

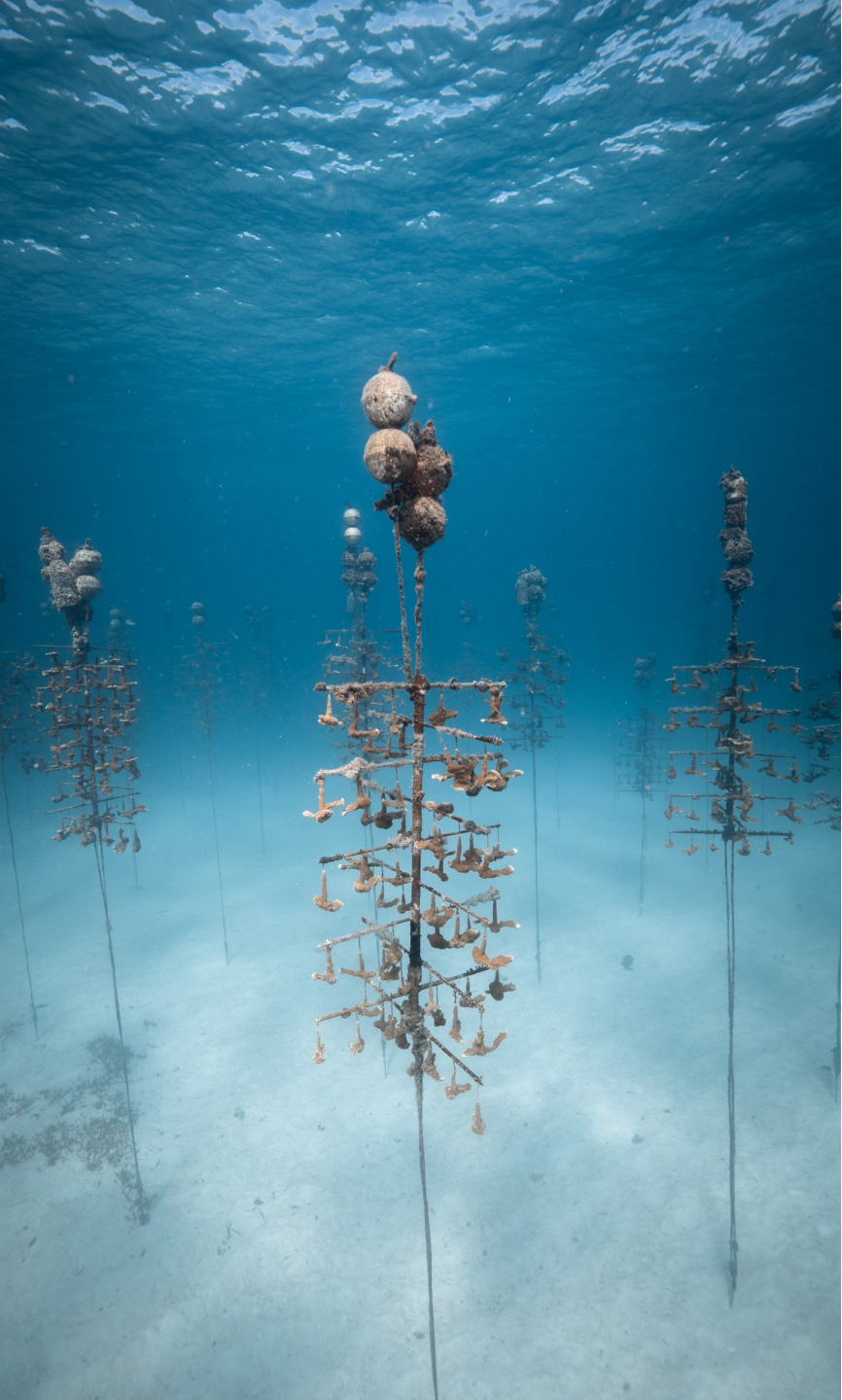


CORAL RESTORATION FOUNDATION™

ENHANCING CORAL REEFS THROUGH ACTIVE AND SCALABLE RESTORATION EFFORTS

JESSICA LEVY • DIRECTOR OF RESTORATION STRATEGY

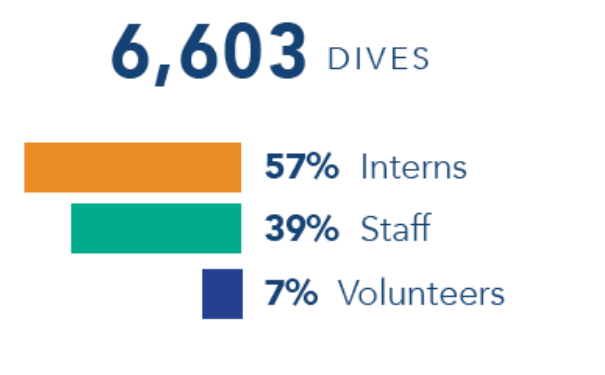
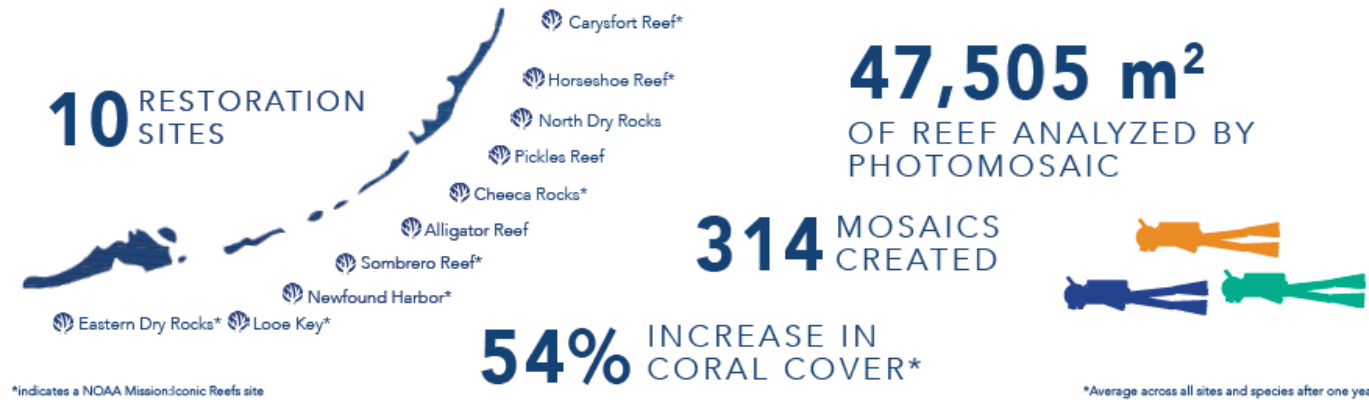




PRESENTATION OVERVIEW

- Introduction to Coral Restoration Foundation™ (CRF™)
- The CRF™ Methodology
- CRF™ in service of the restoration community

2022 IN NUMBERS

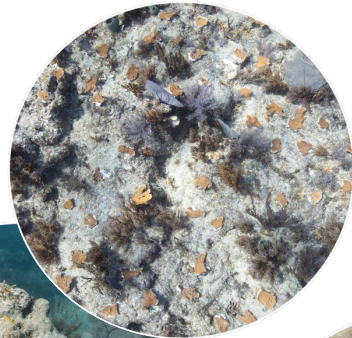


CORAL RESTORATION FOUNDATION™

- Headquarter in Key Largo, FL, CRF™ has been working on reef restoration since 2007.
- Our mission is to restore coral reefs, leverage science and technology to further coral reef, and to educate others on the importance of our oceans.
- CRF™ works with collaborators and researchers to provide resource and support to the global restoration community of practice.



