Removal of the invasive octocoral Xenia umbellata

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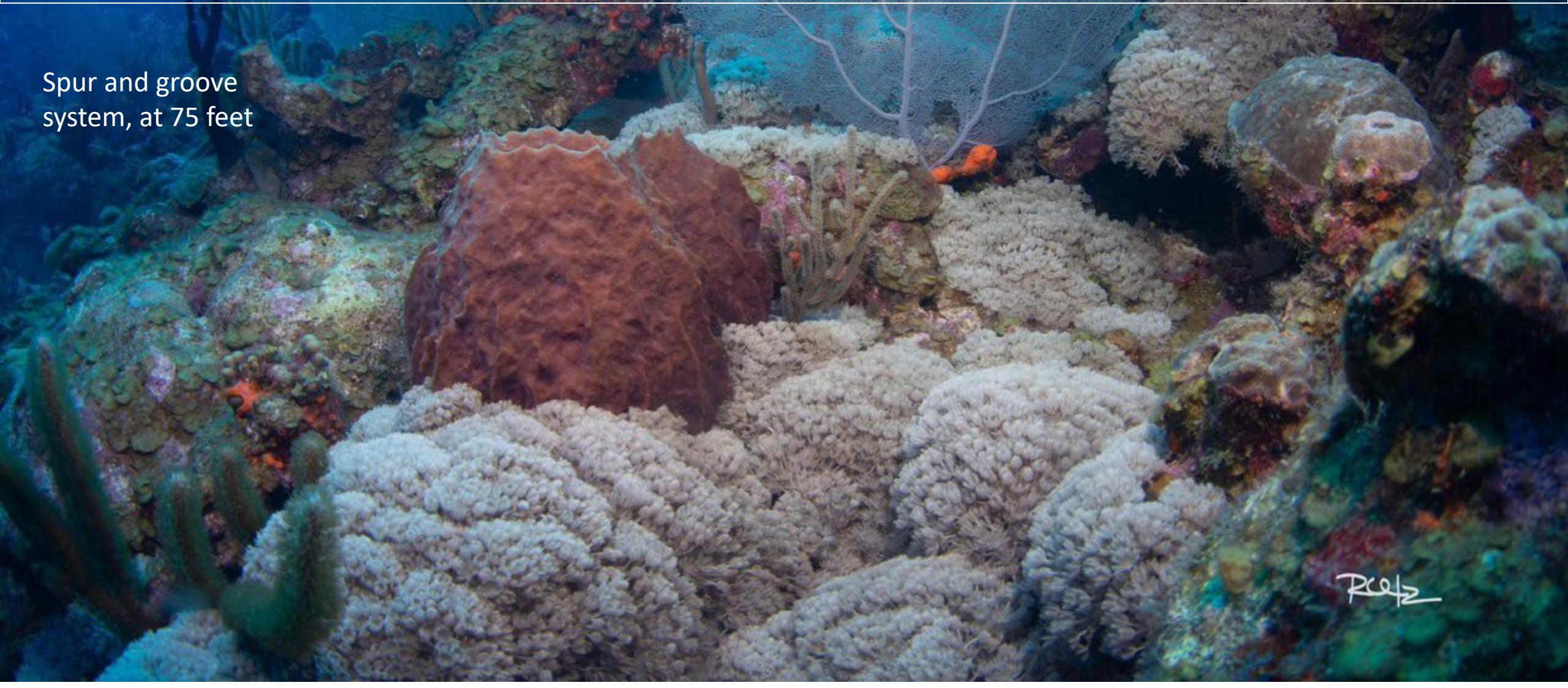
Xenia umbellata is from the Red Sea, and given it has not been reported in other areas, it is thought at present to have been introduced, accidentally or on purpose, by the aquarium trade in Puerto Rico. The first report was observed in October 2023 through a social media publication. It was not until February 2024 that the first location could be corroborated and act upon. The person that made the first report was unwilling to share the information.



Spur and groove system, at 75 feet

The pulsing corals has been observed overgrowing all organisms in Puerto Rico.

It overgrowth sponges, seagrasses and suffocates corals.

