

TITLE: Challenges of OPA and NMSA Related Responses in the National Marine Sanctuary of American Samoa: NO.1 JI HYUN

AUTHORS: Lisa C. Symons<sup>1\*</sup>, Joseph Paulin<sup>2</sup>, Atuatasi Lelei Peau<sup>2</sup>

<sup>1</sup>Office of National Marine Sanctuaries, National Oceanic and Atmospheric Administration, Silver Spring, MD, 20910 USA

<sup>2</sup>National Marine Sanctuary of American Samoa, Office of National Marine Sanctuaries, Tauese P.F Sunia Ocean Center, P.O. Box 4318, Pago Pago, AS 96799

**\*Correspondence:** Lisa C. Symons' Office of National Marine Sanctuaries, National Oceanic and Atmospheric Administration, 1305 East-West Highway, Silver Spring, MD, 20910 USA  
[lisa.symons@noaa.gov](mailto:lisa.symons@noaa.gov)

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Fa'a-Samoa (the Samoan way) is a living tradition and continues to define the Samoan way of life. It is the foundation of Polynesia's oldest culture - dating back some 3,000 years. Fa'a-Samoa is interconnected with Samoan lands and waters and by sharing the intact and vibrant traditions, values, and legends that connect the Samoan people to the land and sea, the local community plays an INTEGRAL role in the protection and preservation of natural and cultural resources of the area. Fa'a-Samoa places great importance on the dignity and achievements of the group rather than individuals.

On April 14, 2016, the 62 ft. FV NO1 JI HYUN lost the main engines and grounded off the west side of Aunu'u Island in the National Marine Sanctuary of American Samoa (NMSAS). This area is of ecological and cultural significance for the local residents using hook-and-line, casting nets, spearfishing (non-scuba assisted) and other non-destructive fishing methods including those traditionally used for sustenance and cultural purposes such as gleaning, `enu and ola. The

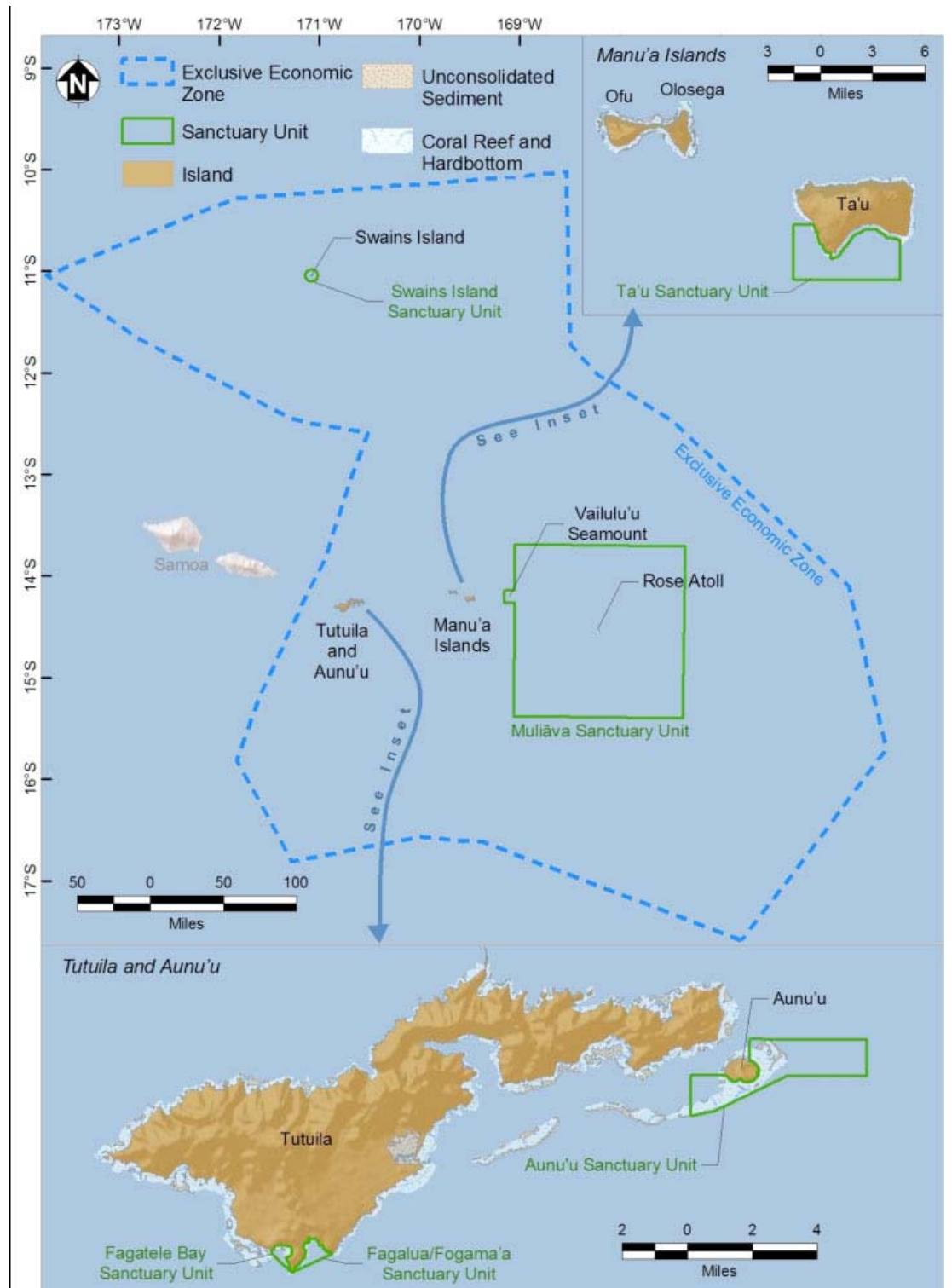
village on Aunu'u was extremely wary of inclusion of the waters of Aunu'u in the expansion of the sanctuary being concerned about loss of control of their traditional uses of the nearshore environment.