Fragments removed from Coral Trees and attached to substrate with epoxy



Fragments grouped by genotype in **cohorts** will then fuse into thickets

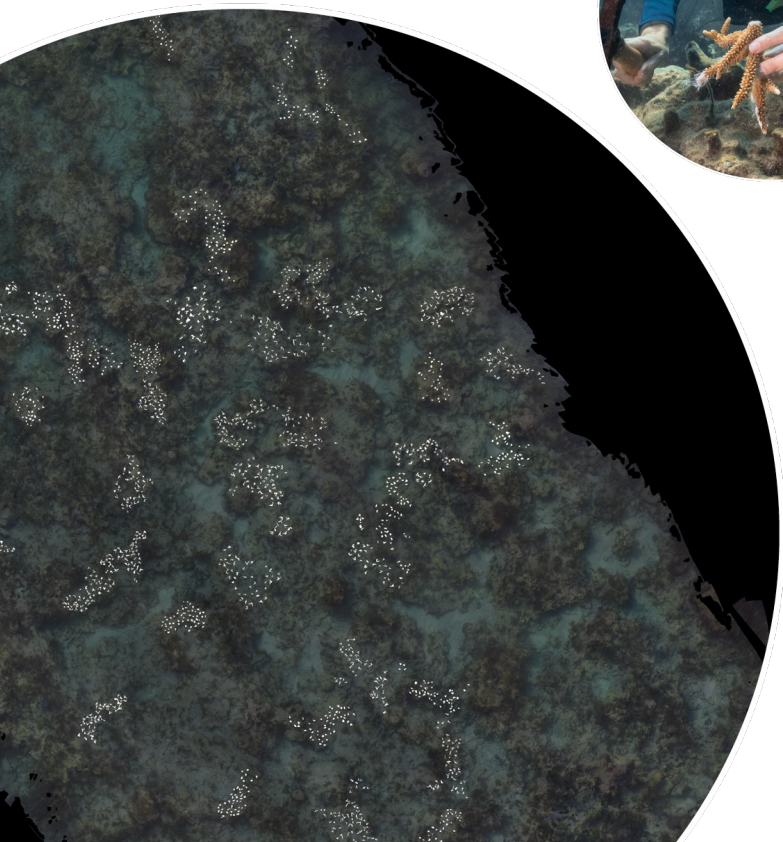


A cohort is made up of **monogenetic** outplants - which could be individual outplant fragments, clusters or a combination of each.

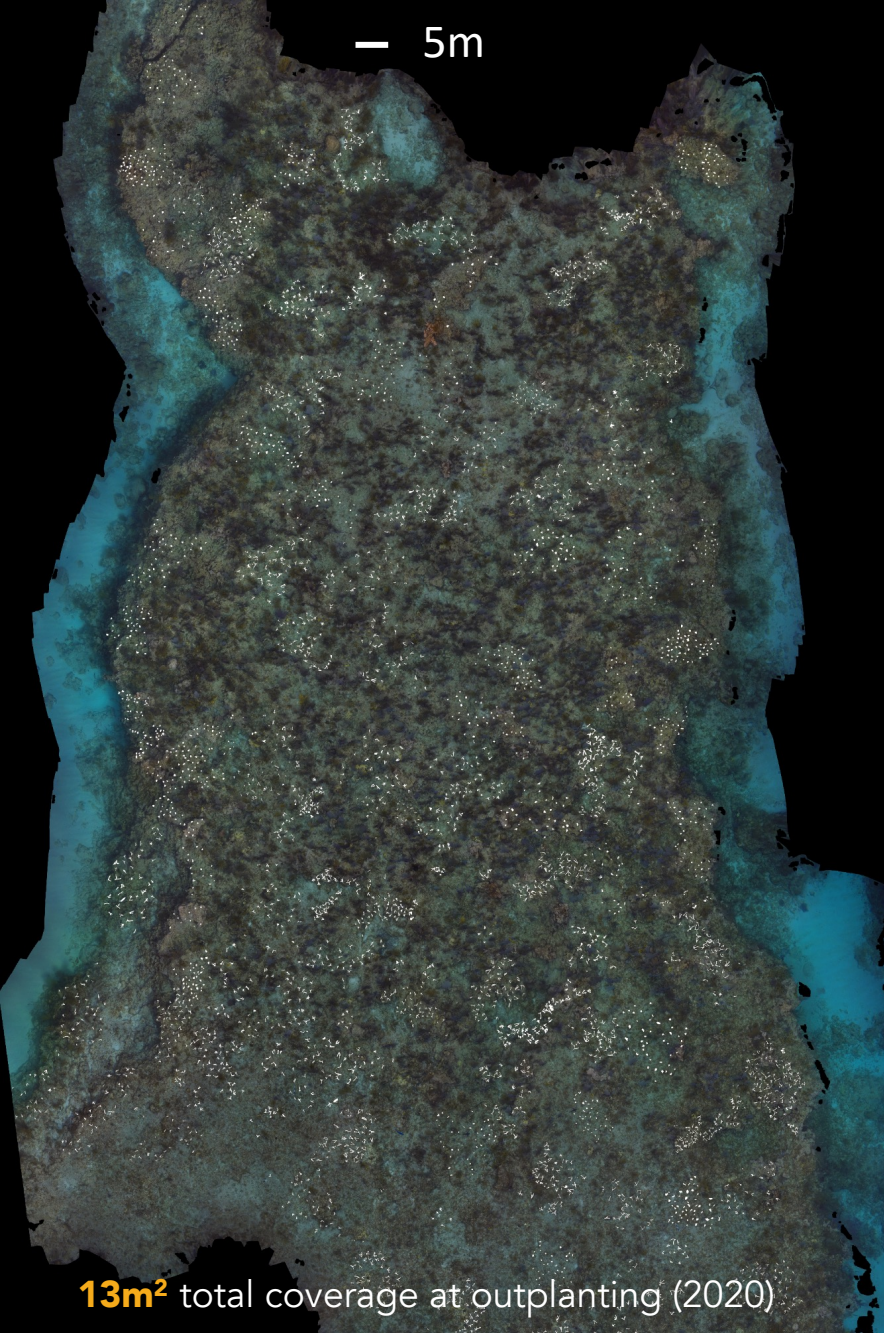


RESTORATION PROCESS

- In-situ nursery propagation
- Promote and safeguard species and genetic diversity
- Outplanting in large abundance
- Monitoring restoration site to track area restored