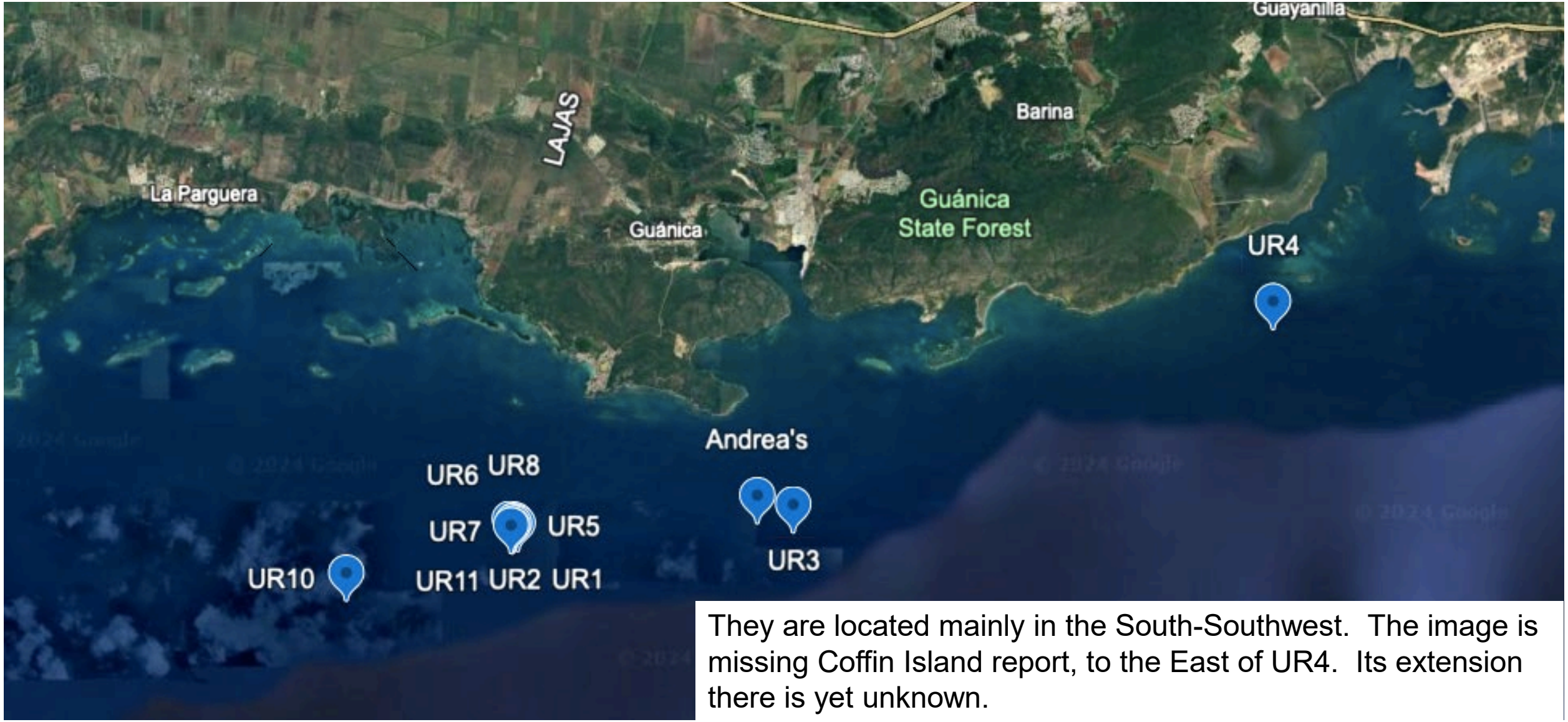
The largest patch found, at the shelf edge, believed to be maybe where the propagation began, shows almost 90% coverage. This could be projected to be the fate of the marine ecosystems if it is not managed rapidly.

It is a species known for being a totipotential species with great regeneration capacity.

Other countries with similar organisms

- In Venezuela *Unomia stolonifera* was introduced by the early 2000's. Unfortunately nothing was done for decades, and now it has smothered the marine ecosystems, reduced the biodiversity and affect the fisheries.
- In Cuba, we supported the genetic analysis of the species observed. It is *Xenia umbellata*. It has been reported for two years. Removal began by scraping, it, which resulted unsuccessful. Currently is being addressed by covering with tarp and chlorine. They are working on the original reported area, but they have additional reports which they have not been able to corroborate and keep fighting recolonization observed on the area.

