

**Hurricane Irma –Displaced Vessel and Spill Response at Naval Air Station Key West**

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**ABSTRACT**

On the evening of 09-10 September 2017, the Florida Keys were pummeled by Hurricane Irma - a Category 4 storm that was the fifth-costliest hurricane to hit mainland United States, causing an estimated \$50 billion in damages, and 34 lives lost in Florida alone.

In the Keys, approximately 1350 boats were destroyed or damaged, and approximately 2000 boats were removed from the waters and shorelines from a Unified Command (UC) comprised of U.S. Coast Guard, EPA and Florida Fish and Wildlife Conservation Commission funded from the Federal Emergency Management Agency (FEMA), under an ESF10 Mission Assignment to remove those vessels displaced from the storm where they had sunk, submerged, or been stranded along the shoreline.

On September 28, 2017, the UC decided that boats that were on federal property were the responsibility of that agency to manage, and furthermore, since each of these boats had batteries and in most cases fuel on board they posed an immediate hazardous substance and/or oil spill

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threat, so requested that Navy undertake operations immediately as the lead FOSC to address each of the vessels sunk, submerged, stranded or otherwise displaced on Navy property in the Key West area.

On October 1, 2017, the Navy On-Scene Coordinator Representative (NOSC-R) from Navy Region Southeast (NRSE) deployed to Naval Air Station Key West (NASKW) to manage the response. Once adequate funds were identified and secured, NRSE contracted Navy Supervisor of Salvage (SUPSALV), who quickly arrived on-scene with a contracted private salvor.

Operations fell into several stages: locating each vessel on NASKW property and determining its condition; identifying each owner/representative; retrieval and temporary storage of each vessel or its remains on Navy property; contacting vessel owners/representatives to making arrangements for owner or insurance company to retrieve the vessel, or surrender it to Navy custody for final destruction at Navy's expense.

A number of challenges arose during this response: finding adequate funds at the end of a fiscal year for an un-programmed multi-million dollar project; identifying owners and contact information; negotiating final disposition of each vessel; allowing owners access to vessels stored on Navy property.

After 9 weeks of vessel location and identification, and owner notifications, 15 vessels were retrieved by owners, 13 vessels were towed away or otherwise removed by owner insurance companies, and 52 were barged off to a boatyard for final destruction at Navy's expense. In total, \$3M was spent by Navy for this operation.

## INTRODUCTION

On the morning of 30 August, Tropical Storm Irma formed in the far eastern Atlantic Ocean and intensified over the following 30 hours into a major category-3 hurricane (on the Saffir-Simpson Hurricane Wind Scale) with highest sustained winds of 115 MPH, a rapid strengthening considered unusual for storms in the far eastern Atlantic. (NWS 2019) The storm continued to intensify as it moved westward over warmer water, encountering an increasingly more moist atmosphere, and developed sustained winds of 185 MPH by 05SEP17, becoming a rare category-5 hurricane and one of only 5 hurricanes to be measured at 185MPH in the Atlantic basin. Even more uncommonly, Irma maintained its category-5 winds for 3 days as it moved towards Puerto Rico and Hispaniola. (NWS2019)

The strong high pressure ridge that had been steering Irma westward started to breakdown around 09SEP17 and Irma made a turn to the Northwest into the Florida Straits, and by the time Irma made landfall in Florida, on Marco Island on 10SEP17, it had reduced to a category-3 storm, with winds at 115MPH, and gusts to 142MPH (NWS2019).

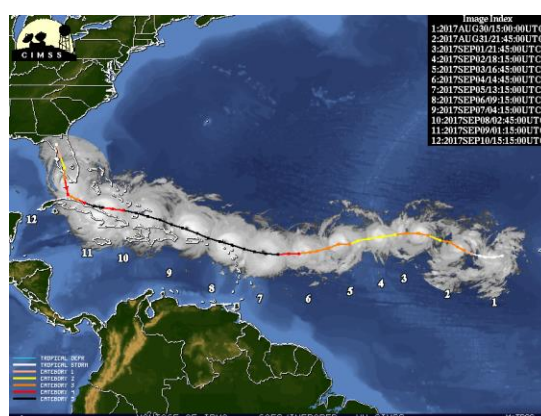


Figure 1. Satellite montage of Irma from National Hurricane Center, using GOES IR images (source: [https://www.weather.gov/tae/Irma\\_technical\\_summary](https://www.weather.gov/tae/Irma_technical_summary)).