In what became an extension of Fa'a-Samoa, the United States Coast Guard (USCG), the National Oceanic and Atmospheric Administration (NOAA) and the American Samoa Territorial government worked, together to address both the pollution hazards from the incident and the impact to the coral reef ecosystem even after the fuel was removed. While a relatively straight forward response were it to happen in the continental U.S., severe weather (Tropical Cyclone Amos), high winds and swells, limitations on site access, daylight high tides, and availability of resources to include tugs, tow lines and trained personnel made this quite challenging. Three removal attempts occurred under Oil Pollution Act (OPA) authorization and three efforts occurred under the National Marine Sanctuaries Act (NMSA), with guidance from a professional salvage master.

This prolonged 4-month response has prompted some new dialogue and hopefully new commitment to increase preparedness and spill response capabilities within the territory. The designation of the NMSAS allowed for the use of the combined authorities of OPA and the NMSA, forging new path that protects and preserves both the natural and cultural resources of the region from the impacts of pollution and from future groundings whether large or small.

## INTRODUCTION

Late on a Thursday night on April 14th, the fishing vessel NO.1 JI HYUN lost its main engines and grounded on the reef just off the west side of Aunu'u Island in American Samoa, riding up on a surf break known, ironically, as "Shipwrecks." While the crew of seven evacuated safely, it would be four months before the 62-foot vessel was removed, an unusually long amount of time for a relatively simple salvage effort. The difference is that this effort occurred in a very remote location. A tiny volcanic island within the Samoan archipelago, Aunu'u is one of six management areas within National Marine Sanctuary of American Samoa (NMSAS), the largest and most remote of the 13 national marine sanctuaries. NMSAS is comprised of six protected areas, encompassing over 13,581 square miles of nearshore coral reef and open ocean waters across the Samoan Archipelago. Aunu'u is an important part of NMSAS and the community was extremely skeptical of the benefits of inclusion and had concerns about loss of control and access to the reef and nearby waters, so critical to their daily lives. A grounding in this location put intense political pressure on NOAA and others to live up to promises about increased marine resource protection. Some of the discussion during the expansion discussions focused on how NOAA and others would/could respond in a spill or grounding incident and whether this type of federal protection would bring additional response assets to an incident.



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Figure 1. Samoan Archipelago with Sanctuary Units identified.

