

Emergency Response Strategy to the invasive coral of the Xeniidae family, a new threat for coral restoration and Puerto Rico Coral restoration projects update, how are we addressing the threats



Dr. Nilda Jimenez
Coordinator
DNER Endangered Species Program



Background

- ▶ 2000 and 2005- the intentional introduction by people associated with the aquarium industry in Venezuela (Ruiz-Allais, et al., 2014). This octocoral was later identified as *Unomia stolonifera* (Benayahu et al., 2021).
- ▶ Can proliferate quickly and easily asexually. The species grows on all types of substrates, suffocating sessile marine organisms and displacing those that have motile capacity. As a result, a decrease in the diversity and density of species and coral coverage is observed in the marine ecosystems, (Ruiz-Allais et al, 2021).
- ▶ Actions to control the species in Venezuela did not begin until 2021 and it is currently reported to have 100% coverage in several places.
- ▶ In the aquarium industry, these octocorals are considered a weedy species with the capacity of overgrowing an aquarium tank, requiring constant maintenance when introduced. Species within this Family are reported to grow at a rate of one or two polyps per day. Loose octocorals can reattach within 2-3 days and start budding within 10 days (Nadir et al., 2023).

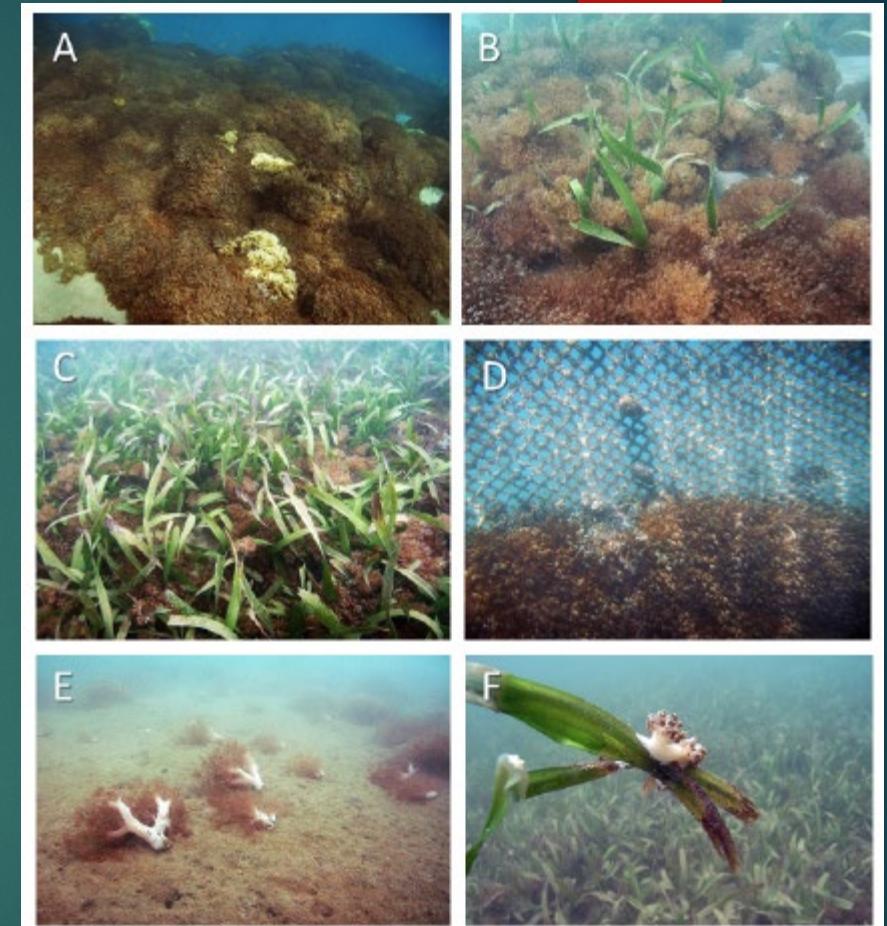


Figure 2. Underwater images of the invasive *Unomia stolonifera* in the study sites along the northeastern coast of Venezuela, Southeastern Caribbean Sea. A. Colonies monopolizing hard reef substrate. B. Colonies overgrowing the seagrass *Thalassia testudinum*. C. Seagrass bed occupied by invasive octocoral. D. Fishing net with colonies. E. Drifted colonies on the bottom. F. Detached *T. testudinum* with colonies floating with currents.

