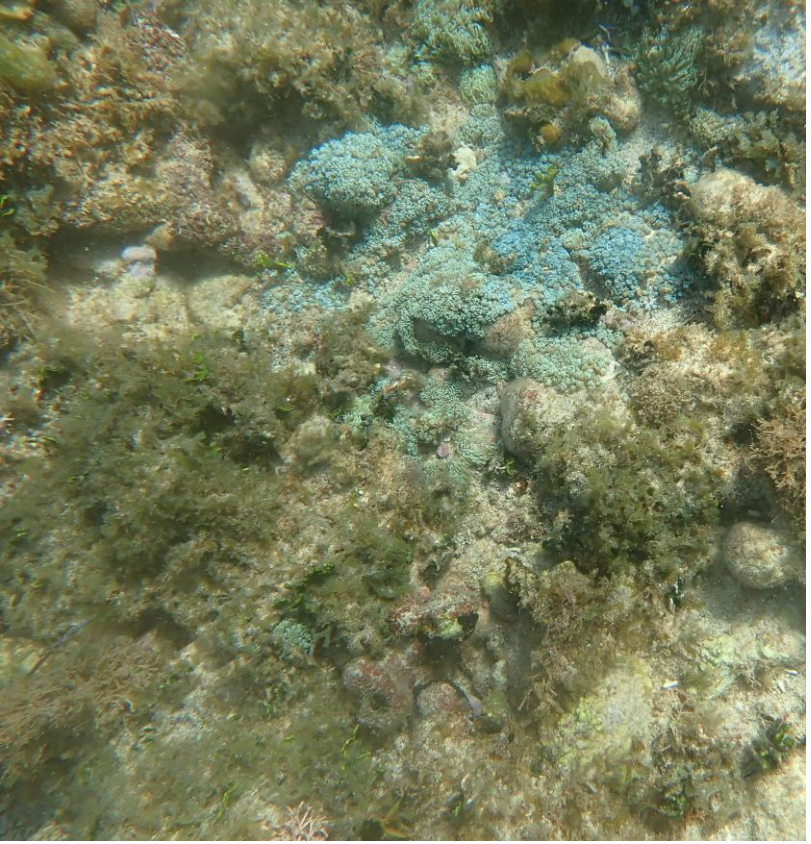
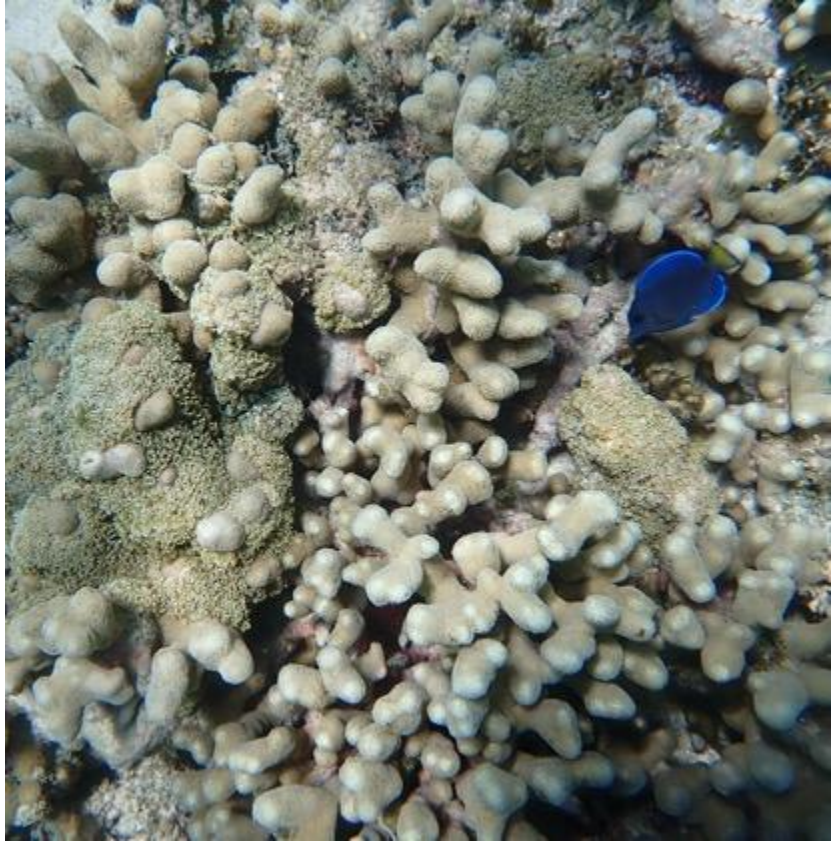



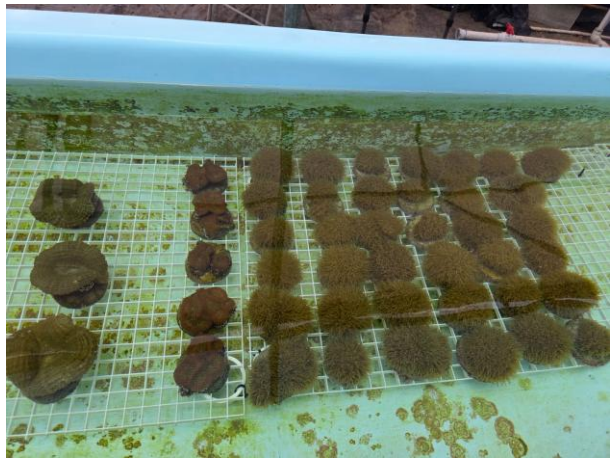

Pulsing corals in Puerto Caribbean Rico: The puzzle

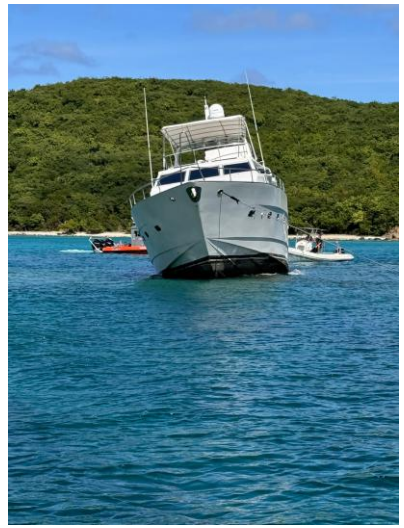
Nilda M. Jiménez, PhD
Coordinator
Protected Species Program

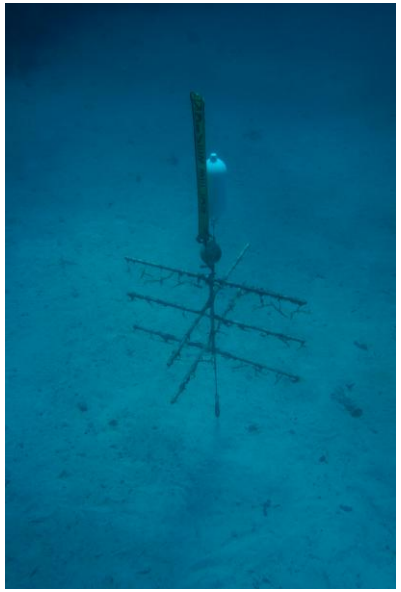
DEPARTAMENTO DE RECURSOS NATURALES Y AMBIENTALES
DRNA
GOBIERNO DE PUERTO RICO

Protected Species Program

Protected Species Program







What are pulsing corals?

- Soft corals
- Characterized by the rhythmic pulsing movement caused by their stalks and feathery polyps.
- Popular in the marine aquarium trade for being easy-to-care-for, grow fast and glamorous movement.
- They can quickly overgrow an aquarium tank if not managed and become a pest.

Xenia umbellata

From the Red Sea

Resist high temperatures, but not high nitrate concentrations

Depends on heterotrophic feeding but can last a while without it.

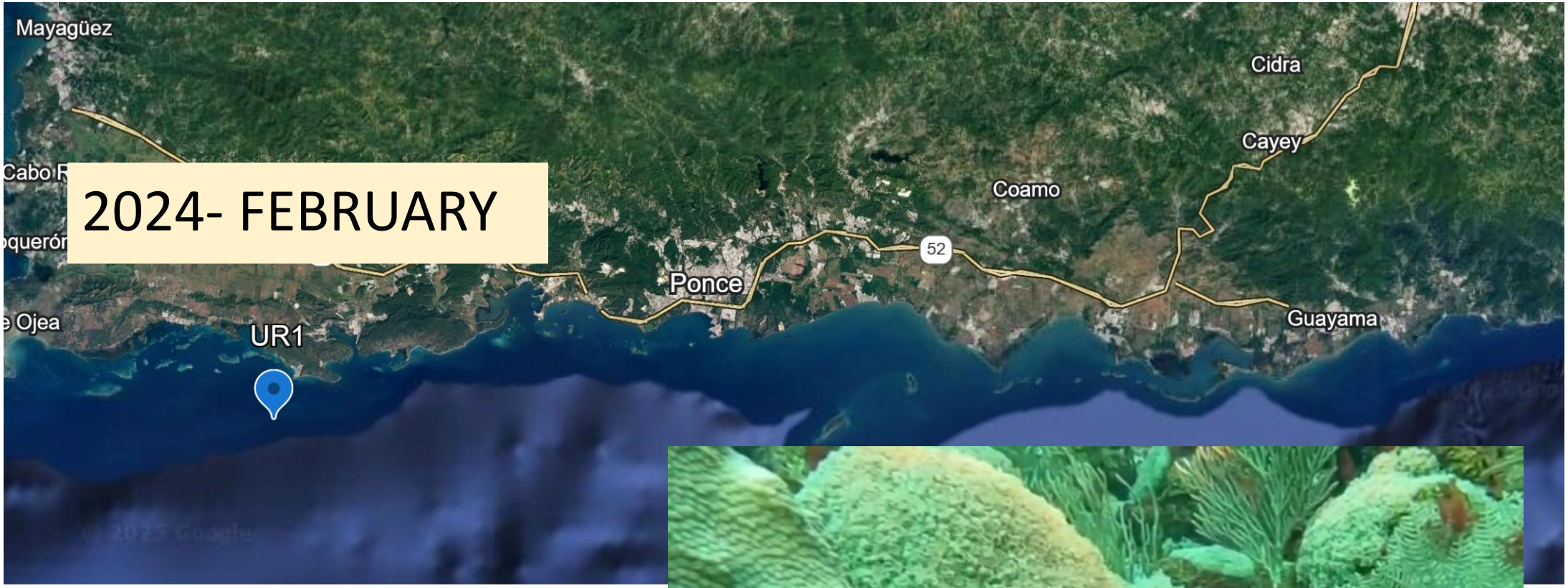
No negative effect due to eutrophication