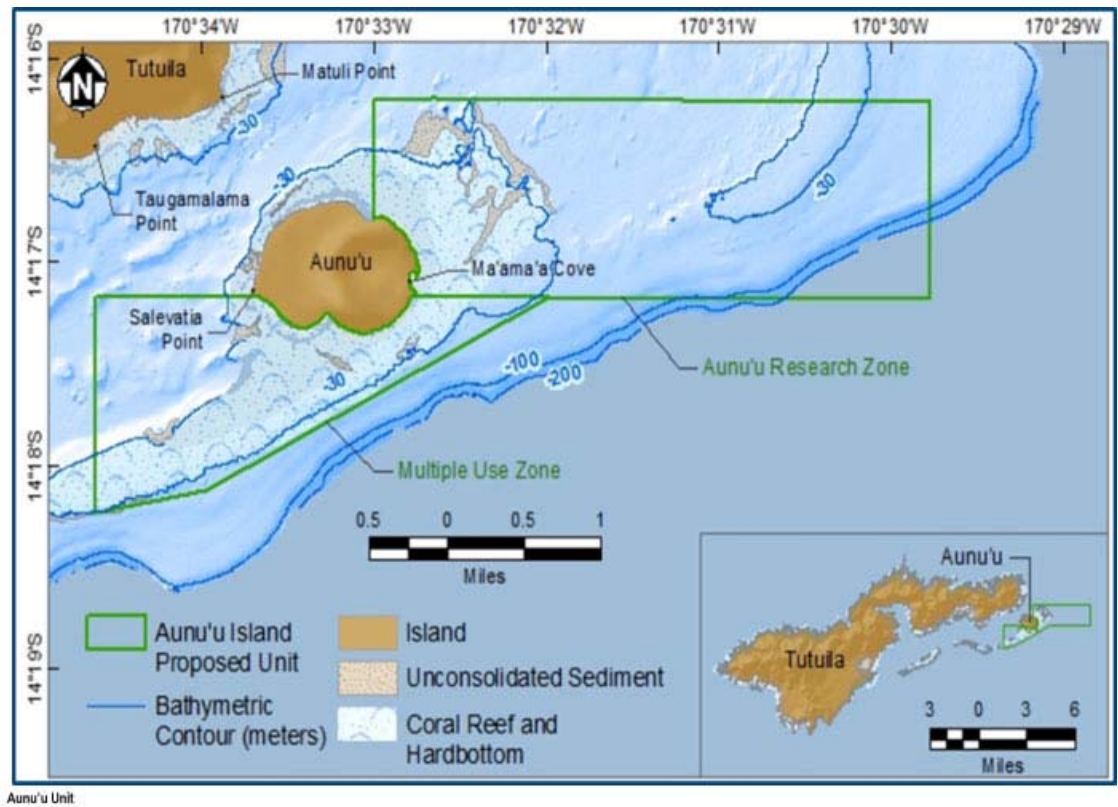


Figure 2. Aunu’u Island is approximately 2 km southeast of Tutuila with a land area of 1.5 square km. The grounding occurred just south of Salevatia Point.

NO.1 JI HYUN was not supposed to be near Aunu’u that night. The vessel had left port late in the evening after getting work done at the local boat yard; however, the crew had not undertaken a “shake down” cruise to check that all systems were operational and soon found themselves taking on water. They chose to put the vessel aground, on a reef flat that was just within the boundaries of the NMSAS. NO.1 JI HYUN although registered as a fishing vessel; was acting that night as a cargo vessel, carrying solar equipment, 144 bags of cement, and two one ton bags of sand for the American Samoa Power Authority, although it was not legally certified by the

USCG to do so. The vessel was initially reported to have 5,000 gallons of diesel on board; this was revised to approximately 2,500 gallons. NOAA provided modelling support for both the diesel and the potential release of the sand and concrete. While the diesel would typically evaporate quickly, it is highly toxic to fish, corals and other benthic resources in this type of shallow nearshore environment. There were also concerns about smothering associated with a plume of sand and cement or a sand, cement and fuel mixture. Early concerns were about the ability to plug a hole in the port side fish hold and possible loss of integrity of the hull as the vessel was pounded by surf that built to 8-10 ft. and attempting to address fuel removal prior to Tropical Cyclone Amos.