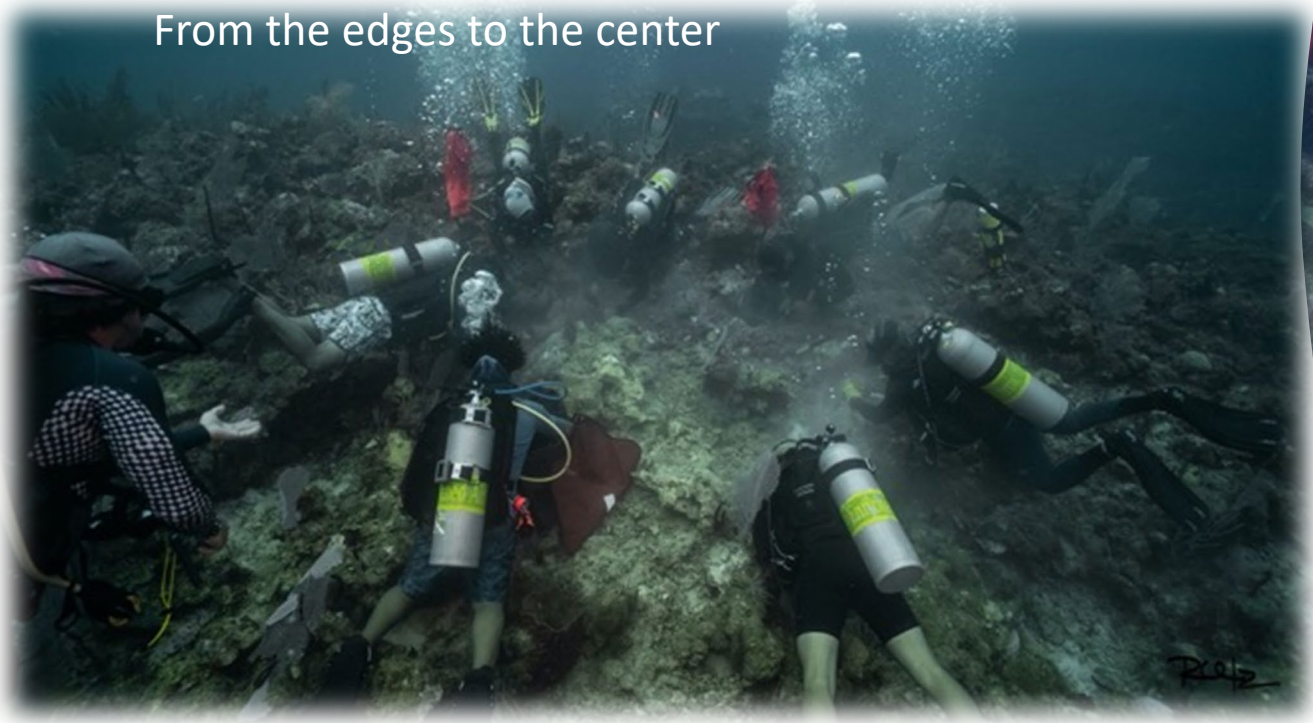
Patches identified in Puerto Rico



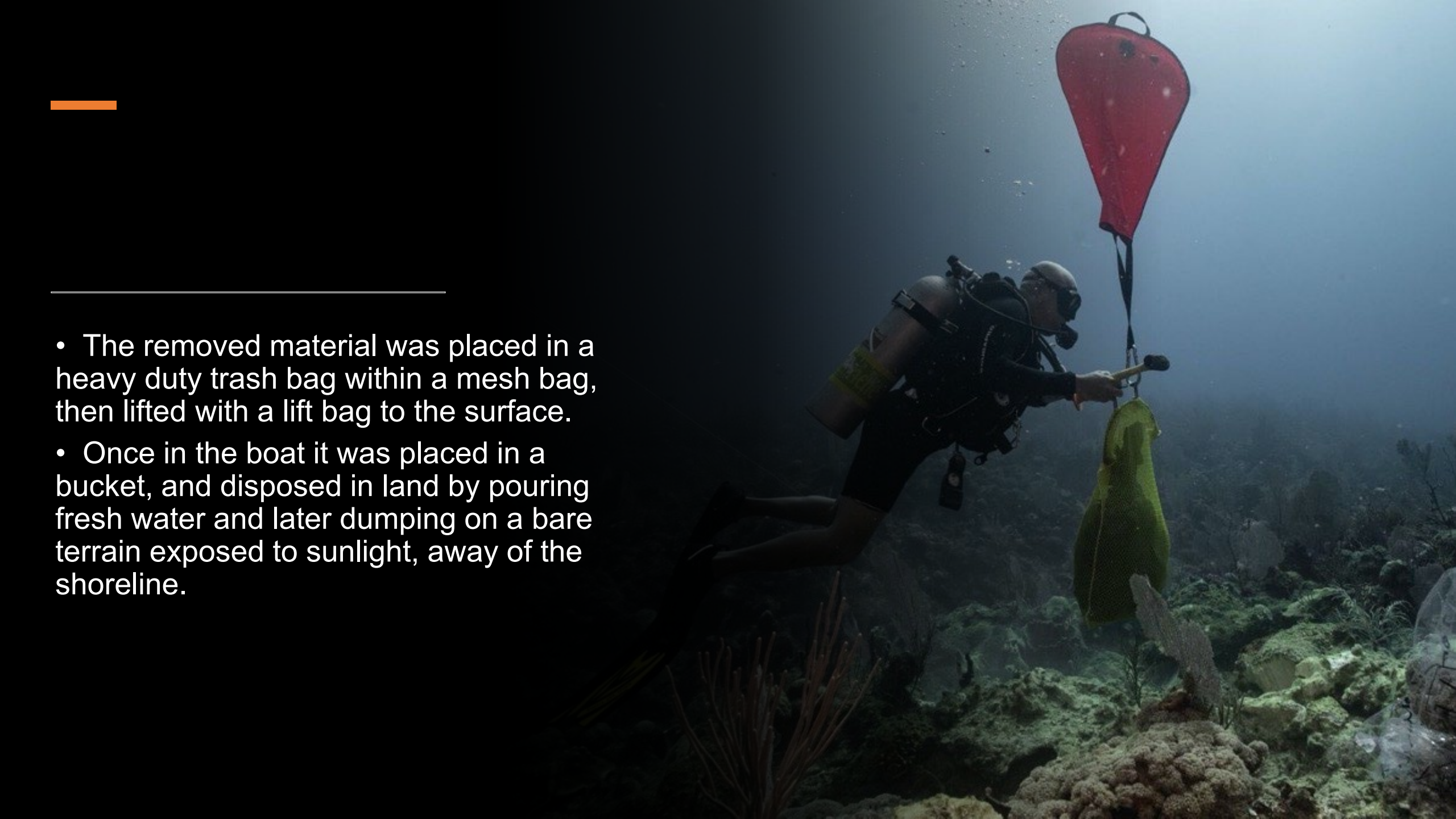
They are located mainly in the South-Southwest. The image is missing Coffin Island report, to the East of UR4. Its extension there is yet unknown.

Removal method

The first removal method was using hammer and chisel. The organism was removed with the substrate it was growing on, because of its totipotential regeneration ability.

