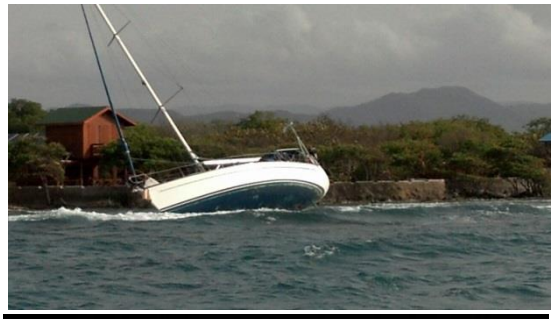
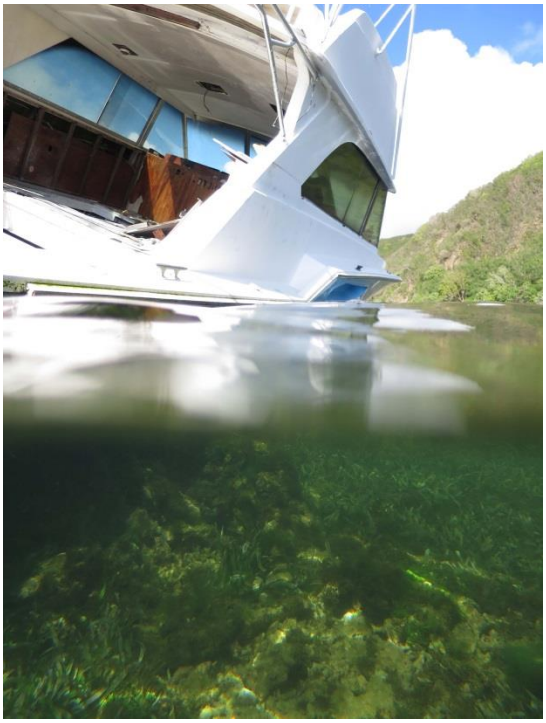
Response to Physical Impacts on Coral Reefs in Puerto Rico and the USVI

2015 Report





US reefs are impacted by 3 - 4 large groundings and hundreds of small incidents annually. In the aftermath of groundings, impacted corals are often broken, dislodged, or flipped over. These fragments are subject to abrasion, scour, and sedimentation, which ultimately result in death. Unchecked, these damages can result in additional reef loss and instability. However, if dislodged fragments can be collected and stabilized shortly after physical impacts then the probability of survival increases substantially (>90%).

Response to physical impacts is a Jurisdictional Priority in both PR/USVI, an identified capacity gap in both jurisdictions, and a priority element of the draft Acropora recovery plan. Puerto Rico and the USVI have acknowledged that because of internal limitations and the need for quick and flexible response that more robust action on the part of NOAA was necessary to help stem the unchecked and unnecessary coral losses that were occurring after physical impacts.

In 2009, an emergency response support contract with a local firm was set up. This in combination with the RC's on-the-ground presence in the region has enabled NOAA to address the numerous impacts that were occurring annually. The support contract provides NOAA, PR DNER, and USVI DPNR support to have a functional emergency restoration. Between 2009 - 2015, the RC has performed restoration at 39 sites in PR and the USVI and have reattached over 18,000 corals (Table 1). A notification network along with a form to report grounding incidents (Appendix 1) has been set up with the US Coast Guard, salvers, and the local communities so that we are notified immediately of impacts. This notification system has allowed us to often get personnel onsite while the vessel is still aground on the reef. In many of these cases, our team has been able to provide feedback to the salvers to minimize further impacts during vessel

extractions, saving countless corals. On multiple occasions we have found that the salvers preferred extraction path would have resulted in significant additional damage and on more than one occasion prevented entire thickets of *Acropora spp.* from being destroyed. A report from one of the incidents in 2015 can be found in Appendix 2.

Funding for this work was provided from NOAA's Restoration Center, the Coral Reef Conservation Program, Protected Resources Division, Assessment and Restoration Division and the South East Regional Office. In addition to physical impact response, the support contract that has been set up has also served as a vehicle for funding additional restoration, research and monitoring activities in the region. Funds have been further leveraged by getting private parties and insurance companies to directly cover the cost of emergency restoration at multiple sites. This was only possible because we had the capability to do immediate post-grounding site assessment and an approved/permitted contractor. With all of the restoration work that has been done, there still is not enough funding to address all of the reported impacts.

Table 1: Summary of NOAA RC grounding response activities since 2009. * In 2014, an additional 8 Caribbean coral species were included as Threatened on the ESA list.