Other than a limited USCG Strike Team spill response materials prepositioned in a cargo container in Pago Pago, spill contingency planning, training and response assets are extremely limited. NOAA personnel for NMSAS had no response training. The USCG BOA contractor in the territory had no salvage expertise, although a local subcontractor had limited experience. The local understanding within the territorial government, contractors and local community about response concepts was extremely limited. While the response was important, locals initially felt it had to occur with the context of what was culturally acceptable for when work was allowed, for example, not on Flag Day and not on Sundays. Early on, this meant losing access to advantageous weather and tides. USCG would ultimately remove 3,754 gallons of fuel and fuel water mixture and 10 bales of sorbent pads. The sorbents were used throughout the vessel holds to address the fuel that had soaked into the 2 tons of sand, and was clinging to other debris in the holds and cargo spaces.

## DISCUSSION:

Typically, the pollution and salvage response to a vessel of this size would be relatively straightforward. USCG, NOAA and the affected state or territory would work with the responsible party to ensure that appropriate response and salvage assets address the removal of any pollutants under the authority of the Oil Pollution Act of 1990 (OPA). The parties then work with NOAA to make sure that the hull and any associated debris is removed under the authority of the National Marine Sanctuary Act (NMSA). This case was anything but typical. To start, the responsible party did not have insurance or sufficient financial assets to fund the response. Response and salvage assets in the region are extremely limited despite regular traffic from fishing vessels, cruise ships and large commercial cargo vessels. To get from Hawai'i to American Samoa by boat takes 12 days in good weather, and the mainland United States is even further away. *Within* American Samoa, Aunu'u is remote -- it takes about 45 minutes by boat to travel from Tutuila's Pago Pago harbor to Aunu'u. The island has no cars, and the people of Aunu'u depend on the subsistence fishing on the reef to survive.

The stakes were high: in 2012, the sanctuary had expanded from one management area in Tutuila's Fagatele Bay to six areas throughout the territory. The community of Aunu'u was initially reluctant to accept the sanctuary, and this grounding was a key opportunity to prove the sanctuary's value to the community. NOAA staff from the site did not have emergency response or salvage training. This incident required them to quickly develop an understanding of the issues and skills necessary to implement a successful response and salvage. Time was of the essence with the village directly adjacent to the reef where NO.1 JI HYUN was aground, many different facets of the community were affected, from families fishing to feed themselves, to kids who would normally spend afternoons playing on the reef. NOAA staff worked directly with

senior leaders within the community of Aunu'u to help facilitate all aspects of the effort from access to the site on weekends when work normally is not allowed, to protecting equipment and materials that had to be stored on Aunu'u.

The cultural dynamics of village life were an additional challenge. The Deputy Superintendent Atuatasi Lelei Peau, is a high chief in his community in American Samoa, and was able to work closely with Fonoti Simanu, Aunu'u's high chief, and the village council to communicate the removal process. Simanu is also a member of the Sanctuary Advisory Council. This meant he was an ideal go-between: as high chief, he serves as the voice of the village, while as Sanctuary Advisory Council member; he was familiar with the sanctuary and sanctuary staff. Simanu was at the table for every meeting about the removal process, while Atuatasi, too, attended village council meetings to keep the council up to speed. Peau's high chief status made it possible to confer with the village council with proper protocol; without his status, he explains, the sanctuary would have had to bring in someone else to help serve as a go-between.

This collaboration and open communication was crucial, because so much of the removal process depended on the support of those in Aunu'u. Many of the removal efforts and preparations occurred on Sundays, a *tapu*, or holy, day of rest and religion throughout American Samoa. Normally, day-to-day activities stop on Sunday, and the village easily could have shut down all operations once a week, often when they were most needed. Instead, the village council permitted these operations, also adding extra ferryboat trips to Aunu'u to accommodate contractors who needed to travel in from Tutuila. The council also imposed a curfew to keep villagers from being too close to the grounded vessel and from fishing during operations.