Xenia umbellata

- Polyps can attach in 2-3 days
- In 10 days budding can begin
- If the oral disk is amputated, a new one grows back in 10 days and budding continues during that period.
- Tentacles can develop in polyps in 21 days
- Totipotencial for all parts of the body

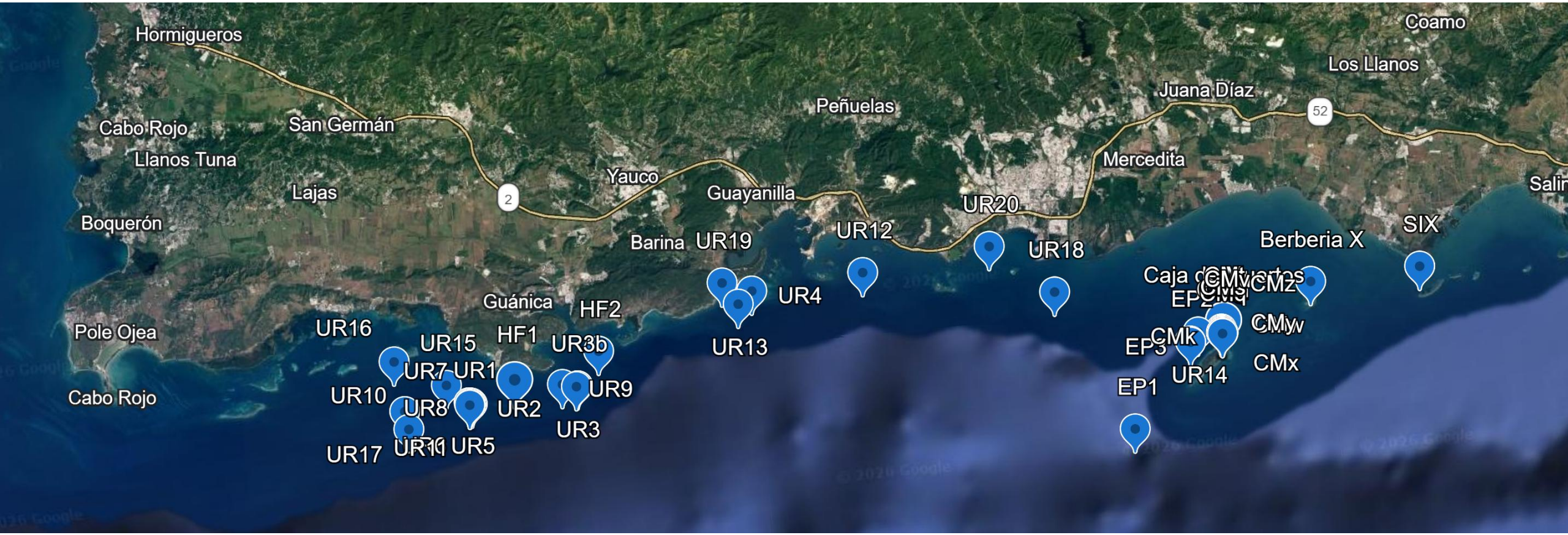
***Elinor Nadir, Tamar Lotan y Yehuda Benayahu. 2023. Xenia umbellata* (Octocorallia): A novel model organism for studying octocoral regeneration ability**

BRIEF RESEARCH REPORT article Front. Mar. Sci., 01 February 2023 Sec. Coral Reef Research Volume 10 - 2023 | https://doi.org/10.3389/fmars.2023.1021679



2023 October

Distribution- 2026



Most have been identified through drift dives with remaining air after removal actions or reported by biologist conducting field work. We are still slowly evaluating additional areas where we believe might be found based on what has been observe and reported.

Pulsing coral species identification

First record of a second invasive soft coral species, *Latissimia ningalooensis*, in southern Puerto Rico

Daniel A. Toledo-Rodriguez[1,2], Catherine S. McFadden[3], Nilda M. Jimenez Marrero[4], J. David Muñoz-Maravilla[1], Alex J. Veglia[2,5], Ernesto Weil[1], Nikolaos V. Schizas[1]

[1]Department of Marine Sciences, University of Puerto Rico at Mayagüez (UPRM), PO Box 9000, Mayagüez, PR 00681, USA

[2]EcoAzul, HC01 Box 4729, Lajas, PR 00667, USA

[3]Department of Biology, Harvey Mudd College, Claremont, CA 91711, USA

[4]Department of Natural and Environmental Resources (DNER), San José Industrial Park, 1375 Ave. Ponce de León, San Juan, PR 00926, USA

[5]Department of Biology, University of Puerto Rico at Mayagüez, PO Box 9000, Mayagüez, PR 00681, USA

Corresponding Author: Nikolaos V. Schizas, nikolaos.schizas@upr.edu

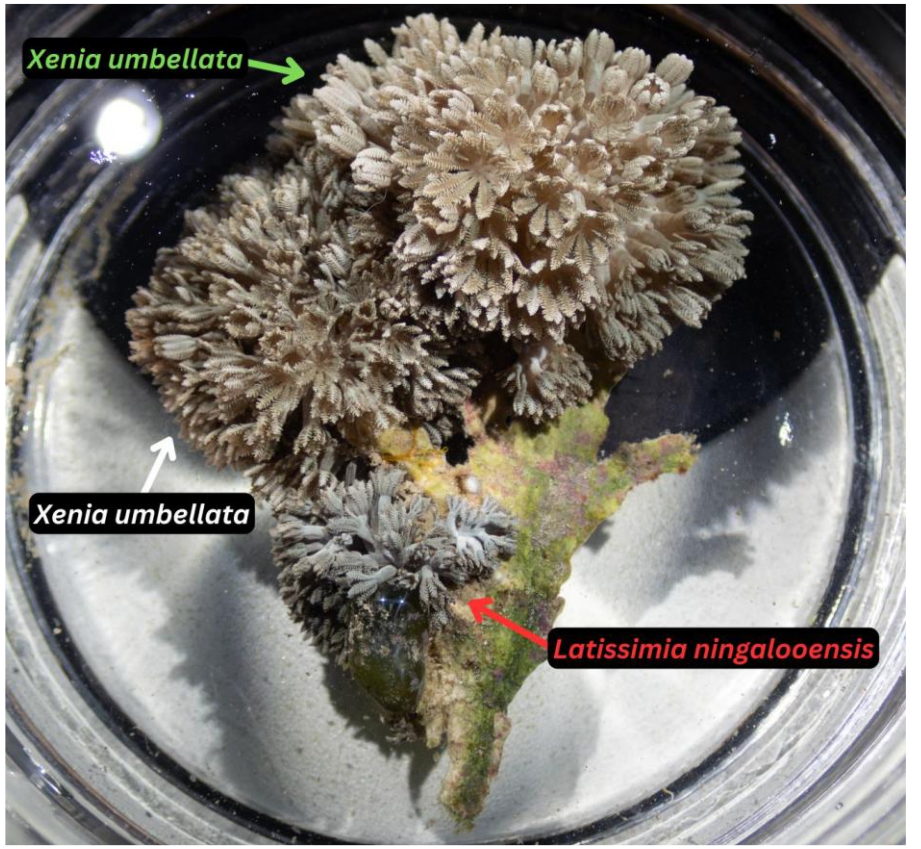
Latissimia ningalooensis from Australia
Xenia umbellata from the Red Sea
Additional analysis of other collected samples is needed

Coral Reefs
https://doi.org/10.1007/s00338-025-02670-5

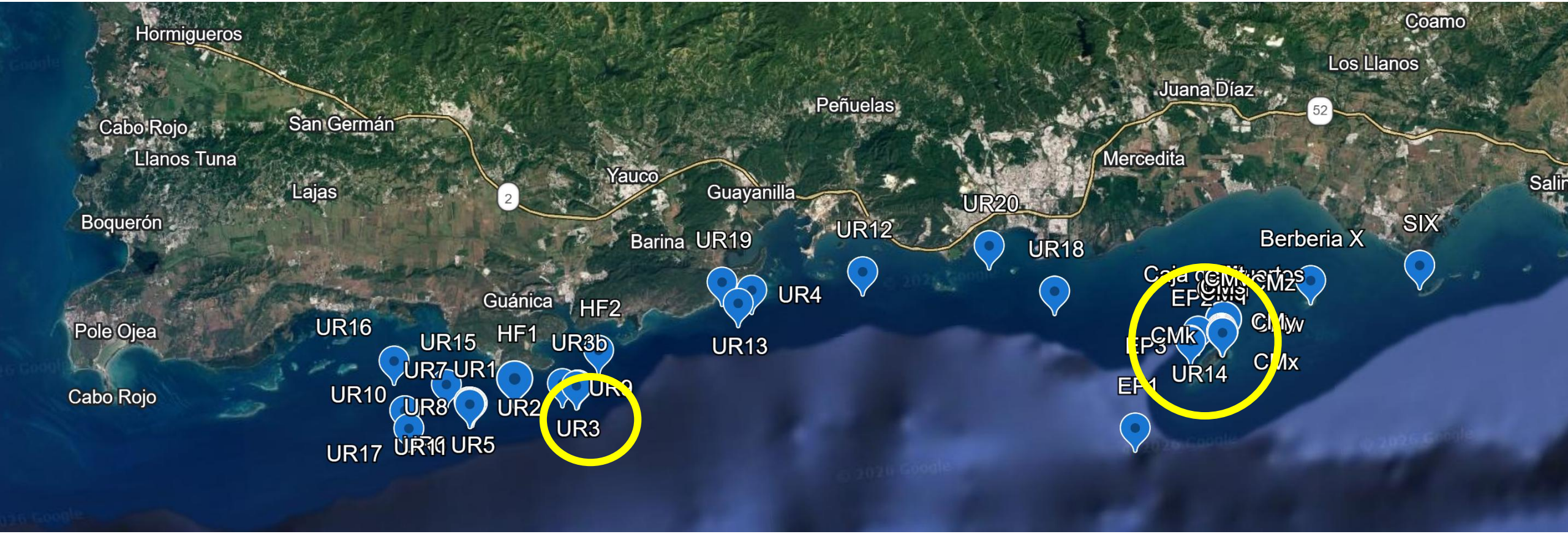
NOTE

Shadows over Caribbean reefs: occurrence of a new invasive soft coral species, *Xenia umbellata,* in southwest Puerto Rico