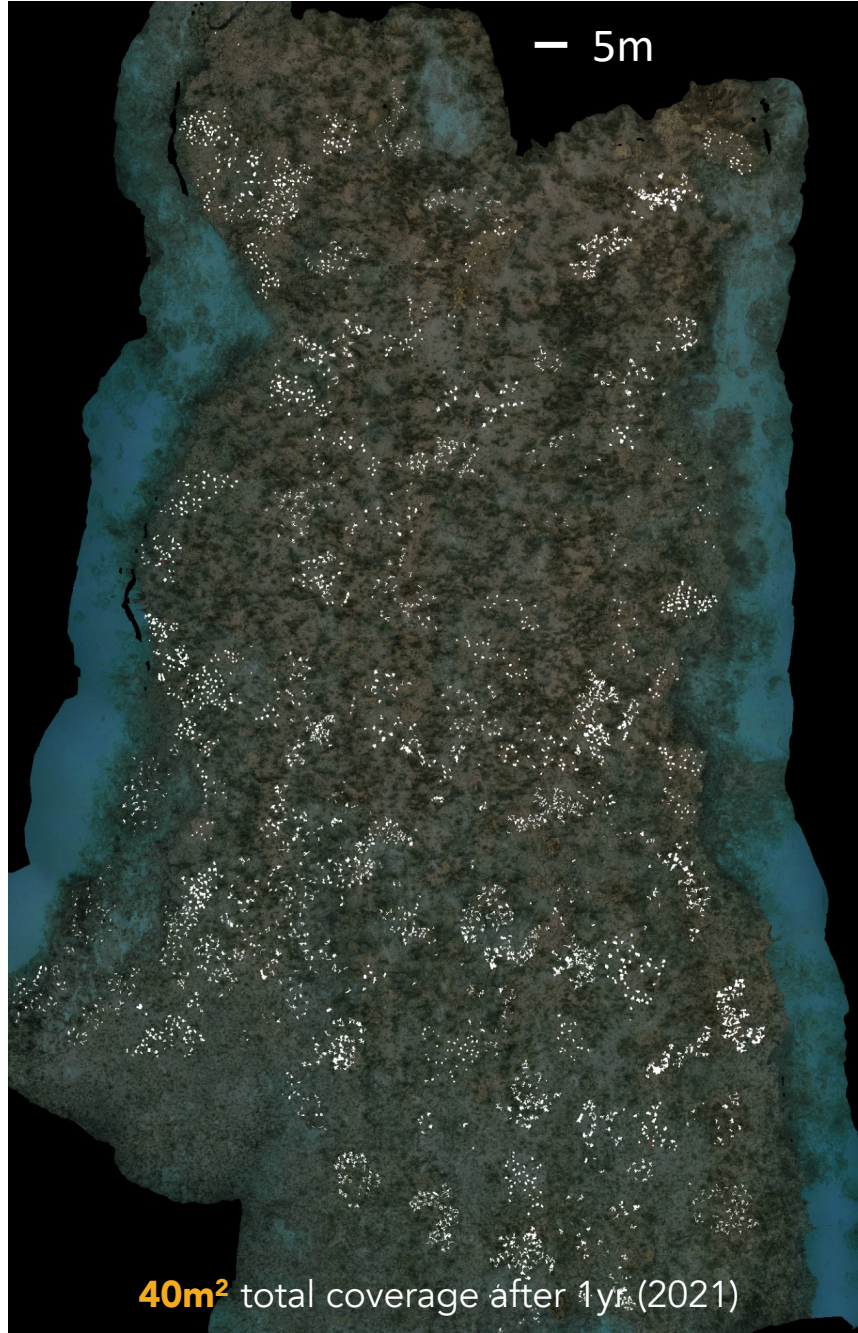


— 5m

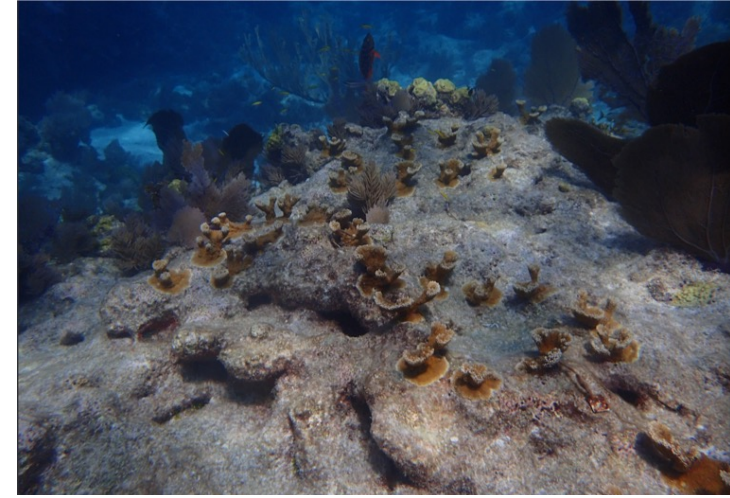


13m² total coverage