Memoria
del 80 Aniversario del Instituto de Oceanografía y Recursos Acuáticos

80 Años
80 años de Oceanografía y Recursos Acuáticos

Artículo

The invasive octocoral *Unomia stolonifera* (Alcyonacea, Xeniidae) is dominating the benthos in the Southeastern Caribbean Sea.

Juan Pedro Ruiz Allais, Yehuda Benayahu and Oscar Migue Lasso Acosta

Reports in Puerto Rico

- ▶ Video published on social media in Lajas-Guánica in October 2023- unknown coordinates
- ▶ February 2024, second report, a patch of approximately 37 m² was located at 75 feet in a reef of spurs and grooves. This was corroborated.
- ▶ Close to the first corroborated patch a second one was found of approximately 170 m² at 65 feet.
- ▶ While conducting a study on Nassau grouper spawning aggregation area two more areas were found
- ▶ After creating awareness, a professor reported another large patch in Caja de Muertos which was later corroborated.

Name	Location	Lat	Long	Depth	Area	Date
UR1	Parguera	17.89582	-66.9728	75	25 m ²	2/20/2024
UR2	Parguera	17.89578	-66.9736	65	170 m ²	2/27/2024
UR3	Guánica	17.90001	-66.9084	77	12 m ²	2/29/2024
UR4	Guayanilla	17.94509	-66.7961	80	5 m ²	2/29/2024
UR5	Ponce	17.90035	-66.5092	8	TBD	3/21/2024



Dense areas



RC12

Observed growing over corals including *Orbicella*

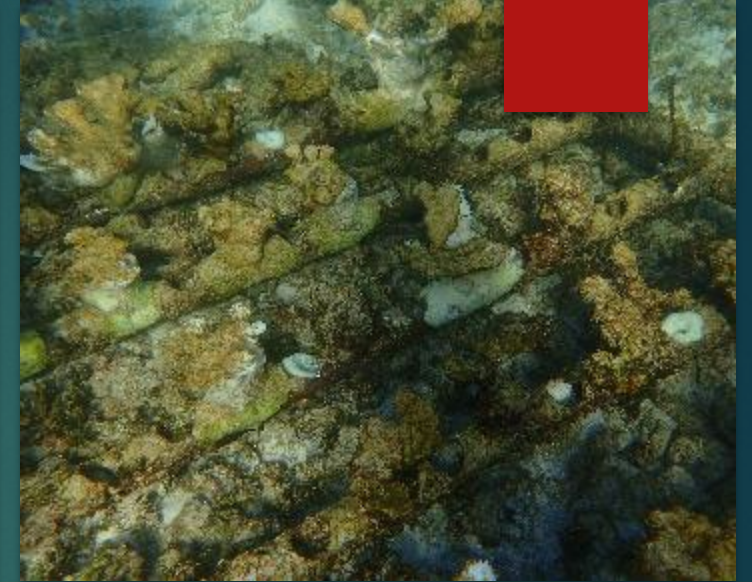


Emergency Response

1. BEGIN THE REMOVAL TO ERRADICATE AND PREVENT SPREADING
 - a. Loose fragments or polyps can float and eventually adhere to the substrate, promoting the colonization on new places
 - b. If the colony is partially removed, tentacle regeneration is observed after 9-10 days.
 - c. Depriving them of sunlight, depending exclusively on heterotrophic feeding, cause their death after 7 days, but it is unknown the colony reaction to the stress (asexual propagation?)
2. Seek funds to enhance removal action
3. Collaborate with genetic studies- The species was identified as *Xenia umbellata*
4. Evaluate the distribution- visit other areas
5. Create awareness to promote reporting and identifying existent or new propagation areas
6. Declare it as an emergency through an Administrative Order
7. Research other removal alternatives ex-situ
 - a. Chemical
 - b. Covering with tarp



- ▶ Bleaching and what it represents to coral nurseries and restoration projects
- ▶ Water temperatures and coral response was different along the Island
- ▶ Severe in the southwest-killing all *A. palmatas* in nurseries and restoration areas