Year	Total # of Incidents Reported	On-Site Confirmation	Restoration Implemented	# Corals Reattached	% of Restored sites with ESA coral Damage *
2009	51	25%	7	9,074	43%
2010	32	47%	3	1,045	33%
2011	55	75%	7	915	57%
2012	36	50%	4	2,835	50%
2013	32	31%	3	214	100%
2014	42	48%	12	2,132	67%
2015	51	33%	3	1,919	100%
Total/ Average	**299**	**44%**	**39**	18,134	**64%**

Appendix 1

Natural Resource Trustee Incident Report

This form is for reporting incidents (vessel groundings, anchor damage, marine debris, plane crashes etc.) to NOAA that have the potential to cause physical damage to marine resources (corals, seagrass, mangroves, etc).

For Immediate Assistance Please Call: 787-667-7750 or 727-647-6538 (NOAA)
941-538-2476 (PRDNER) or 340-774-3320 (USVI-DPNR)

Please call-in all incidents requiring immediate assistance and incidents involving commercial vessels.

Email Report to: PRVI.Trustee@NOAA.gov

Vessel / Incident Information

Vessel Name: MAMBO Incident Date: 22JUL15 Time: 1814Z

Vessel Description: LUXURY YACHT Type: Rec. Other Length: 112 Draft: ____

Incident Type: Vessel Taking on Water Reg. #/IMO#: WDF9146 Time Freed: 1817Z

Incident Description: VESSEL CALLED MAYDAY REPORTING THEY HIT THE REEF AND WERE TAKING ON WATER

Natural Resource Affected (coral, seagrass, rocks): ROCKS, CORAL

Pollution Status/Notes: NONE

Fuel Onboard (type/qty:) _____ Vessel Cargo: RECREATIONAL

Incident Location

Geographic Location: PACKET ROCK 0.7 SOUTH OF ST THOMAS Nearest Town: _____

Lat/Lon (Initial): 18-18.05 N, 064-53.19 W Notes: PACKET ROCK

Lat/Lon (Alt): _____ N, _____ W Notes: _____

Please attempt to gather and note if position is exact grounding location, any pertinent details, position type (GPS, Chart Plot, ADF) and source (vessel, CG, FURA). For large vessel groundings please request a GPS position of both the bow and stern of the vessel, Please request multiple bow/stern positions during extraction.

Vessel Route (from/to): _____

Location Notes: _____

Reporting Source / Owner / Operator Information

Reporting Source: DONALD VOGT Primary Phone: 954-383-5404 Alt Phone: _____

Vessel Operator: DONALD VOGT Primary Phone: _____ Alt Phone: _____

Operator Address: _____

Vessel Owner: _____ Primary Phone: _____ Alt Phone: _____

Owner Address: _____

Additional Information

Salvage Company: SEA TOW Primary Phone: 340-777-4869 Alt Phone: _____

Salvage Status/Notes: VESSEL WAS ABLE TO MAKE IT TO DRY DOCK AT SUB BASE IN ST THOMAS CRUM BAY

SAR Status/Notes: EVERYONE WAS OK

Recommendations*/Additional Notes: _____

**tug cable floats, minimize cables touching bottom, minimize vessel movement, confirm safe exit path)*

Report Information

Entity Filling Out Report: U.S.C.G. Name: OS2 ADAM JOHNS

Email: adam.d.johns@uscg.mil Primary Phone: 787-289-2041 Alt Phone: _____

Submittal Information

Please fill-in all appropriate and available information to the maximum extent possible without delaying notification and email to PRVI.Trustee@NOAA.GOV or Fax to 1-888-521-6622. Feel free to submit additional forms as more information becomes available. Email and Fax notifications will be auto forwarded to Puerto Rico DNER & US Virgin Islands DPNR.

E-Mail Form

This form is designed to facilitate communication between NOAA and the Reporting Source and does not constitute formal notification when required by the National Contingency Plan.

Appendix 2

Successful collaboration between government agencies, NGO's and volunteers to rescue corals and minimize additional impacts after the M/V Aubi grounding