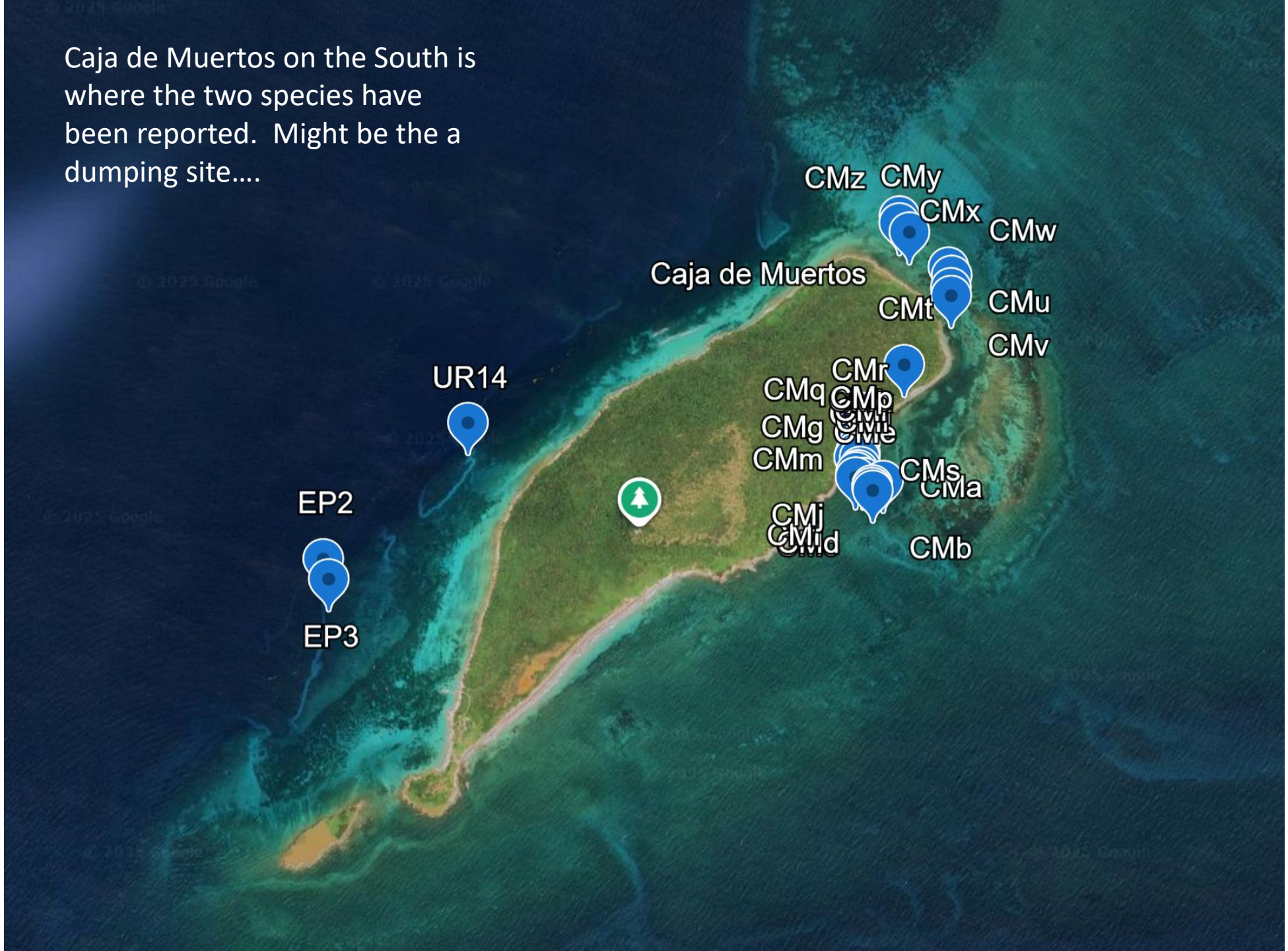
Daniel A. Toledo-Rodriguez[1,2] · Alex J. Veglia[2,3] · Nilda M. Jimenez Marrero[4] · Joyce M. Gomez-Samot[1] · Catherine S. McFadden[5] · Ernesto Weil[1] · Nikolaos V. Schizas[1]



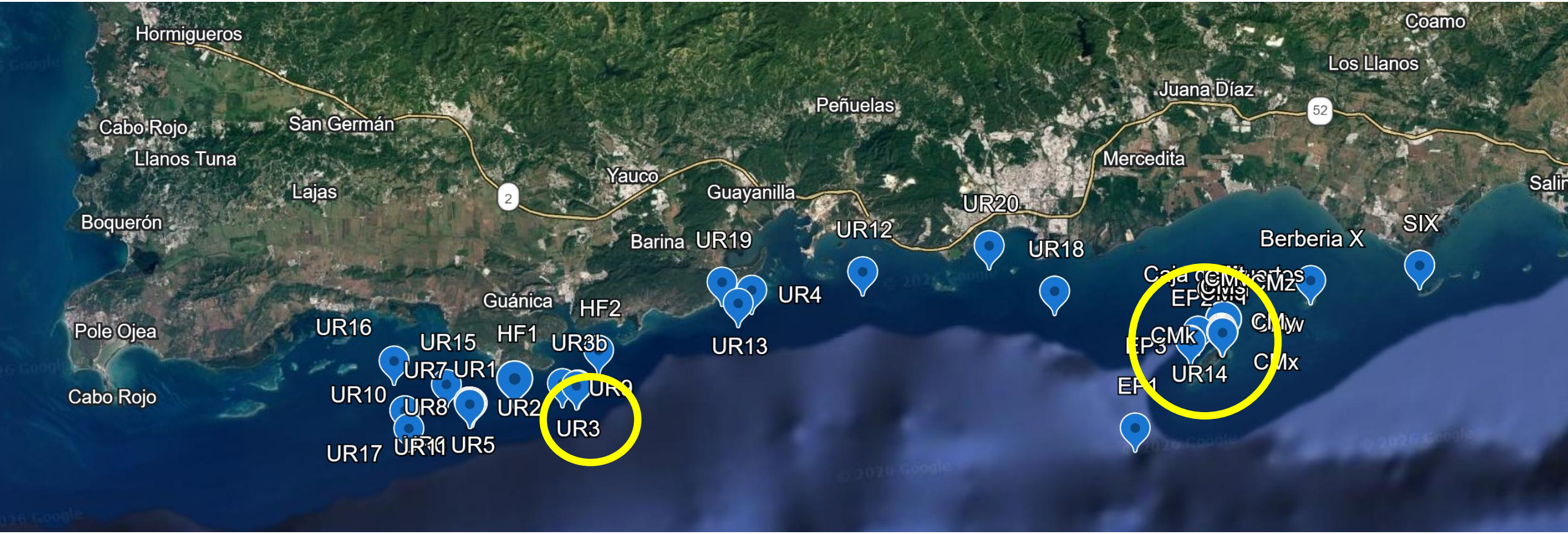
Is there a propagation pattern?



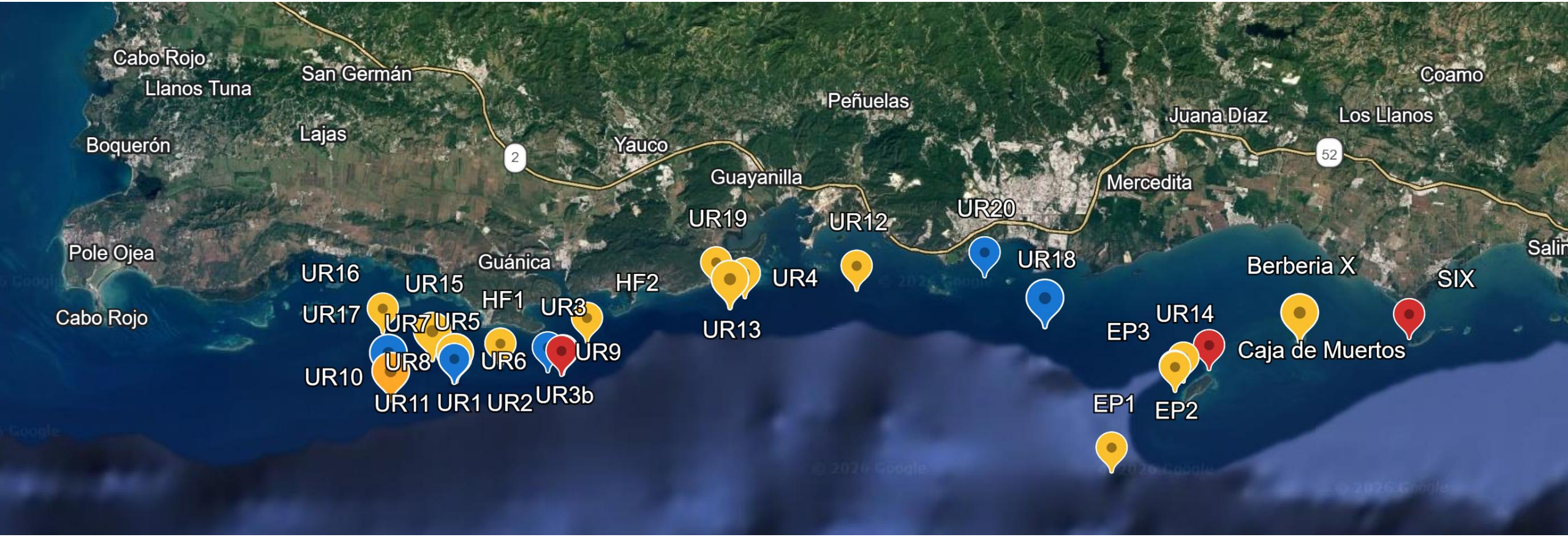
Caja de Muertos on the South is where the two species have been reported. Might be the a dumping site….