at outplanting (2020)

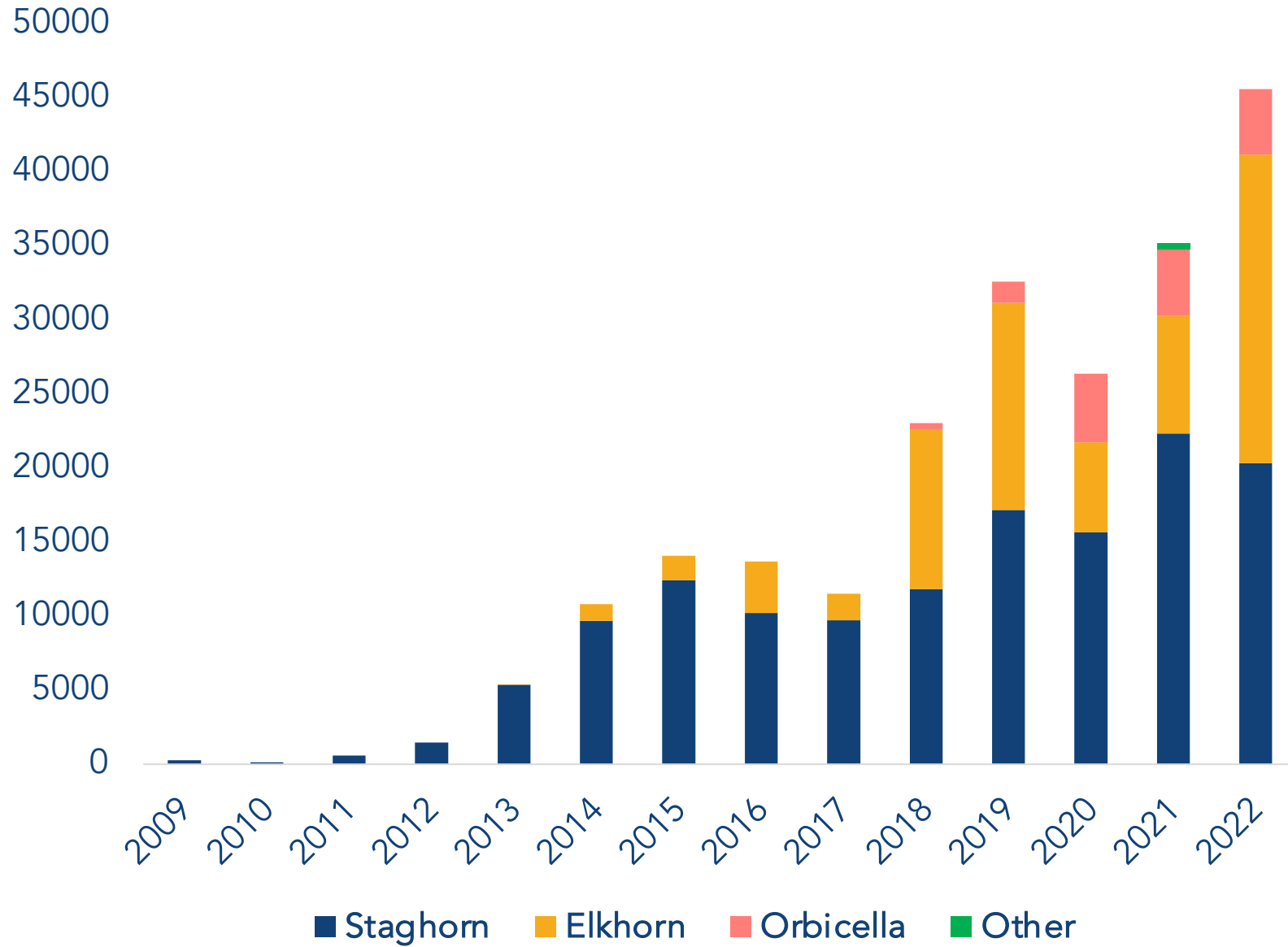
— 5m



40m² total coverage after 1yr. (2021)