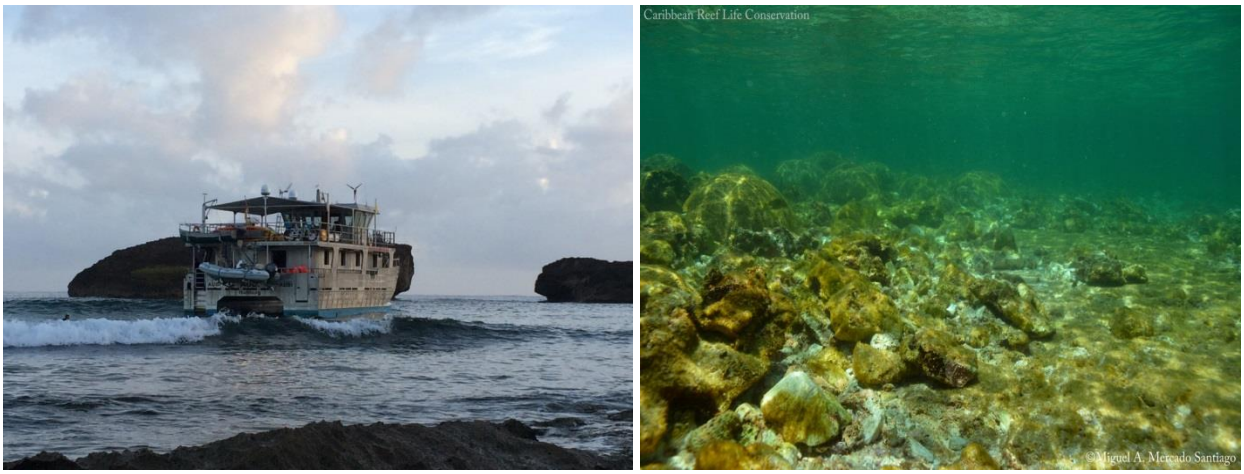


Figure 1: Left Photo: M/V Aubi aground near La Cueva del Indio in Arecibo, PR. Right Photo: Section of the M/V Aubi grounding site showing the flattened impacted reef on the right, rubble berm in the middle and unimpacted coral to the left of the berm. (Photo on right: Miguel A. Mercado)

Background

The M/V Aubi, a 49' powered catamaran, ran aground on a coral reef the evening of 14May2015 in the vicinity of La Cueva del Indio, Arecibo, Puerto Rico (Figure 1). The owner/operator apparently became confused while navigating the north coast of Puerto Rico at night enroute from Dominican Republic to San Juan, PR and became grounded on a reef within a newly established Puerto Rico Marine Reserve. There are high densities of corals in this area including thickets of *Acropora palmata* which is listed as Threatened under ESA (Figure 2). The 8mm thick, aluminum hulls of the vessel contained integrated fuel tanks and the USCG ordered the fuel removed prior to allowing the vessel to be removed to remove all risk of oil spill. Ultimately 1,500 gallons of fuel were removed from the vessel the evening of 15May2015 and the vessel was pulled free from the reef at 0700 16May2015 by multiple Sea Tow vessels. NOAA/NOS ERD & ARD and NOAA/NMFS SERO & RC were all closely coordinated during the initial incident response in support of the USCG's successful prevention of an oil spill.

Figure 2: Unimpacted reef adjacent to the M/V Aubi grounding site.

Figure 3: Reef flattened by M/V Aubi on left (Photo by Miguel A. Mercado). Reattached corals on the right.

Coral Impacts

While an oil spill was prevented, the grounding resulted in significant impacts to coral reef resources flattening 366m^2 of reef, damaging thousands of medium to large corals which were broken, dislodged, buried, or destroyed, and creating two large berms of coral and rubble (Figures 1 and 3). The majority of corals impacted were *Psuedodiploria* (Brain Coral) and *A. palmata* (Elkhorn). During the 24 hours the vessel was aground the two of the vessel hull's slowly shifted towards the south grinding up the reef slowly as it moved. This created two large berms of coral and reef rubble that demark the center and southern edge of the site. The berms were 3' tall and 4-5' wide and about 40' long and had many live but buried corals within them. The grounding also generated a significant amount of loose rubble that ranged in size from a few inches to multiple feet. The rubble while typically a secondary matter at grounding sites posed an immediate risk since it had buried many live corals and, when mobilized by swells, would impact areas containing healthy colonies of ESA listed *Acropora palmata* (Elkhorn) and other species (Figure 4). The damage at this site, from a 49' catamaran, is on par with damage seen at some of the larger tanker grounding sites and certainly the worst coral damage from a recreational vessel seen in many years.