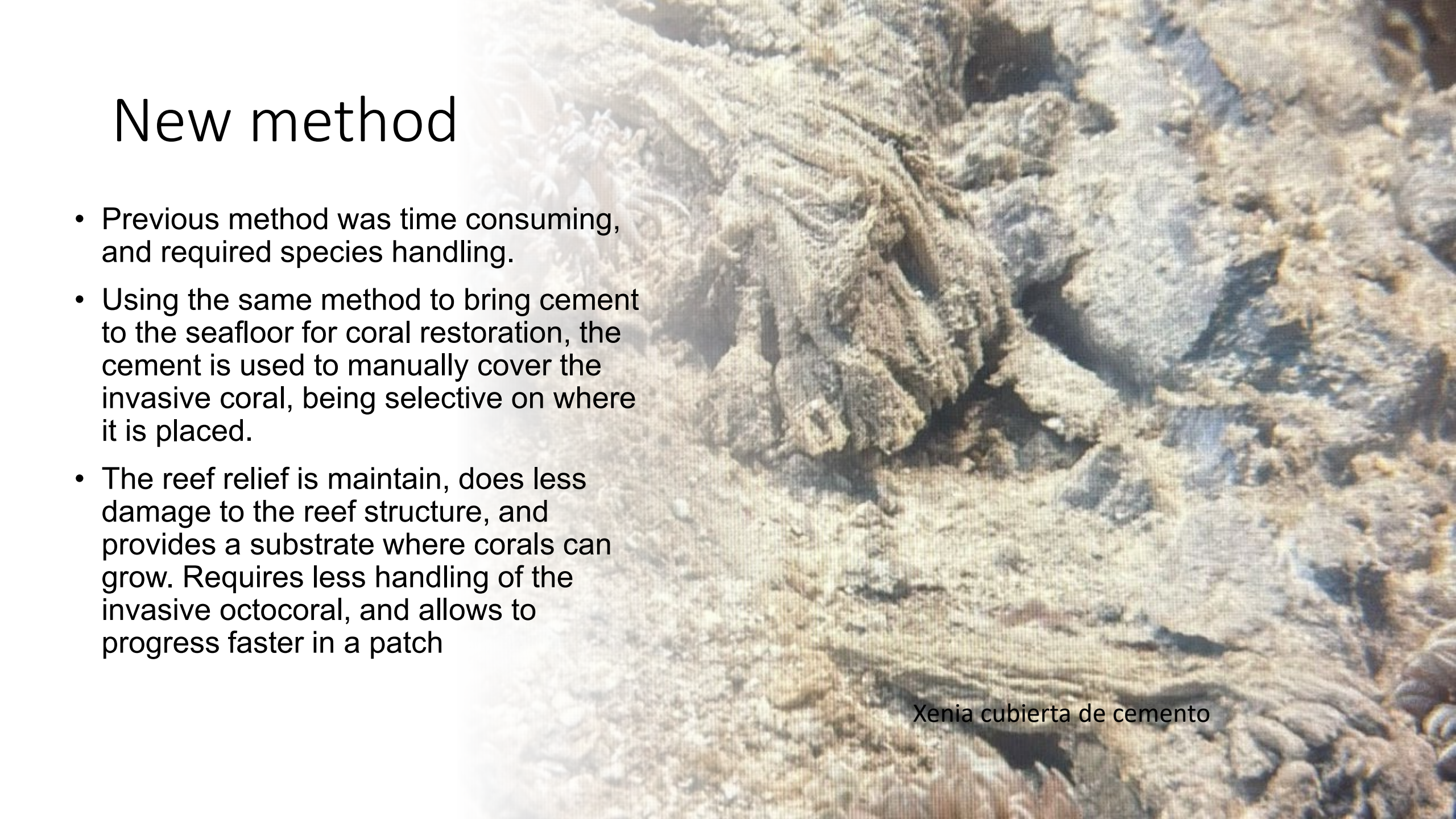


- The removed material was placed in a heavy duty trash bag within a mesh bag, then lifted with a lift bag to the surface.
- Once in the boat it was placed in a bucket, and disposed in land by pouring fresh water and later dumping on a bare terrain exposed to sunlight, away of the shoreline.