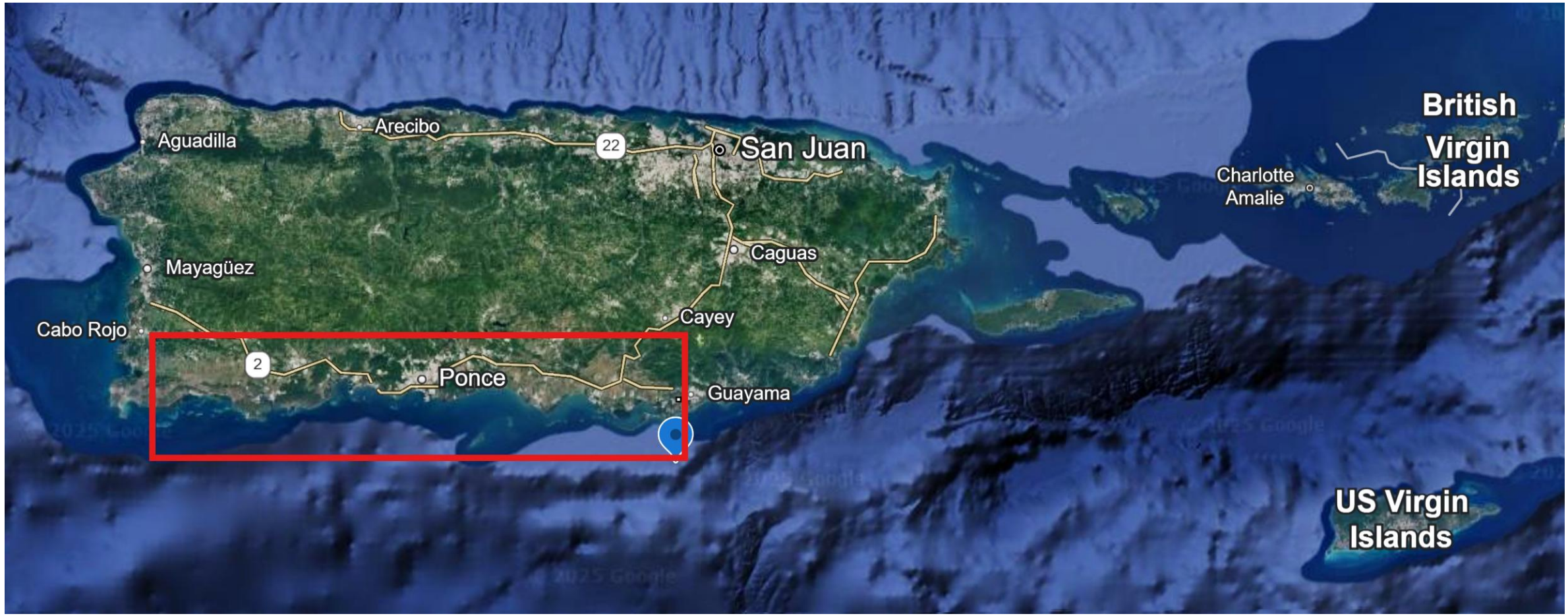
Is there a propagation pattern?

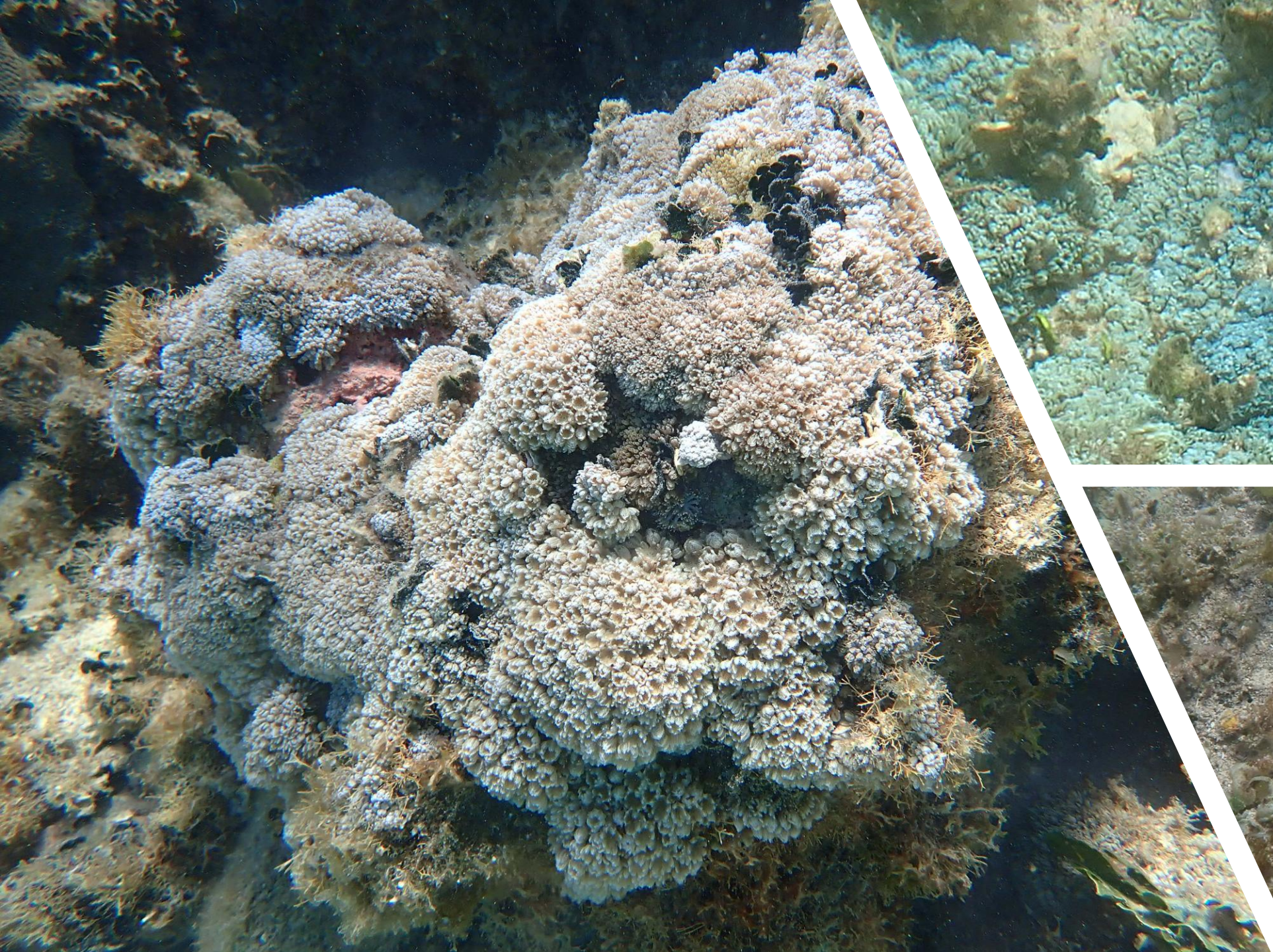


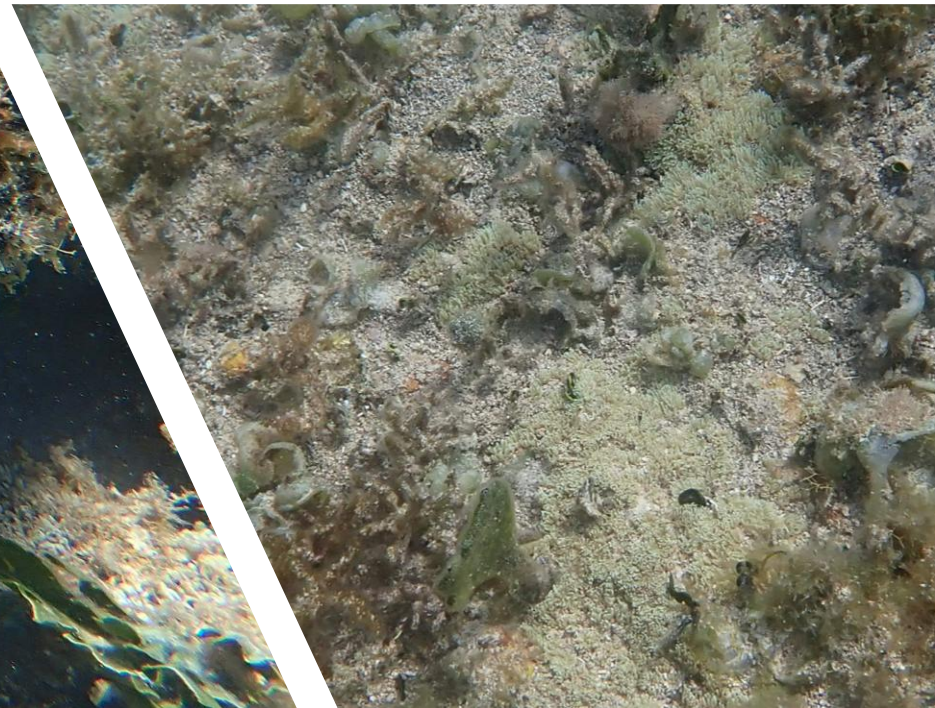
UR3 is so far the largest and denser patch that extent from ~ 75’ to ~ 200’. Invasive octocoral cover is ~90%.