When the vessel first grounded, because of fuel on board, its removal was under the jurisdiction of the USCG under the Oil Pollution Act. USCG and the NMSAS faced some major challenges to address the grounding as the vessel grounded just before the weekend's Flag Day celebrations. Flag Day, which commemorates the day American Samoa became a United States territory, is a major holiday in American Samoa, with canoe races, community events in the stadium in Pago Pago, and other celebrations. Everyone on island participates in some aspect of the celebrations. Getting an emergency response underway was a challenge as it pushed against local cultural norms. However, there was an upside: USCG personnel from Sector Honolulu and District 14 with spill response experience were in American Samoa for the celebration. This was to be critical in the implementation of the first several attempts to free the vessel. These senior USCG personnel understood the benefits and environmental challenges for spill response efforts in national marine sanctuaries having worked with NOAA in California over several responses and a large Preparedness for Response Exercise Program (PREP) exercise in Monterey Bay and Greater Farallones National Marine Sanctuaries called Safe Seas. The FOSC for the response shifted to one of these more senior personnel and he was then able to engage with the Port Authority, the LT. Governor of American Samoa and others to help bring territorial assets into the response, to work more effectively with the local USCG contractor.

Due to the location and the approach to the vessel, it could only be towed during a daylight high tide; during low tide, it perched precariously mostly high and dry. There were concerns about not causing additional injury to healthy corals near the grounding. There were concerns about whether the hull would remain intact when it was dragged a considerable distance to get it off the reef. Contingency plans were developed to scuttle the vessel outside the boundaries of the

NMSAS if the tugs did not think they could get it back to the harbor. There were concerns about the potential smothering impacts of the two tons of sand and the 144 bags of concrete if they were spread across the reef if the vessel started to break apart.



Figure 3. FV NO1 JI HYUN on April 18, 2016. Subsistence fishing is a daily occurrence.

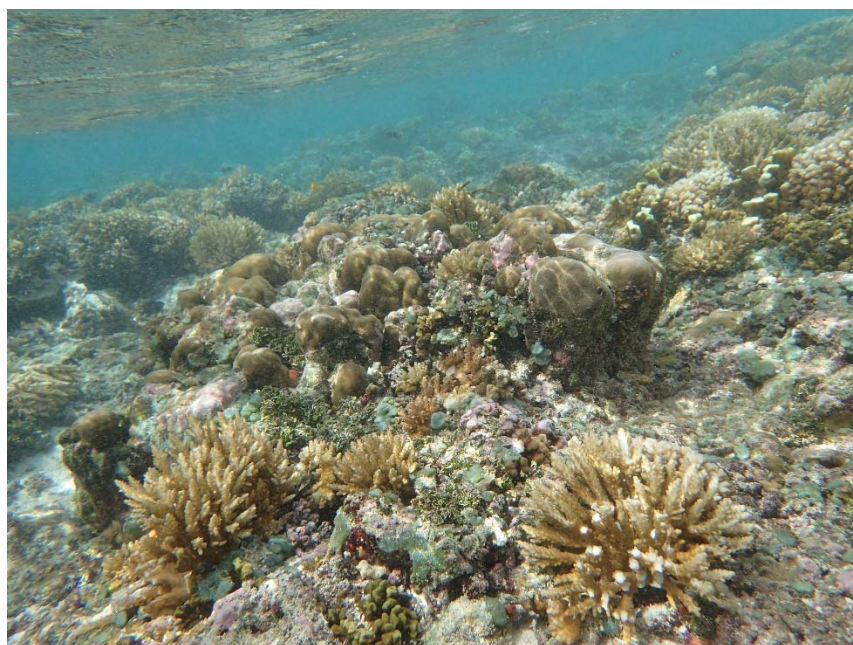


Figure 4. Live healthy corals in the area near the FV NO1 JI HYUN grounding site.



Figure 5. Coral debris plume on April 17.



Figure 6. Vessel high and dry on May 8, 2016. Note lighter colored coral rubble plume to right.

Only two of the three tugs in Pago Pago harbor had the necessary towing capacity, and they were in heavy demand: any large vessel, like a cruise ship or cargo vessel, that enters Pago Pago harbor must be escorted by one of these tugs. These tugs were built in the late 1960's and are not set up for towing or salvage with bollards or capstans. Whether they would be effective in a critical towing situation in the port area has yet to be tested, but is of significant concern. The salvage effort required two tugs to be available for an entire day and for the Port Administration to determine that the salvage efforts would not put the tugs in harm's way. The Port Administration did not typically have ship escort schedules more than 48 hours ahead of time, and if a commercial vessel notified the port of imminent arrival that took precedence over the salvage effort. For example, a vessel had to come in just prior to the arrival of Tropical Cyclone Amos causing the loss of one of a weather window. Large commercial vessels provide critical lifelines for the delivery of goods to the island and the cruise ships provide an important

economic benefit. The first salvage efforts used the one available towline in the territory. It proved to be too heavy to move through the surf easily, and when under tension, was prone to snapping. Heavy anchors were needed and had to be made locally. NOAA subsequently sourced a new towline when they took over the salvage effort.