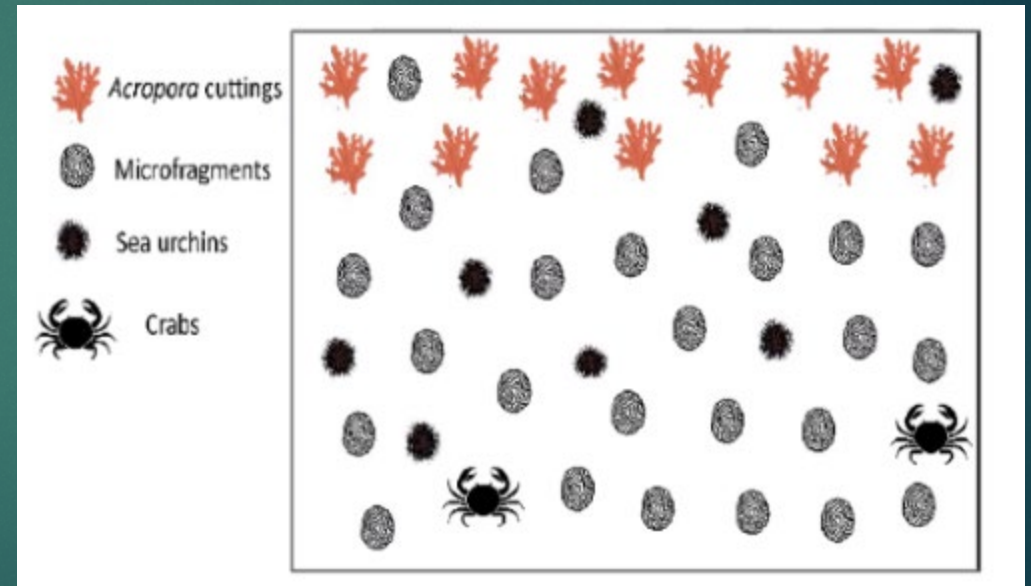
Projects and funding for coral restoration (small and large scale) (holistic or targeted)

Small scale- Response to groundings and part of the operations of the coral nurseries (targeted)

Large scale: Various projects on going and depending on harvesting from nurseries. Highlighting two:

Caribbean Reef Project- Holistic

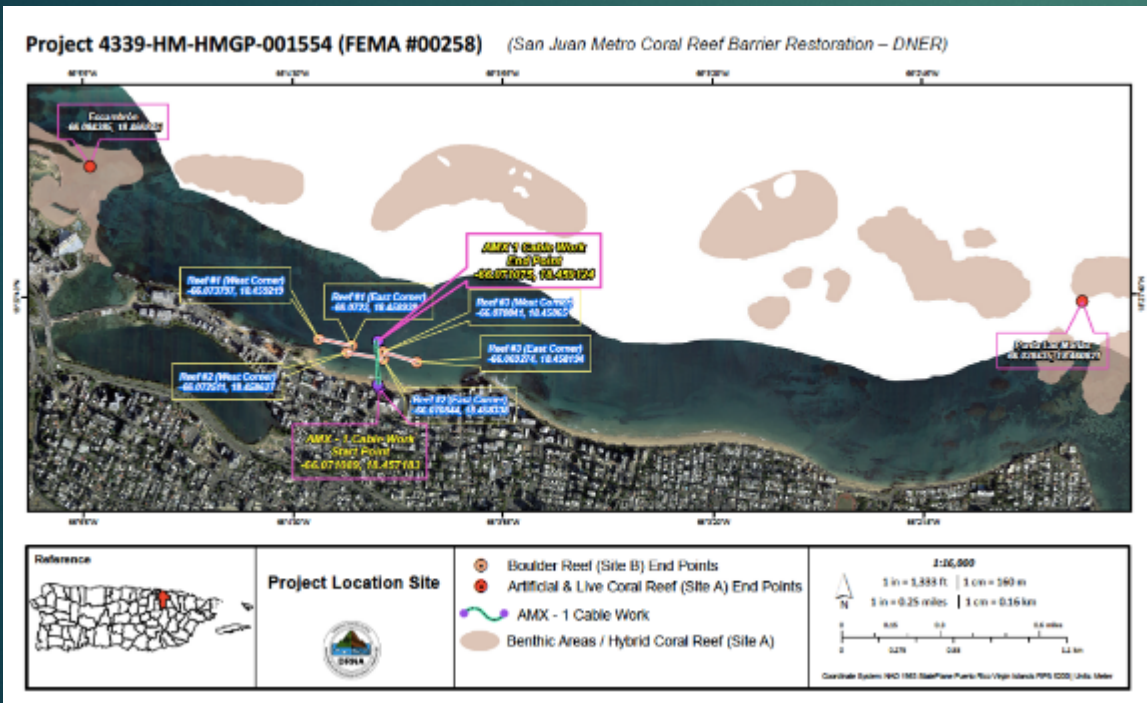
Seeks to restore over 5 acres of coral reef at three locations (La Parguera, Mayagüez, and Fajardo), through outplanting a combination of 20,000 coral microfragments of *O. annularis*, *O. faveolata*, *O. franksi*, *D. cylindrus*, *P. strigosa*, *M. cavernosa*, *C. natans*, and *A. palmata*, a 1,000 *A. palmata* cuttings. In addition the project will restocked various herbivores (1,000 *D. antillarum*, 600-1,500 *E. viridis*, *T. ventricosus*, and 100 *M. spinosissimus*).