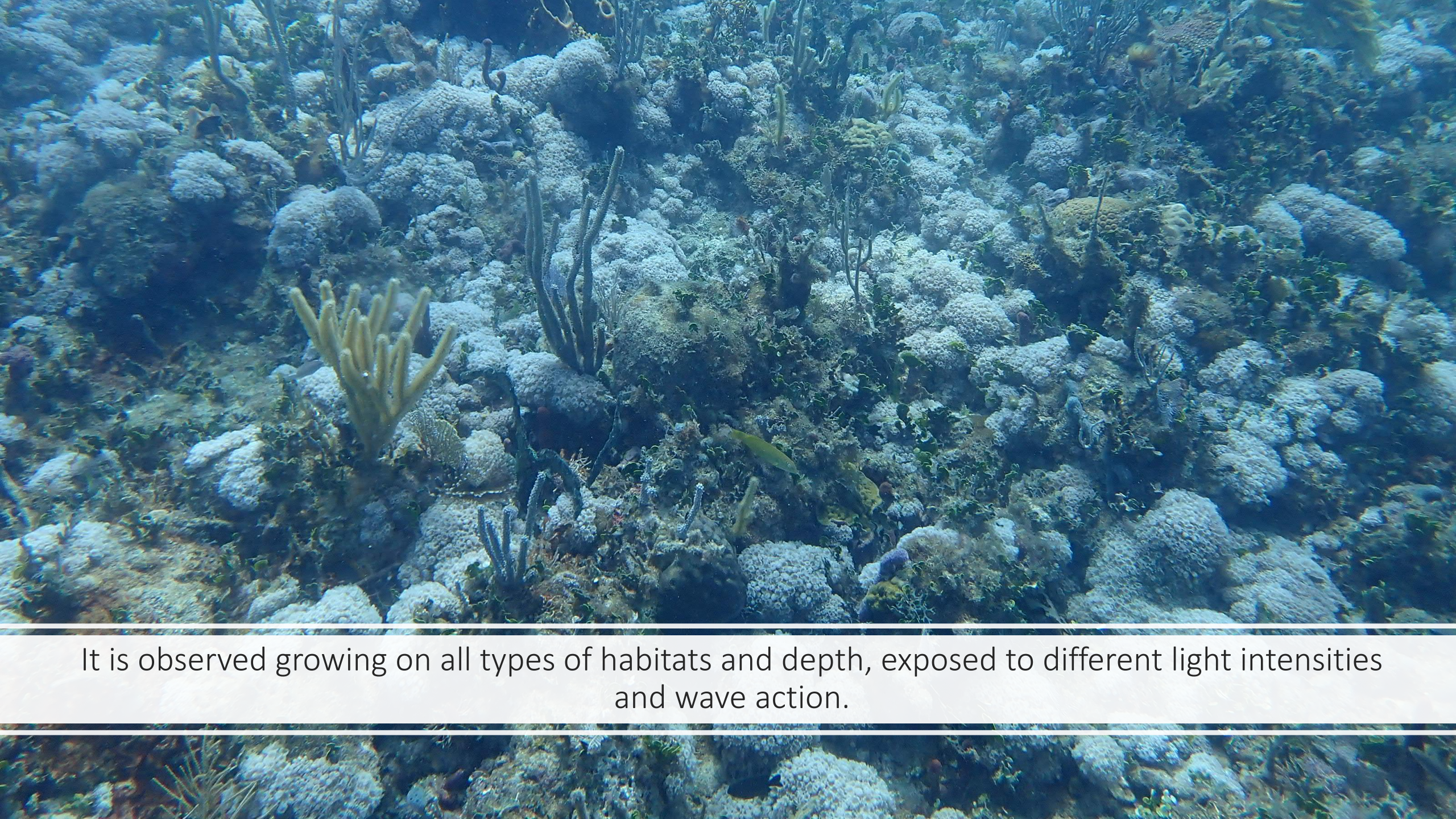

Cabo Rojo
Llanos Tuna
San Germán
Boquerón
Lajas
2
Yauco
Peñuelas
Guayanilla
Juana Díaz
Los Llanos
52
Coamo
Mercedita
Pole Ojea
Guánica
UR19
UR12
UR20
UR18
UR16
UR15
HF1
HF2
UR3
UR4
UR13
UR17
UR7
UR5
UR8
UR6
UR9
UR10
UR11
UR1
UR2
UR3b
Cabo Rojo
Berberia X
SIX
UR14
EP3
Caja de Muertos
EP1
EP2