Tropical Cyclone Amos, forecast to be a direct hit to the islands, delayed the first salvage attempt by a week. The sanctuary worked with the USCG to get as much of the fuel off the vessel as possible ahead of the storm and to secure the vessel. Decisions were made to leave the sand and cement on board and the vessel voids were watered down in an effort to hold it in place, along with anchors placed seaward and lines attaching the vessel to the shore.

Three attempts in April and early May with single tugs were unsuccessful due to a range of issues including problems with the available towline snapping and then heavy surf conditions making use of messenger lines to get the towline out to the tug difficult and ultimately unsuccessful. Heavy surf on the outer reef (~20 ft.) and overhead surf (~6 ft.) during the May attempt made operational conditions unsafe and also caused the vessel to shift in orientation on the reef to make it almost parallel to the shoreline. The vessel did not stay in that orientation long, but shifted again after a few tidal cycles. Each salvage attempt provided lessons learned about local conditions and capabilities that were incorporated into the next iteration of the salvage plan. These changes reflected the conditions and the limited available equipment and expertise. Each shift of the vessel was causing severe crushing and scouring of the corals and developing a rubble plume that eventually made its way to the shoreline.

Sector Honolulu and the USCG Salvage Engineering and Response Team (SERT) were very mindful of the concerns about impacts to sanctuary resources and kept a nexus to OPA open as long as possible. The USCG premise was to remove the vessel as a whole including its cargo and residual fuel to help prevent additional injury to sanctuary resources. The USCG continued to work on removing the wreck for as long as possible under the Oil Pollution Act. In early May, after removal of clingage in the tanks and interior spaces, the USCG, NOAA and the territory of American Samoa discussed the hand off for the response from USCG to NOAA under the authority of the National Marine Sanctuary Act. USCG continued to provide critical support through the next several months.

After the handoff, NOAA reviewed the lessons learned to date, existing materials and expertise in the territory and evaluating what fiscal resources were available, NOAA made some key decisions about next steps. First, they reaffirmed that the vessel needed to come off the reef, so salvage was necessary. Second, additional salvage expertise was clearly needed and communication with local stakeholders was necessary. Using access to the USCG Basic Ordering Agreement (BOA) contracts, NOAA contracted with T & T Salvage and obtained the services of a salvage naval architect who used to work at USCG SERT and who had worked in Olympic Coast National Marine Sanctuary on the removal of the Japanese tsunami dock, deployed out to Pago Pago from Houston, Texas. He was able to provide on-site expertise, reevaluate local resources and provide some needed guidance and training. NOAA purchased a longer, lighter and much stronger, 1¾-inch towline from Oregon and had it shipped to American Samoa. The cost of the line alone was equivalent to what a typical salvage for a vessel this size would cost the sanctuary system stateside.

The salvage master developed a plan to rig a wire bridle for the NO.1 LI HYUN, as she did not have any good towing points from the stern and developed a towing bridle for an individual tug that would take as much advantage of their capacity as possible. He also spent time with the tug captains regarding how best to operate the vessels safely in this challenging salvage operation, as they were unfamiliar with best practices for towing. When the wire bridle was torn and ripped through the vessel hull when placed under strain, the salvage master came up with new alternatives.

Two more attempts to remove the vessel were made in late May and early June, with the assistance of the salvage master, local response contractor, USCG, the National Park Service, and local agencies. Those attempts were unsuccessful due to equipment failures and high surf conditions. Several attempts were scheduled in July, but weather, limited daylight high tides and lack of availability of the tugs caused cancellations. During this time, the rest of the oil-contaminated cargo of cement and sand was removed, and new attachments were welded to the hull to replace pad eyes that had ripped off the vessel in previous attempts. The towing bridle on the vessel and for the tugs were reconfigured to allow for a tandem tow. Offshore anchors for the towline were redeployed and everyone watched the weather, tides and the schedule of the port authority tugs and waited. He used the time to work with the tug captains and the rest of the team to build skills from vessel handling to effective communications on the water during a response or salvage effort.