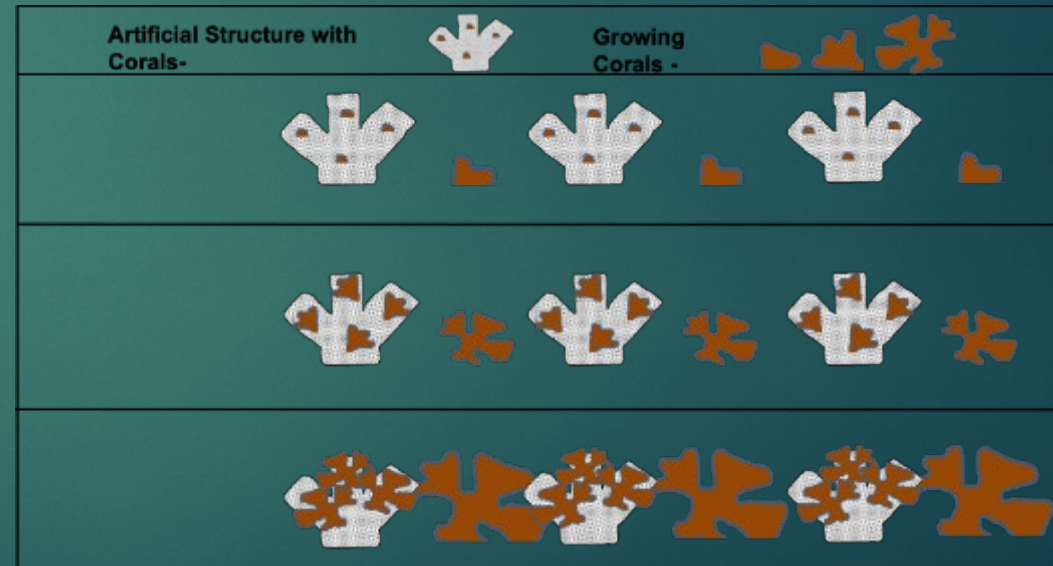
San Juan Metro Coral Reef Barrier Restoration Hazard Mitigation Program-FEMA

It is justified as an alternative to reduce the loss of life and property from natural hazards as described in the *2021 Puerto Rico State Natural Hazard Mitigation Plan*

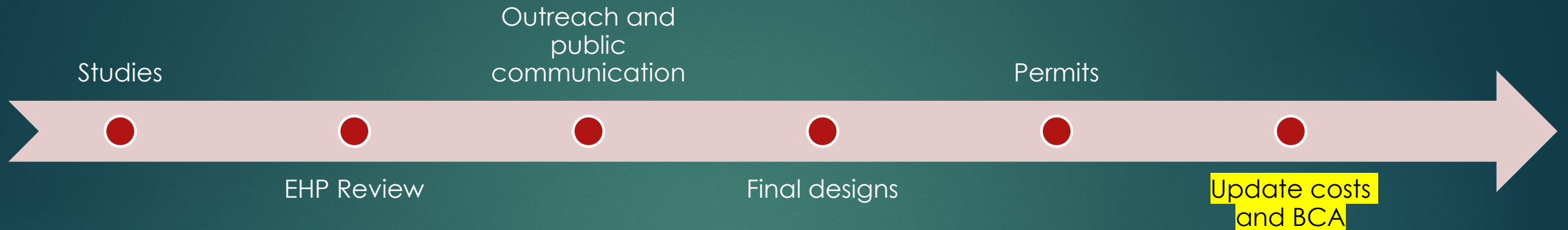
It is based in the knowledge that coral reefs play a crucial role in dissipating wave energy and protecting the coastline by reducing wave energy by up to 97%.



Hybrid model of artificial coral like structures with corals



Phase I



STUDIES

- ▶ Site and environmental assessment
- ▶ Ocean current
- ▶ Wave modeling studies
- ▶ Wave and wind climate analysis
- ▶ Benthic study
- ▶ Marine subsurface survey
- ▶ Geotechnical subsurface investigation

Nursery and outplant schedule



- ▶ Find the survivors, prepare for potentially another bleaching event with higher temperatures
- ▶ in-situ and ex-situ genetic bank

Thanks