Distribution in Puerto Rico

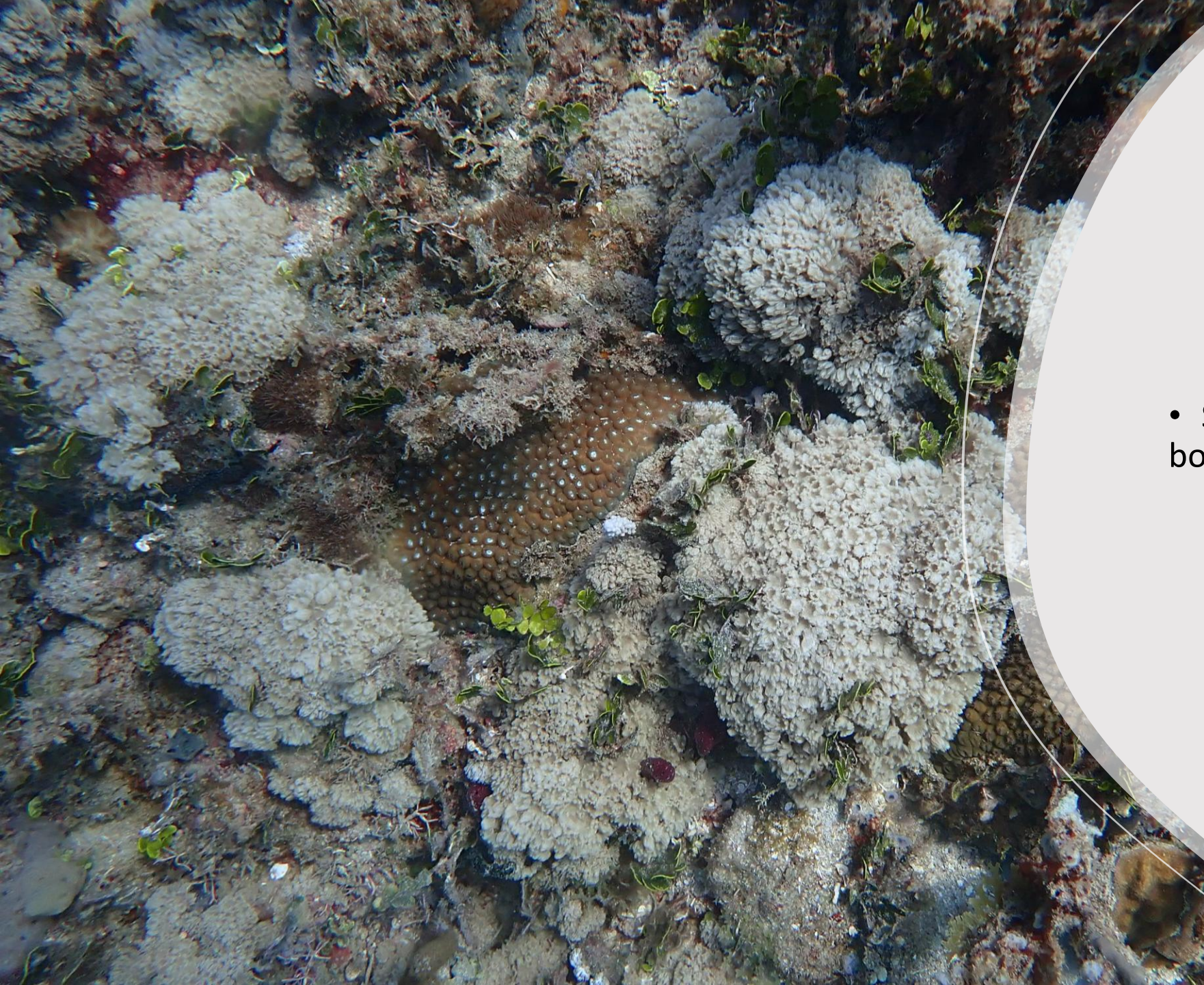






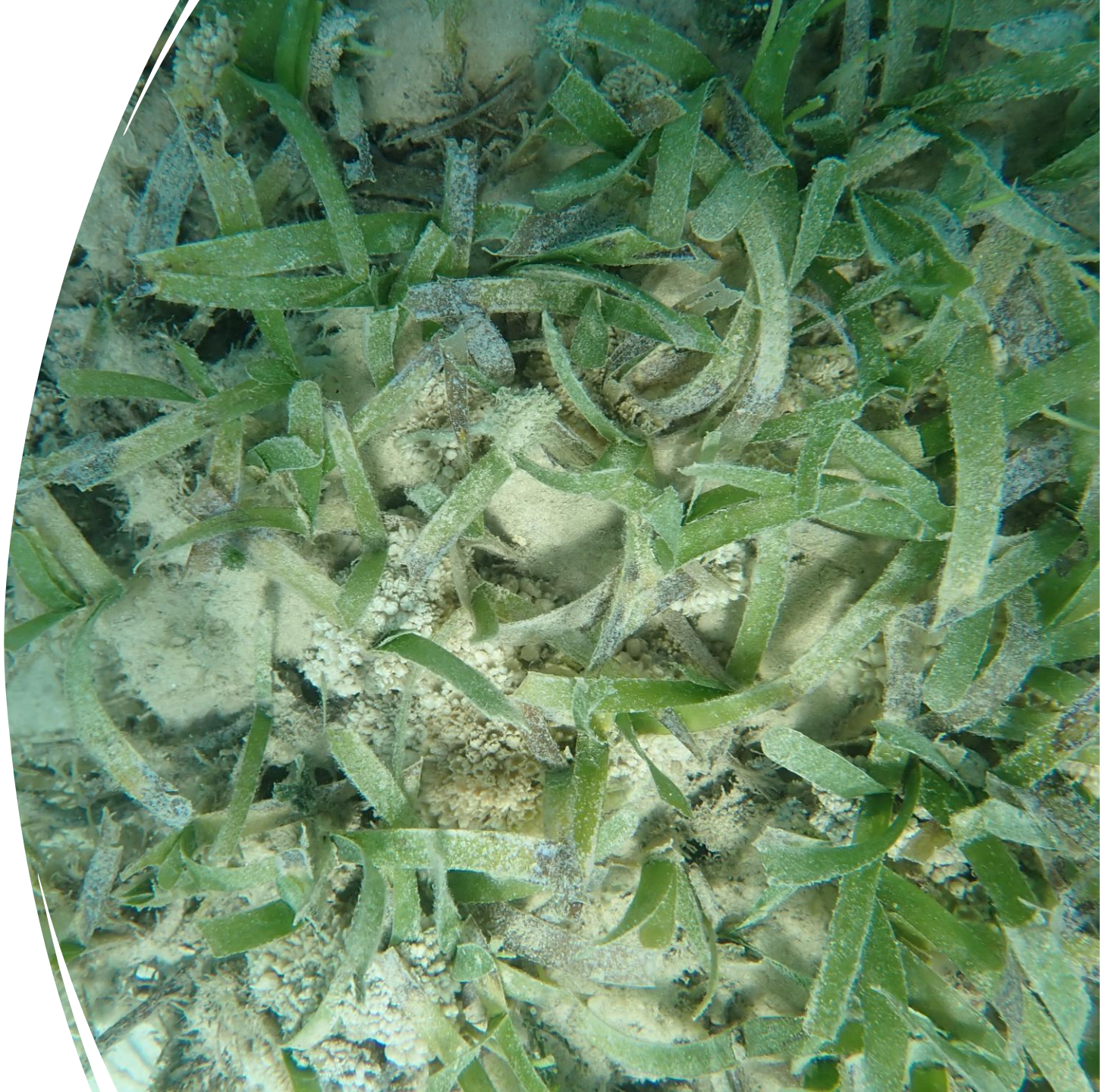


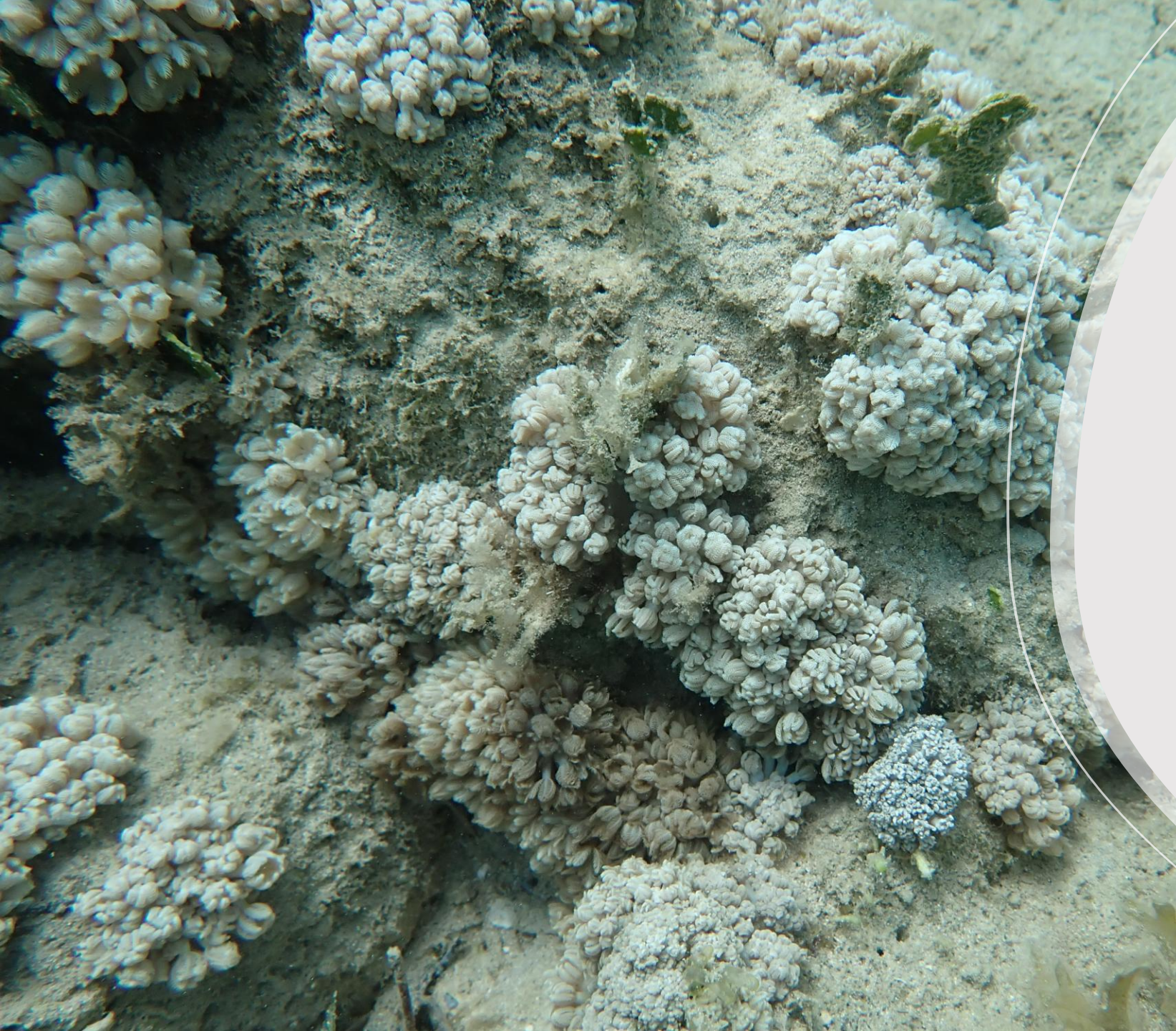
It is observed growing on all types of habitats and depth, exposed to different light intensities and wave action.



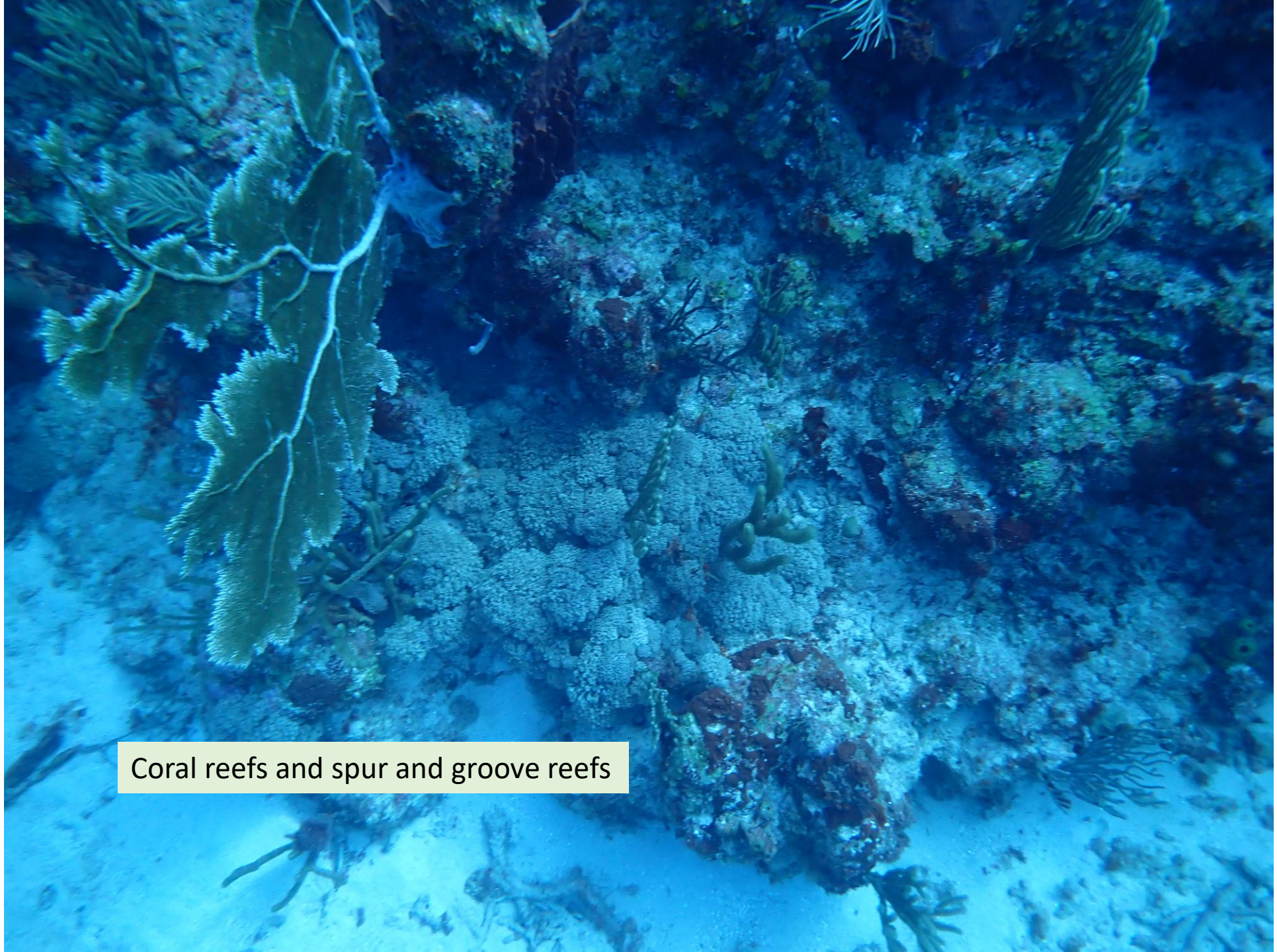
- Smothering corals, in hard bottom and algal plains

- In sea grass and in the leaf litter of seagrass, extremely hard to manage without affecting the ecosystem.