CARYSFORT REEF



**CORAL RESTORATION
FOUNDATION™**
OUTPLANT HISTORY

PROCEEDINGS B

royalsocietypublishing.org/journal/rspb

Research



Cite this article: Cuning R et al. 2021 Census of heat tolerance among Florida's threatened staghorn corals finds resilient individuals throughout existing nursery populations. *Proc. R. Soc. B* **288**: 20211613. <https://doi.org/10.1098/rspb.2021.1613>

Census of heat tolerance among Florida's threatened staghorn corals finds resilient individuals throughout existing nursery populations

Ross Cunning¹, Katherine E. Parker¹, Kelsey Johnson-Sapp², Richard F. Karp², Alexandra D. Wen³, Olivia M. Williamson², Erich Bartels⁴, Martine D'Alessandro², David S. Gilliam⁵, Grace Hanson⁵, Jessica Levy⁶, Diego Liman⁷, Kerry Maxwell⁷, Wyatt C. Million⁸, Alison L. Moulding⁹, Amelia Moura⁹, Erin M. Muller¹⁰, Ken Nedimyer¹¹, Brian Reckenbell⁷, Ruben van Hooijdonk^{3,12}, Craig Dahlgren¹³, Carly Kenkel⁸, John E. Parkinson¹⁴ and Andrew C. Baker²

frontiers
in Marine Science

TECHNOLOGY AND CODE
published: 10 July 2021
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Coral Reef Restoration Monitoring Guide

Methods to evaluate restoration success from local to ecosystem scales

September 2020

NOAA Technical Memorandum
NOS NMFS 279

National Centers for
Coastal Ocean Science



CORAL
RESTORATION
FOUNDATION™

WEISSMAN
NOVEMBER 5, 2020
Coral Restoration Foundation™ Photomosaic Manual
Second Edition - November 2020



Coral Restoration Foundation™ Photomosaic
Manual

AUTHORS
Alexander M. Neufeld and Garrett Fundakowski
Coral Restoration Foundation™

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CORAL
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Coral Restoration Foundation™ boulder coral
(*Orbicella* spp) methodology for in-situ, large-scale
restoration.

SEPTEMBER 24, 2021

AUTHORS

Coral Restoration Foundation™ boulder coral
(*Orbicella* spp) methodology for in-situ, large-
scale restoration.

AUTHORS
Dan Burdeno, Bailey Thomasson, Amelia Moura, Jessica
S. Levy, Coral Restoration Foundation™

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Coral
Restoration
Consortium

First published: 20 September 2021 | <https://doi.org/10.1111/rec.13498> | Citations: 3

STRATEGIC ISSUES ARTICLE | Open Access |

Six priorities to advance the science and practice of coral reef restoration worldwide

Tali Vardi ✉, Whitney C. Hoot, Jessica Levy, Elizabeth Shaver, R. Scott Winters, Anastazia T. Banaszak, Iliana B. Baums, Valérie F. Chamberland, Nathan Cook, David Gulko, Margaux Y. Hein, Les Kaufman, Michelle Loewe, Petra Lundgren, Caitlin Lusic, Petra MacGowan, Mikhail V. Matz, Miles McGonigle, Ian McLeod, Jennifer Moore, Tom Moore, Sandrine Pivard, F. Joseph Pollock, Baruch Rinkevich, David J. Suggett, Samuel Suleiman, T. Shay Viehman, Tatiana Villalobos, Virginia M. Weis, Chelsea Wolke, Phanor H. Montoya-Maya ... See fewer authors ^

CRC Monitoring Working Group

Evaluating Success in Restoration: The Coral Reef Restoration Monitoring Guide

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Postdoctoral Fellow
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Stephanie Schogmeyer
Associate Research Scientist
Florida Fish and Wildlife