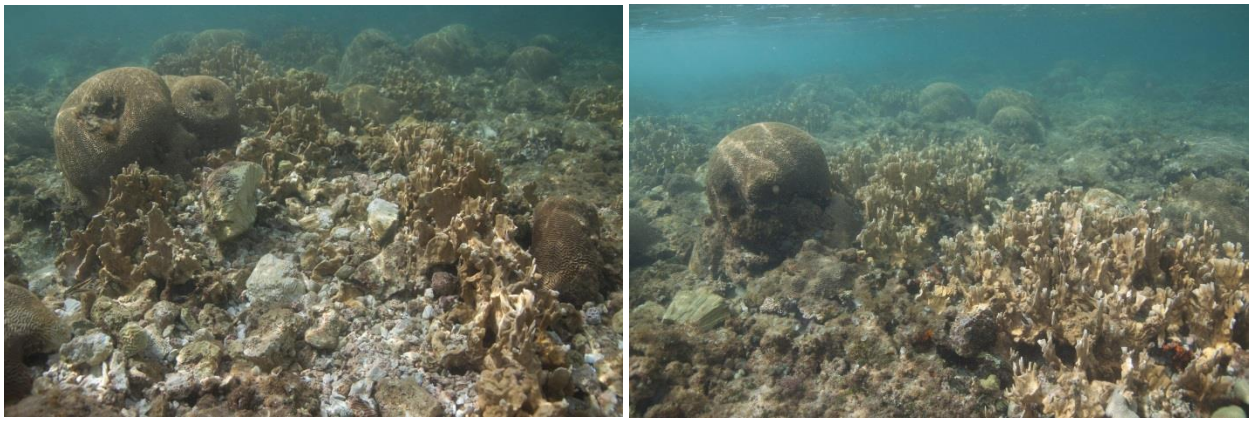


Figure 4: Reef impacted by rubble movement on left. Reef not impacted by rubble movement on right.

The weather forecast was calling for the seas to increase a couple days after the vessel was removed. Therefore, immediately following the removal of the vessel, over 20 people worked together for 2 days to cache corals in deeper water and remove rubble before the swells increased. The group included personnel from NOAA's Restoration Center, Puerto Rico DNER, Sea Ventures Inc., NGO volunteers from Caribbean Reef Life Conservation, VIDAs and Yo Amo al Tinglar, and members of the local community. The team worked long hours in a very complex shallow and high energy environment. They

were able to salvage over 800 medium (<1m) to large (>1m) coral colonies including smaller fragments of colonies) and move them into deeper water adjacent to the site for temporary holding. An additional ~75 very large colonies of *Diploria* were righted but unable to be moved due to size. Using buckets and their hands, the team filled kayaks with corals and rubble to transport them offshore into deeper water. They were able to fill 50 loads of rubble into open kayaks/small boats and float them further offshore into deeper water to a site that PRDNER approved for dumping (Figure 5).

Emergency Stabilization

Once the seas improved again, NOAA RC mobilized a restoration crew led by Sea Ventures using an emergency response fund set up with support from SERO, CRCP, and ARD. Approximately 1,500 corals, including 100 fragments of *Acropora palmata*, were reattached and $10m^3$ of material were removed from the site during the restoration (Figure 5). Thanks to the efforts by everyone involved, impacts to coral resources were minimized after the grounding.

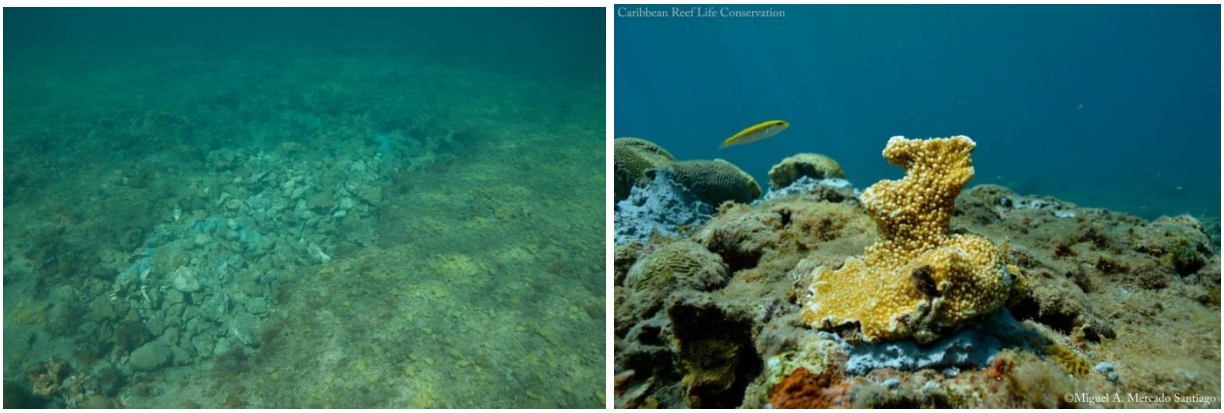


Figure 5: Deeper offshore depression site filled with rubble from the M/V Aubi groundings site on left. Reattached fragment of *A. palmata* reattached on right (Photo by Miguel A Mercado).