- Even fine sediment

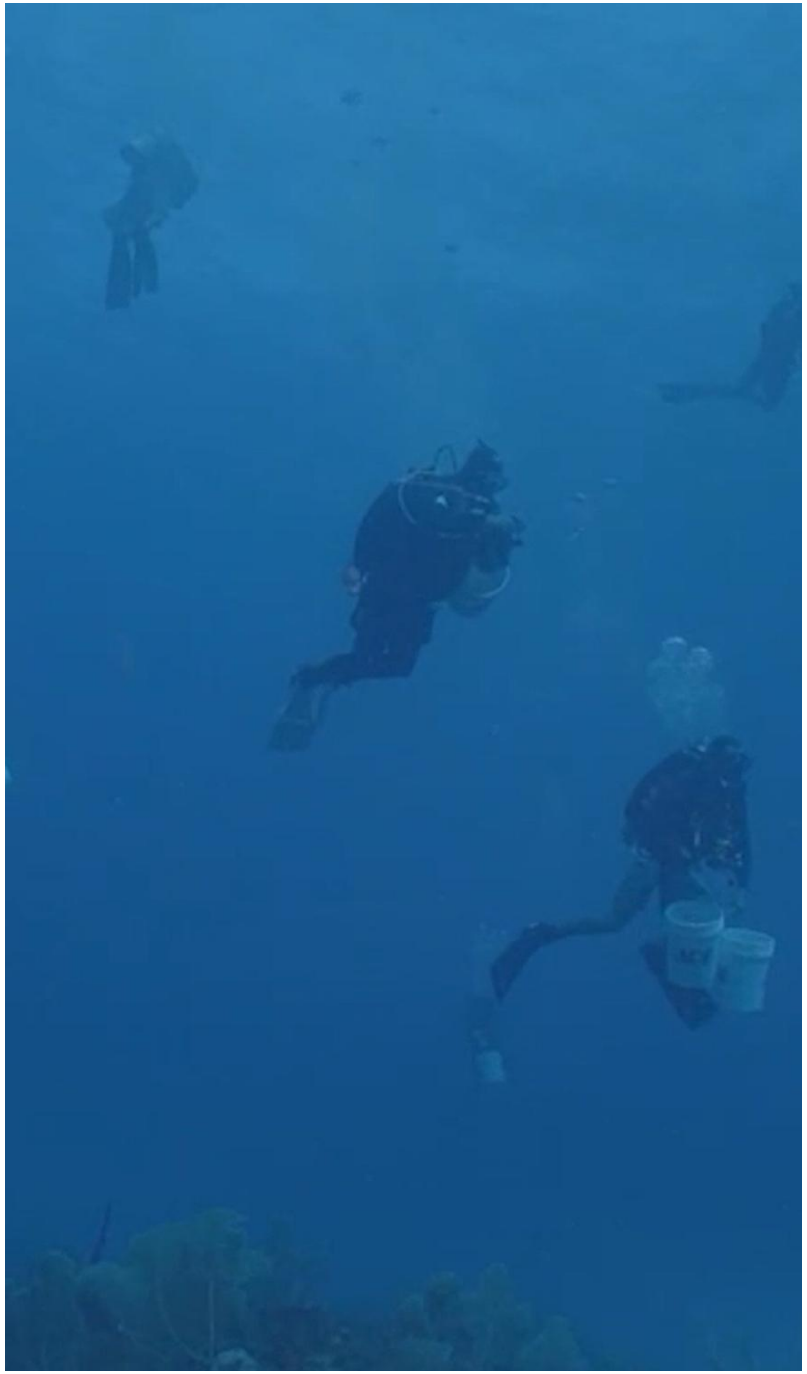


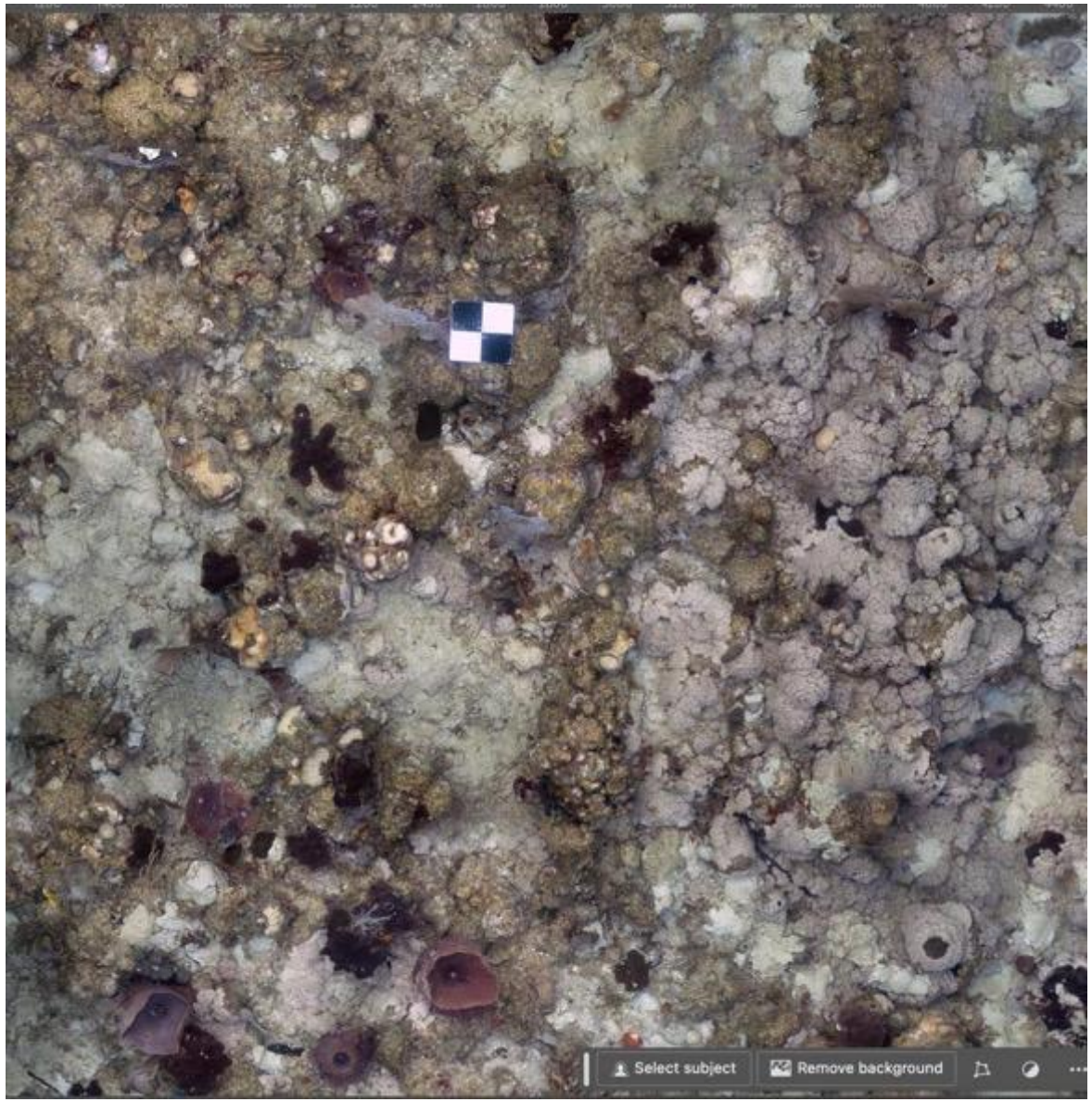
Coral reefs and spur and groove reefs

Removal essays

- Calcium hypochlorite-Do not kill it
- Vinegar- Do not kill it
- Chlorine- kills it but might trigger asexual reproduction
    - if used with a bag will kill everything
    - needs rocks or weights to hold the bag
    - not adequate if there are ES species present
- Manual removal - Not being used
    - very lengthy process
    - promotes propagation
- Cement- Method currently used

