BEST Initiative

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Pop-Up Nursery and Coral Restoration

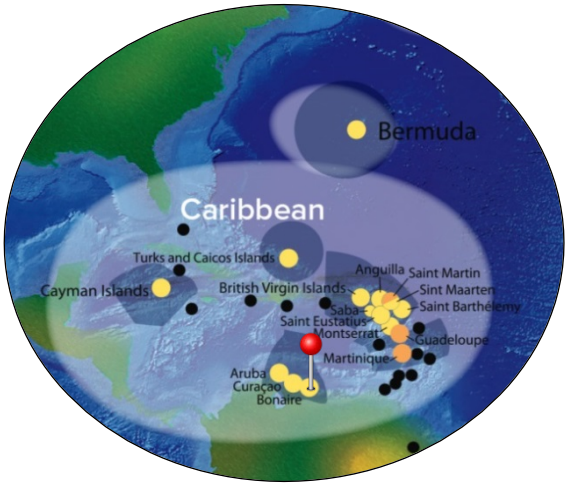
Targeted territory: Bonaire

Total project budget: 49,672 Euros

BEST 2.0 grant awarded: 49,672 Euros

Duration: January 2018 – January 2019 (12 months)

Lead organisation: Coral Restoration Foundation Bonaire



Background:

Elkhorn coral - *Acropora palmata* - has been listed as Critically Endangered in the IUCN Red List since 2008 as a result of a rapid population decline primarily attributed to disease. However, additional threats such as elevated seawater temperatures, ocean acidification, decreased breeding population, loss of recruitment habitat, sedimentation, anthropogenic and natural breakage, predation and increased nutrient and contaminant levels act synergistically and impede its recovery.

Recent studies in Bonaire have shown dramatic changes in coral communities on the reef slopes since 1973, with declines in cover and abundance for virtually all coral species and a shift from communities dominated by framework building species like *A. palmata* to communities consisting of small opportunistic species. When coral populations decline beyond a certain level negative feedbacks make natural recovery increasingly difficult. As the density of Elkhorn coral declines, the dilution of gametes makes successful fertilization less likely and impacts the reproductive potential of Elkhorn coral populations, particularly in sites with low genotypic diversity.

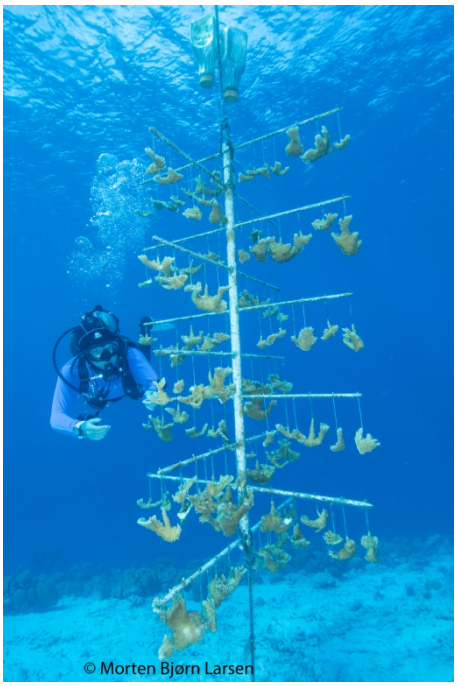
Coral restoration is increasingly recognized as a promising strategy for preserving the genetic diversity of endangered coral species, enhancing coral populations and increasing the likelihood of successful sexual reproduction in short timeframes.

Description of the Project:

The project will restore the Elkhorn coral population of a reef area of approximately 500m^2 within the Bonaire National Marine Park (BNMP), increasing the species abundance and genotypic diversity. Some of the few existing colonies of *A. palmata* in the area are possibly monoclonal. Increasing the colony abundance and adding genetic diversity adjacent to the population will increase the chances of successful sexual cross-fertilization.

A “pop-up” coral nursery will be setup on site, thereby increasing survivorship and simplifying logistics, and will be removed at the end of the project. 700 corals of 14 different genotypes will be raised in 8 months using initial corals sourced from existing nurseries in Bonaire.

The corals will be transplanted on the restoration area 10 months after the nursery installation. Before and after transplanting the restoration area will be monitored using photogrammetric techniques and 3D modelling technology to quantify several measures of coral growth, abundance and health through an easy-to-use and non-intrusive photogrammetry tool. The monitoring protocol and the data collected will be shared with the BNMP, and with active coral restoration projects in the Caribbean through the international Coral Restoration Consortium network forum, aiming to spark the future development of a feasible and standardized monitoring protocol for the collection of large-scale data on coral using this technology.



Intended results:

The project will contribute to an increased abundance and the preservation of the genetic diversity of shallow water populations of Elkhorn coral by:

- Transplanting around 700 Elkhorn corals to increase the abundance and genotypic diversity of a low biodiversity reef area in Bonaire.
- Identifying well-performing genotypes.
- Developing a feasible and effective monitoring protocol using photogrammetric techniques and 3D models.
- Communicating the results of the project to the local and international community to facilitate replication.

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