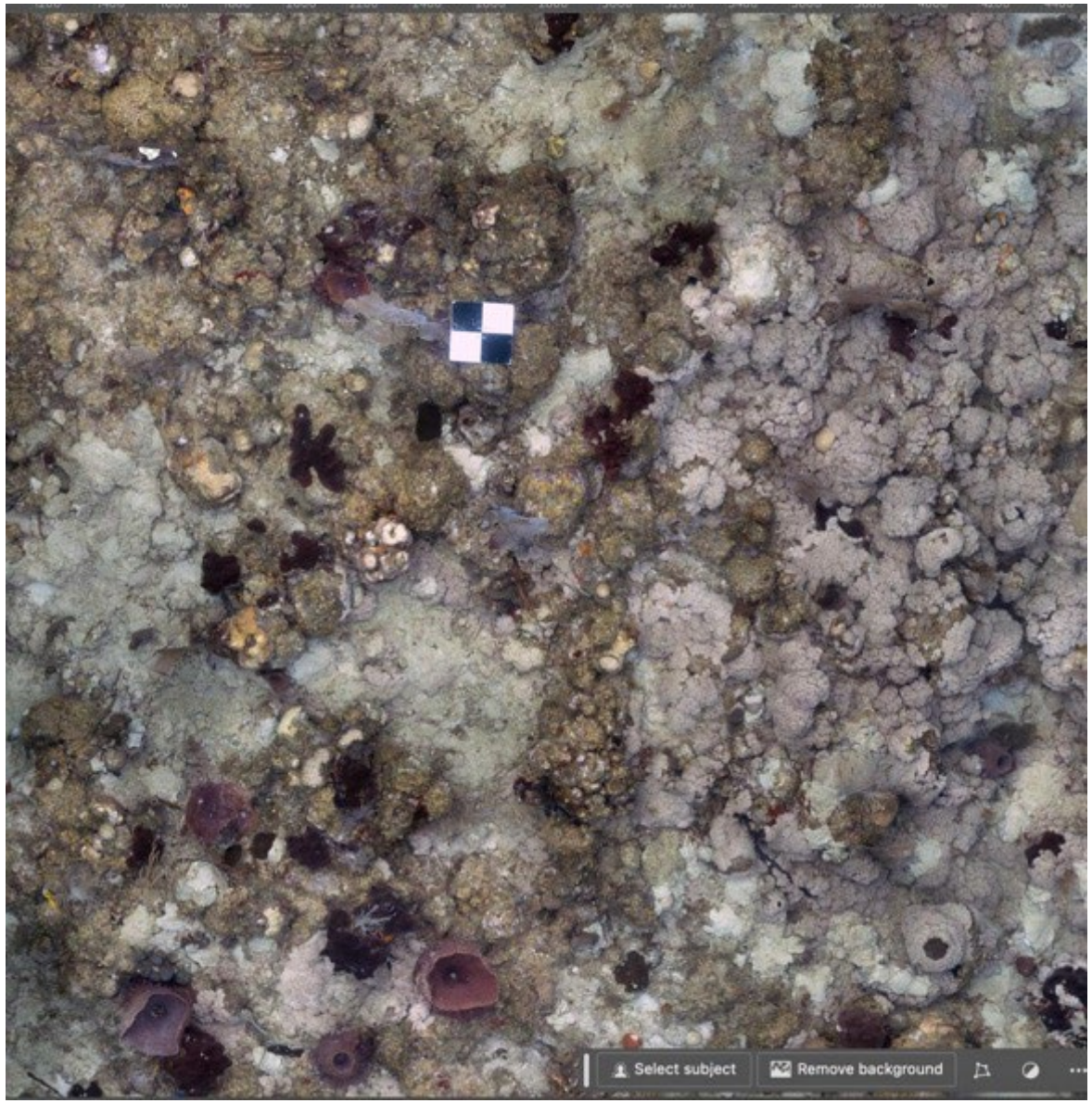
New method

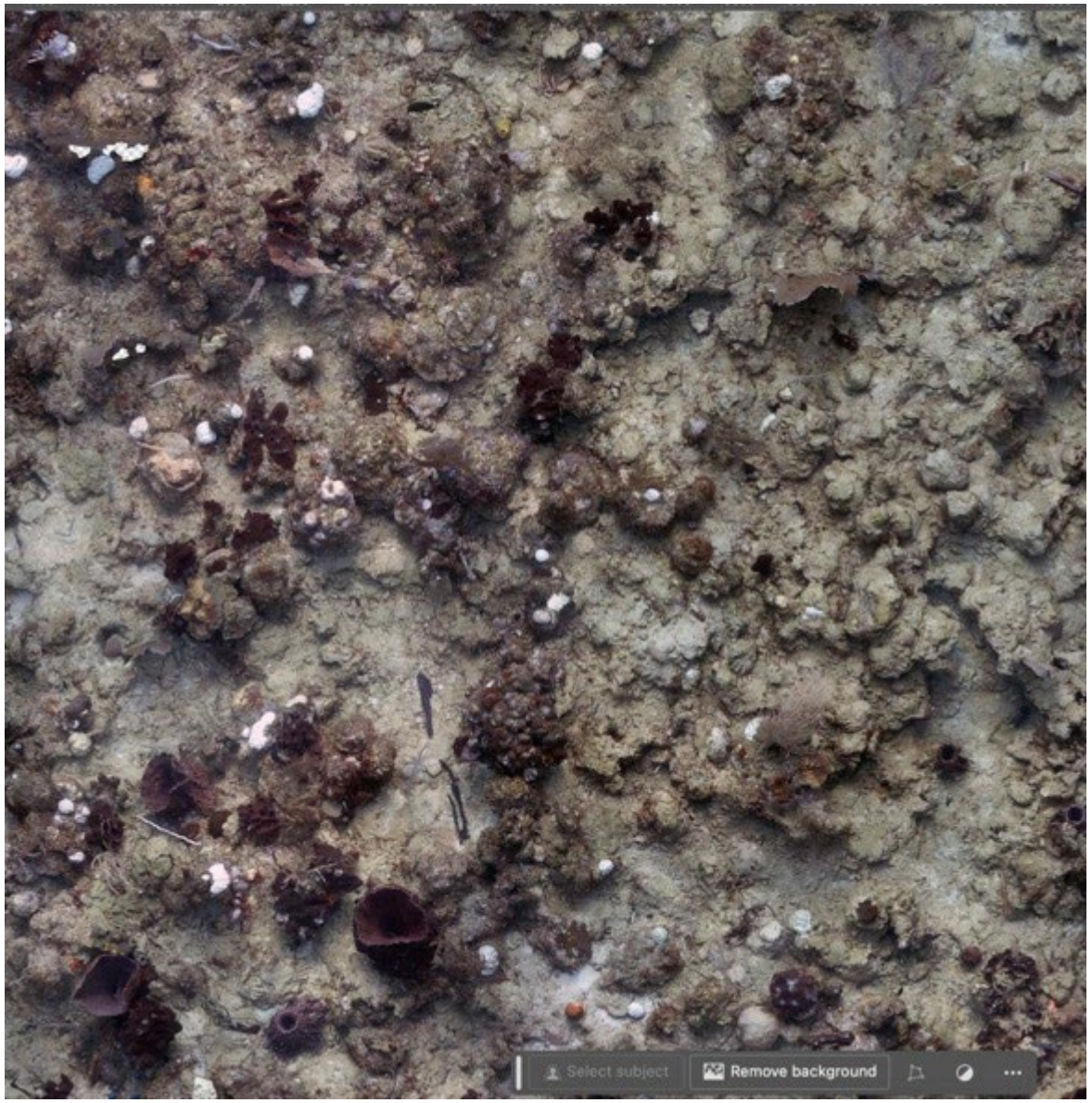
- Previous method was time consuming, and required species handling.
- Using the same method to bring cement to the seafloor for coral restoration, the cement is used to manually cover the invasive coral, being selective on where it is placed.
- The reef relief is maintain, does less damage to the reef structure, and provides a substrate where corals can grow. Requires less handling of the invasive octocoral, and allows to progress faster in a patch



Xenia cubierta de cemento

This method at present is consider a faster and successful method.