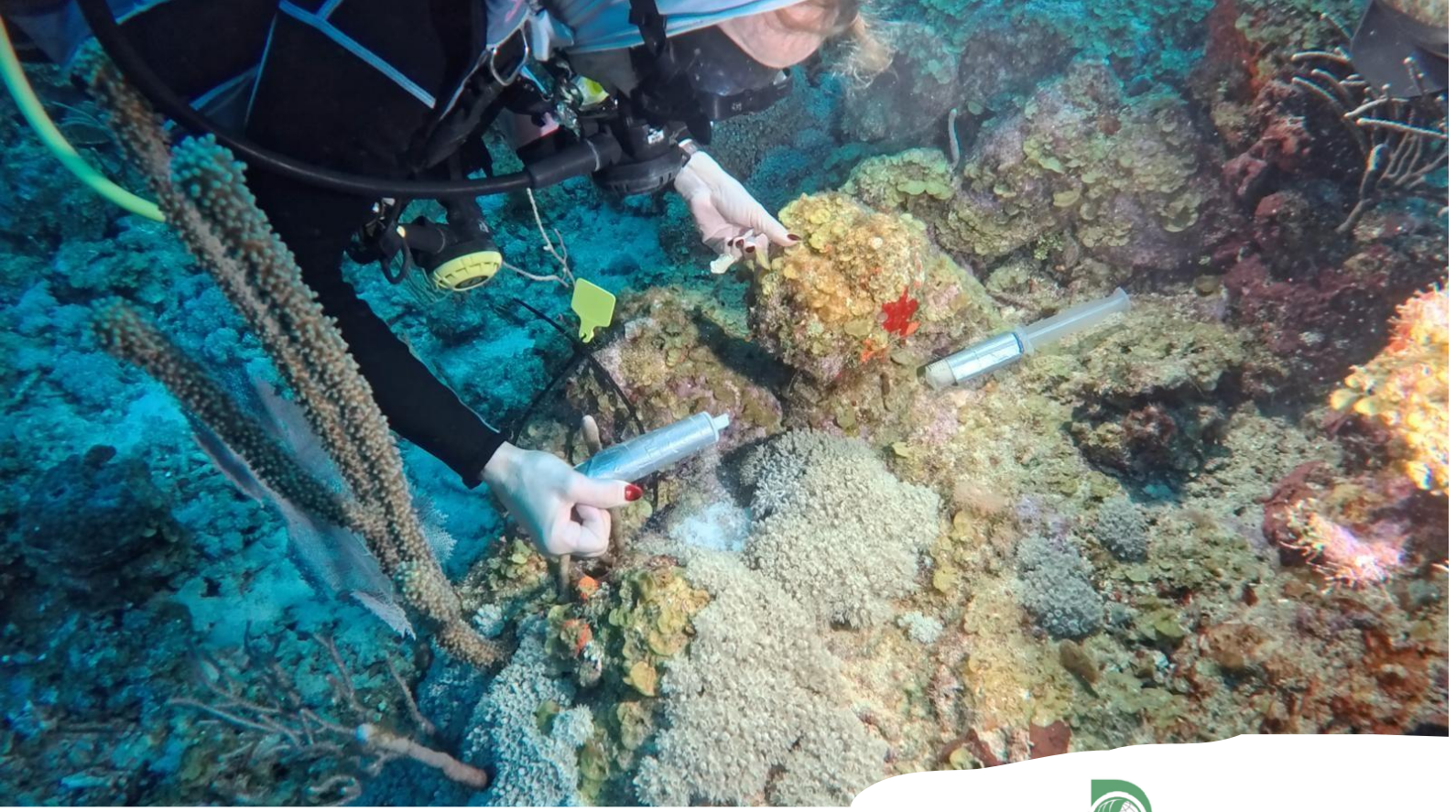
- Cement buckets are pre-mixed (2:1 cement and *marmolina* -marble sand mix))
- At the site it is mixed with sea water to adequate consistency





UR2 Before and after eradication with cement (Orthomosaic created by HJR Reefscaping)

Monitoring



Paste and NaOh

INVASIVESNET Management of Biological Invasions (2022) Volume 13 First Online Article

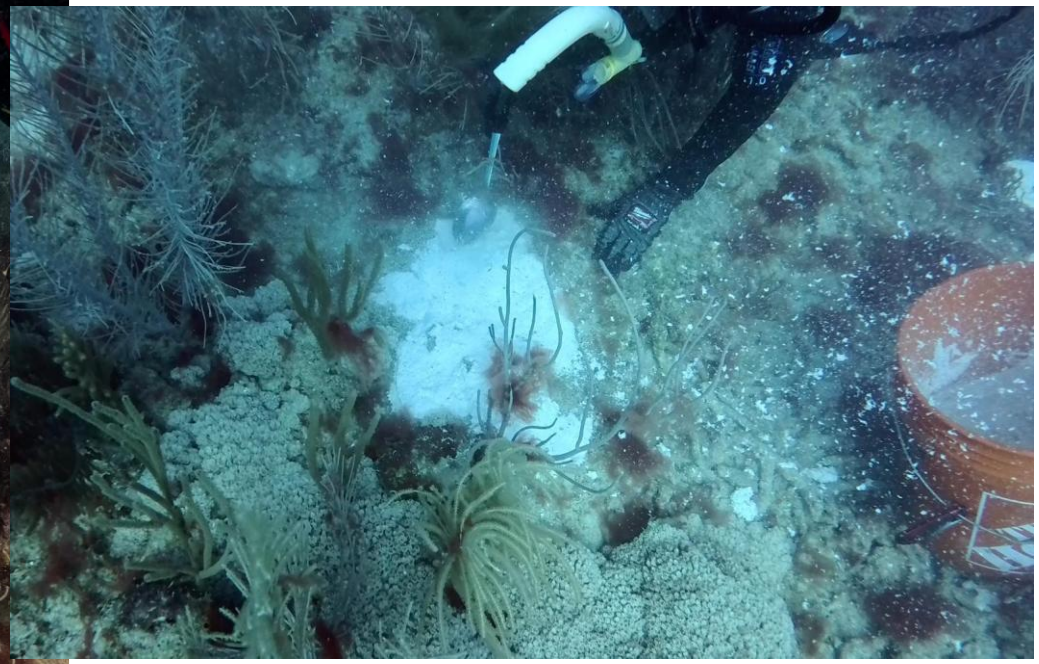
CORRECTED PROOF

Management in Practice

Invasive corallimorpharians at Palmyra Atoll National Wildlife Refuge are no match for lye and heat

Thierry M. Work[1,*], Renee Breeden[1], Robert A. Rameyer[1], Vernon Ray Born[2], Tim Clark[3], Jeremy Raynal[4], Chris Gillies[5], Julia Rose[6], Alex Wegmann[7] and Stefan Kropidlowski[3]

[1]U. S. Geological Survey, National Wildlife Health Center, Honolulu Field Station, PO Box 50187, Honolulu, Hawaii, USA
[2]U. S. Fish & Wildlife Service, Yukon Delta National Wildlife Refuge, Bethel, Alaska, USA,
[3]U. S. Fish & Wildlife Service, Refuges, PO Box 50167, Honolulu, Hawaii, USA
Present address: U. S. National Park Service, War in the Pacific National Historical Park, 135 Murray Blvd, Ste. 100, Hagatna, GU 96910, USA



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[5]*The Nature Conservancy, Suite 2.01, The 60 L Green Building, 60 Leicester Street, Carlton, Victoria 3053, Australia*
[6]*The Nature Conservancy, 923 Nuuanu Avenue, Honolulu, HI 96817, USA*
[7]*The Nature Conservancy, 830 S Street, Sacramento, CA 95811, USA*
**Corresponding author*
E-mail: *thierry_work@usgs.gov*

For 5 gallons:	
Glycerol- 12 pounds	$136.09
•Artcraft shop	
Sodium CMC- 6 ounces	$17.04
•Bakery shop	
Calcium carbonate- 20 pounds	$28.97
•Hardware store/ gardening/ agriculture	
Sodium hydroxide (lye) – 16 ounces	$16.63
•Artcraft shop	
TOTAL	$198.73

For 10 gallons	
Cement	$7
Marmolina	$4
TOTAL	$11

Last Updated: March 2026

INVASIVE SOFT CORAL NOVEL CONTROL METHODS

Heat Treatment

Publication: Work TM, Breeden R, Rameyer RA, Born VR, Clark T, Raynal J, Gillies C, Rose J, Wegmann A, Kropidlowski S (2022) Invasive corallimorpharians at Palmyra Atoll National Wildlife Refuge are no match for lye and heat. Management of Biological Invasions 13, https://doi.org/10.3391/mbi.2022.13.4.02

Equipment and supplies listed below are an improved, larger-scale version of the equipment and supplies used in the Work et al., 2022 publication. Improvements were made based on lessons learned.

Equipment and Supplies Used

- CK3 Model Hot Water Heater (custom designed by Custom Design & Fabrication; 2 units were made for Joint Base Pearl Harbor-Hawaii eradication efforts; ~2000 lbs per unit)
- Insulated hoses (to maintain temperature during delivery of hot water to target)
- Standard toilet plunger (attached to the "mouth" of the hose, to concentrate the delivery of hot water to target)
- Honda 7000-Watt Generator
- Diesel to power generator (~50 gallons)
- Personnel trained to operate heater

Temperature and Time Requirements

Effective eradication within 24 hours requires the following treatment parameters:

Species	Temperature	Minimum Duration
Unomia stolonifera	60°C	≥ 1 second
Capnella spicata	50°C	≥ 3 seconds
Anemonia manjano*	80°C	≥ 5 seconds
Rhodactis howesii	82°C	≥ 1 second

**Paste has also been shown to be effective against A. manjano; Hawaii DAR is also planning to control A. manjano with chlorine + tarping method which proved to be the most effective method based on experimental trials.*

Logistics Considerations

- CK3 Model Hot Water Heater is heavy at apx. 2000 lbs and will need logistics to lift onto a vessel or barge if needed for operation
- CK3 Model Hot Water Heater requires training to operate and maintain
- CK3 Model Hot Water Heater is dispensing very hot water and can be dangerous to operate
- CK3 Model Hot Water Heater and generator must be kept dry at all times and divers should not be on the same vessel as unit due to safety concerns
- A minimum of two vessels are needed for operation
- A 50 gallon diesel generator is sufficient to run the CK3 Model Hot Water Heater for a day

- Next steps:
- Continue report corroboration
- Implement 3-year proposal for eradication
- Evaluate new methods for eradication

- Nilda Jimenez, PhD
- njimenez@drna.pr.gov
- 787-645-5593

- **THANKS!!**