Dr. Alison Moulding
Coral Biologist
NOAA

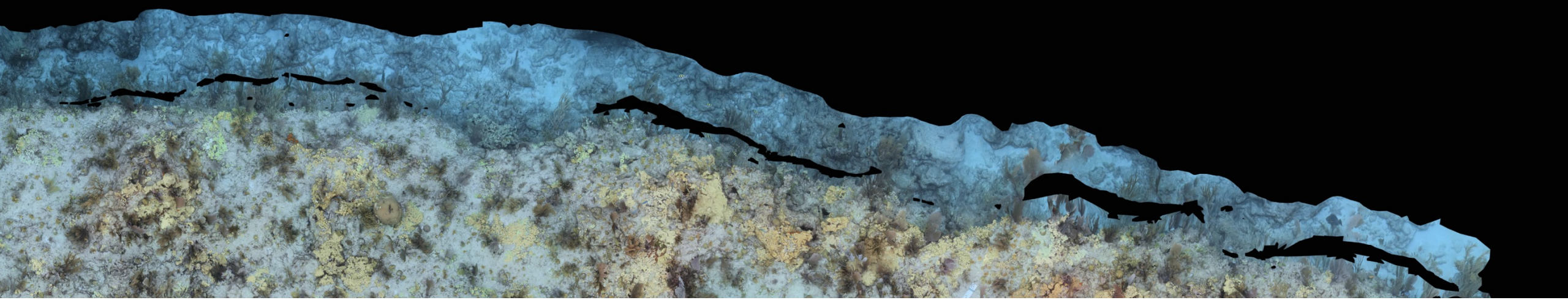
Amelia Moura
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Research Ecologist
NOAA

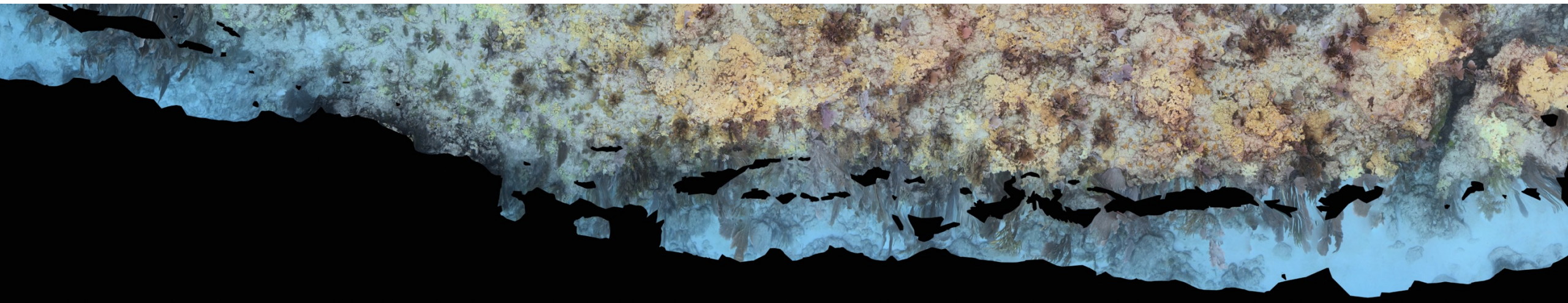
SUPPORTING A COMMUNITY OF PRACTICE

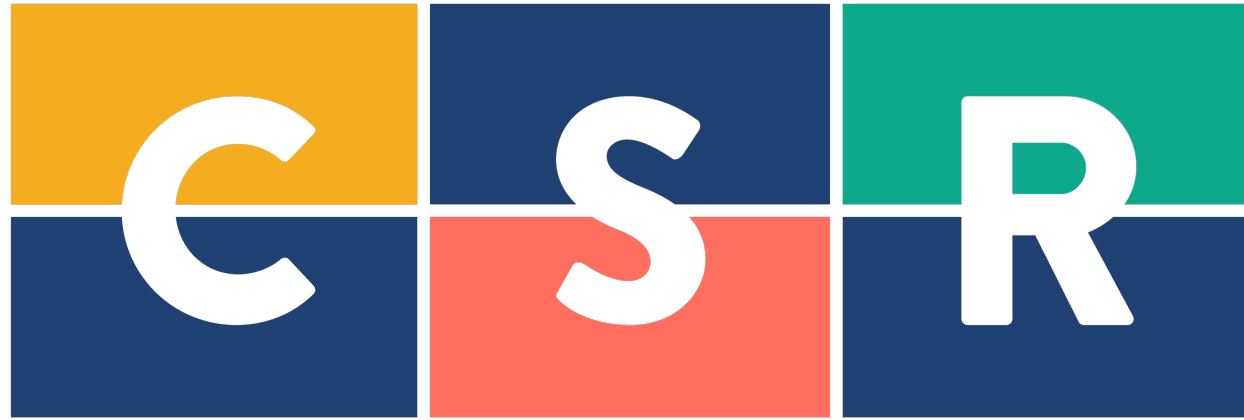
- CRF™ aims to be a **provider and resource** to the global coral restoration community.
- We believe in developing collaborative, **open-source** resources and trainings to enhance the practice.
- Together, we can **scale up** coral restoration interventions and maintain greater success at scale.