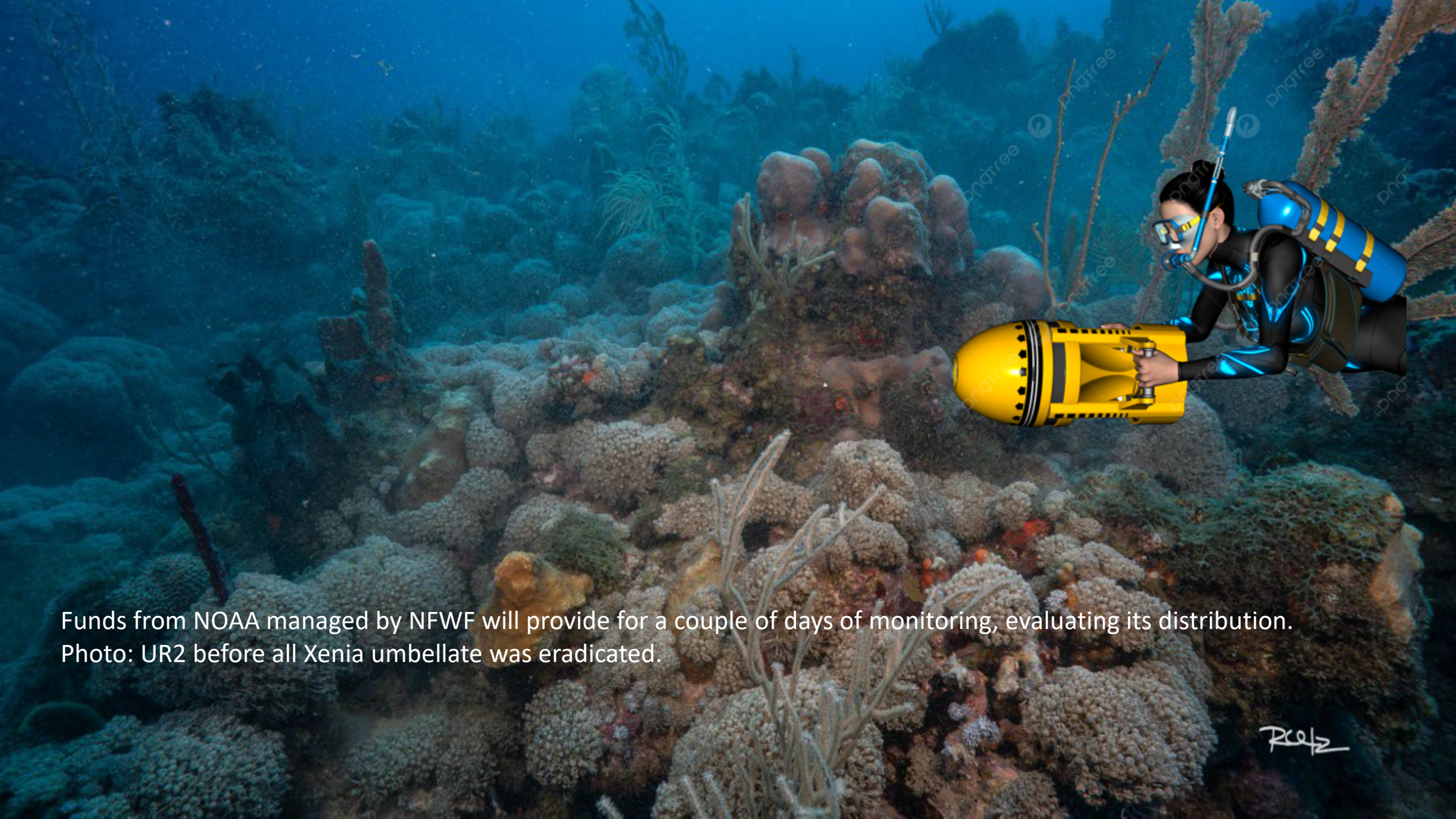


UR2 Before and after the eradication of *Xenia umbellata* using cement (Orthomosaic done by HJR Reefscaping) with no recolonization observed

Identified patches

ID	Lat	Lon	Area m^2	Comments	Days for removal	Depth
UR1	17.895820°	-66.972770°	± 5.25	Eradicated	10	75
UR2	17.895780°	-66.973600°	± 35	Eradicated	19	65-75
UR3	17.900010°	-66.908390°	± 1050		TBD	75-120
UR3b	17.90039	-66.90756	± 2400		TBD	75-130
UR4	17.945090°	-66.796140°	± 72		38	75-80
UR5	17.896520°	-66.973380°	± 180		7	80
UR6	17.896780°	-66.974620°	± .5		1	75
UR7	17.895340°	-66.973990°	± 1		1	75
UR8	17.896260°	-66.973850°	± .5		1	75
UR9 (Andrea's)	17.90205°	-66.91678°	± 1	Eradicated	1	40
UR10 veril sec 6	17.88482°	-67.01283°	± 176		20	80
UR11	17.895390°	-66.974330°	TBD		1	75
Coffin Island			TBD		TBD	6

UR1 was eradicated using the original method, then we change to cement. You could see the difference between the time it took to eradicate UR1 vs UR2. We are currently working on UR5. With funding from NOAA, managed by NFWF, we still have a couple of days for removal hoping to complete UR5.



Funds from NOAA managed by NFWF will provide for a couple of days of monitoring, evaluating its distribution.
Photo: UR2 before all Xenia umbellate was eradicated.


The patch identified as UR 3 was recently evaluated. We discovered is the largest one at present, at depth range of 75’ to 130’. The pending monitoring field work is expected to use technical divers to evaluate more in depth the site. The invasive octocoral cover is almost 90%. We still don’t know how to manage it and have no funds for this action.
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Daily budget~$4,112 for cement erradication

Item	Quantity	Cost	Total
Bote de buceo	1	$1,100/día	$1,100
Buzos	9	300/día	$2,700
Tanques de Nitrox	18	$13	$234
Sacos de cemento	9	$7	$63
Sacos de marmolina	5	$3	$15

Priorities:
Genetic analysis to evaluate introduction path and propagation pattern
Continue evaluation of distribution
Continue eradication
Control the spread of the identified patches

There is still hope, photos taken from the areas we have eradicated the invasive octocoral

Supporting organizations

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