The team as a whole, spent time discussing the lessons learned from previous attempts and discussed what would be necessary to make another attempt. This type of frank and productive discussion was atypical for the region. NOAA funds were running low and it was unclear if there could be another attempt. The final plan highlighted what an ideal salvage effort would take in terms of wind, tide and surf conditions, weather, personnel and equipment. Seasonal weather changes were narrowing the weather windows even more than they had in earlier months. All the preparations and effort to establish effective working relationships lead to a successful salvage on August 19.

That morning, the team was on the water by 3am. It was a calm, clear day with glassy water, unusual conditions for that time of year, but perfect for a response. Divers had already connected a line to NO.1 JI HYUN, and that morning they retrieved that line and connected it to the sanctuary's R/V MANUMĀ, which was able to get closer into the surf zone than previous vessels had been able to. This time both tugs were hooked up to the towline, providing a stronger towing capability, previous attempts had relied on one tug. High tide was at 7am, and though it took hours to set everything up, once the removal began, the vessel came off in about a minute. Two hours later, the vessel was dropped off in the shipyard at Tutuila.





Figure 7. NO.1 JI HYUN under tow and finally breaking free from the reef August 19, 2016

## CONCLUSIONS

The sanctuary is working on assessing the damage the vessel did to the reef and determining whether there will be resources available to implement restoration. The vessel moved around the reef substantially during the four months it was on the reef, and a good deal of damage occurred early on, when waves pushed the vessel around. Given the severity of the crushing injury, and the amount of structural damage to the reef, it is not clear whether on-site restoration to the reef crest on the grounding site is possible. The wave action in this site makes reattachment of corals difficult even if donor corals are available. It may be necessary to consider structural stabilization of the reef crest to ensure that the nearby “ava’ or channel doesn’t increase in size and lose the wave attenuation benefit of the reef for the village. NOAA will consider whether restoration activities nearby will provide a similar level of ecological benefits and services. As the restoration options area developed, a parallel monitoring event both of the grounding site,

and any restored areas would be critical. Moving forward, sanctuary staff are clear that there are a number of lessons learned. Although no one wants to see another grounding or an oil spill, with commercial traffic from fishing vessels, cargo vessel and cruise ships, another incident is likely to occur in the sanctuary or nearby waters.

The grounding highlighted the need for greater response capabilities and a more cohesive contingency planning process between all the partners in the region, and a more active way to engage and prepare local communities in those contingency plans. More training and clearer channels for communication at the outset of an incident will be critical for effective response efforts in the future.

Sanctuary staff also hope to work with residents to ensure that vessel owners and their contracting companies within the territory are held accountable for events like this. The owner of NO.1 JI HYUN had no liability insurance, and its contracting company, the local cannery, does not require local fishing vessels to carry such insurance.

Supplies remain an issue: the sanctuary now has a stronger towline, and some spill response gear is prepositioned in American Samoa, but the tugs in American Samoa are still old and not well outfitted for salvage or towing. The spill response equipment there is not sufficient for a large spill event--those assets would have to be flown in or come from either Hawaii or the mainland, as would any major salvage assets. That 12+ day period would likely mean a much greater impact from an oil spill or large vessel grounding in the area. NO.1 JI HYUN *was* only a 62-foot

vessel, quite small by the standards of some of the vessels that come in and out of American Samoa.

Not far from Pago Pago, on the west side of Tutuila by Coconut Point, another vessel has been grounded for more than a year. It sits outside of sanctuary waters, and has not been salvaged despite impacts to the reef. It too worked under contract for the local cannery. It serves as a visual reminder of how important these relationships among agencies and between local communities and the sanctuary have been.

The response and salvage of the NO.1 JI HYUN exemplifies the extension of Fa'a-Samoa beyond the local Samoan community, reflecting the collective effort of USCG, NOAA, the territorial government, industry and the local community. This incident is both a loss (of coral habitat) and opportunity for new efforts in marine resource protection in American Samoa. The NO.1 JI HYUN response has provided village and territorial leaders a better understanding of what it takes to protect marine and coastal resources and the livelihoods that depend upon them. NOAA hopes that this incident will prompt new dialogue at the federal and territorial levels to improve the regional capacity for both spill response and salvage.