 CERULEAN AI

The logo for Cerulean AI features a stylized icon on the left, resembling a brain or a network of neural connections, composed of blue and white geometric shapes. To the right of the icon, the words "CERULEAN AI" are written in a bold, blue, sans-serif typeface.



CORAL SAMPLE REGISTRY



SAUDI ARABIA

King Abdullah University of Science and Technology (KAUST) Reef Restoration Initiative at Shushah Island

Coral Restoration Foundation™ was hired as a consultant to join the KAUST-based team on the initial development of the coral restoration and habitat enhancement strategy for Shushah Island, located in the northern Red Sea, off the NEOM region of Saudi Arabia. CRF™ provided support including guidance on in-situ nursery methods, site selection, collecting mosaic imagery, standardizing terms and naming conventions, leading planning workshops and meetings, and in-person support for the development of the master plan behind the KAUST reefscape initiative.

PHILIPPINES

Atlantis Dive Resort Restoration Program Expansion and Support

CRF™ was invited to join Atlantis Dive Resort in the Philippines to assist in nursery expansion and outplanting efforts as part of their in-house restoration program. This was a multi-agency effort and included other collaborators such as the Mead Foundation, Loveland Living Planet Aquarium Coral Rescue, and Haka Dive Center in Panglao, Bohol. CRF™ served as the coral restoration expert and functioned as a resource for the guests attending the week-long project, providing educational sessions and presentations.

HAWAII

The Nature Conservancy Non-Acroporid Restoration Techniques

Staff from the Nature Conservancy Hawaii joined the CRF™ restoration team in Key Largo, Florida as they began developing a program for non-Acroporid coral restoration. The focus of the training with CRF™ was a review of CRF™ Boulder Coral Tree™ methods. They received land-based training in Coral Tree™ construction, and field-based training in coral propagation, coral installation, Coral Tree™ cleaning and maintenance, and coral harvesting for outplanting. During the training, divers placed 136 boulder coral plugs onto dead boulder heads at Carysfort Reef.

Participants were also exposed to CRF™ monitoring techniques and approaches to genet selection.

PACIFIC ISLANDS

NOAA Pacific Island Partners Knowledge Exchange Boulder Coral Restoration Techniques

This collaboration between NOAA, CRF™ and the CRC (Coral Restoration Consortium), funded by NOAA through the CRC, was focused on boulder coral propagation and outplanting techniques. Participants from the NOAA Restoration Center Hawaii, Hawaii Division of Aquatic Resources, Kuleana Coral (Hawaii), the Commonwealth of the Northern Mariana Islands (CNMI) Marine Management Program, The Nature Conservancy Guam, and the American Samoa Department of Marine and Wildlife worked with the CRF™ team to propagate over 400 boulder corals in our open ocean nursery and then return over 300 reef-ready boulder coral colonies to the wild. The second part of this exchange will take place in Fall 2023, when CRF™ staff will travel to Hawaii and continue working with members of this team to understand local challenges and support their restoration programs.

AUSTRALIA

Coral Nurture Program Testing Acroporid Outplant Methods

This training exercise, organized by CRF™ and Australia's Coral Nurture Program, supported participants from CRF™, Coral Nurture Program, MARRS, and KAUST divers in learning how to use the "coral clip" as an outplant strategy for Acroporid corals. The exercise involved some epoxy-based outplanting in order to compare outplanting speed as well as rates of attachment and long-term attachment success. Participants included divers from Saudi Arabia, Indonesia, Australia, and the United States.

GUAM

National Park Service Boulder Coral Propagation Techniques

CRF™ restoration staff were joined by members of Guam's National Park Service, who are currently working to develop their own restoration program. They joined us to review boulder coral propagation techniques, including original coral collection efforts and creating brood stock corals to establish initial stalk nurseries. The training involved fragmenting 350 new boulder coral plugs and installing them on a new Coral Tree™. The CRF™ team also shared information about photomosaic monitoring and the collection of novel species.

GLOBAL LEARNING EXCHANGES

In 2022, we organized six learning exchanges, aimed at serving restoration efforts around the world by lending our expertise and support, as well as ensuring we are continuously evolving and applying the world's best practices to our mission.



THANK YOU!

JESSICA LEVY • DIRECTOR OF RESTORATION STRATEGY • JESSICA@CORALRESTORATION.ORG



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