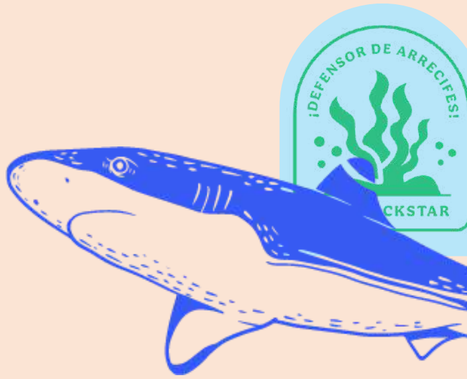
Our achievements



Participation:

4

Corales de Paz Members guiding the project

2

Mars Sustainable Solutions **trainers**

19

Volunteers joined the initiative

8

Divers supporting underwater work

7

Bocachica community members

Restoration:

100 **Reef Stars Installed**

100 **Square meters of reef under rehabilitation**

1,500 **Outplanted coral fragments**

After only two months...

Our first maintenance and monitoring visit to the installation site provided encouraging initial data.

+13%

in hard coral cover

due to coral fragments on Reef Stars

>95%

hard coral survival on Reef Stars

Growth

Some coral species already overgrowing the cable ties

11

Coral species growing on Reef Stars

Reef Star visitors

Seahorse, juvenile parrotfish, surgeon fish, sea urchins

Key learnings

Streamlining operations

The pilot installation offered key insights to improve our restoration workflow—from **optimizing coral attachment techniques to enhancing deployment efficiency.** These lessons will guide more effective planning and execution in future phases.

Blending global and local expertise

With the methodology transferred from Mars Sustainable Solutions, we can now pair their scalable system with Corales de Paz's expertise in local reef conditions—**enabling a restoration strategy tailored to the Colombian context.**

Next steps

- Launch site monitoring and evaluation.
- Build local capacity: train Bocachica community members in Open Water Diver certification by June and Reef Check EcoDiver by August.
- Scale up restoration efforts to 550 Reef Stars.

Thank You!

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