Irma's wind field expanded dramatically as it approached Florida, with tropical force winds extended outward to ~400 miles and hurricane force winds ~80 miles from its center. Storm surge flooding combined with long periods of heavy rain and strong winds to buffet much of Florida's coasts, particularly in the Keys and within ~ 12 hours, Irma had subsided and made its way up Florida towards Georgia and South Carolina (NWS2019).

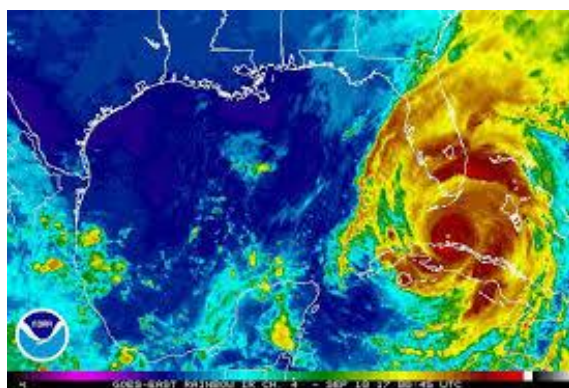


Figure 2. Hurricane Irma path toward Florida, 09SEP17 (source:

<https://www.cbsnews.com/news/hurricane-irma-track-update-florida-path-live-09-09-2017/>)

There were other sources of damage besides Irma's winds: tides combined with storm surges caused inundation levels upwards of 5-8 feet above ground in the lower Florida Keys while heavy rainfall contributed to flooding with 6-10 inches across the Keys (NHC Report, 2018).

In Irma's path lay Naval Air Station Key West (NAS KW) - a U. S. Navy air station and military airport located on Boca Chica Key, just east of the central business district. In addition to providing aircraft combat training for all military services, NAS KW host a number of other tenant commands, including USCG Sector Key West. NAS KW is spread out around Key West and encompasses other annexes, including Truman Annex (former surface ship and submarine base until 1974), Trumbo Point Annex and Sigsbee Park Annex. The Navy's Morale, Welfare

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and Recreation (MWR) program at NASKW provides a number of slips and moorings for Navy members to berth their recreational vessels, at Boca Chica Marina and Sigsbee Marina.



Figure 3. Map of NAS KW (Source: <https://markosun.wordpress.com>)



Figure 4. Examples of damage caused by Hurricane Irma in Key West (source: [aol.com](http://aol.com))

Hurricane Irma left a wide swath of destruction in its path and resulted in a loss of 134 lives, 34 lives lost in Florida alone, along with many complex recovery and mitigation challenges. As with many hurricanes that move through populated coastal areas, one of the challenges that often

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arise is managing the many recreational boats and watercraft that can be damaged, sunk or partially-submerged, washed onshore or otherwise displaced. These recreational vessels, even those powered by sail, typically have some sort of oil and/or gas stored onboard and may have other hazardous chemicals onboard as well which puts them under the auspices of the Emergency Support Function 10, Oil and Hazardous Materials Response under the National Response Framework (NRF). The NRF establishes a single, comprehensive response capability to managing domestic incidents such as earthquakes, hurricanes and other disasters (EPA 2017). The NRF is utilized to help organize and manages responses to such incidents, especially those that have been declared a disaster under the Stafford Act (Robert T. Stafford Disaster Relief and Emergency Assistance Act); a disaster declaration authorizes the President to be able to provide federal disaster assistance (FEMA 2011). The Hurricane Irma incident was declared a federal disaster on 10 September 2017, and was designated Florida Hurricane Irma (DR-4337) by the Federal Emergency Management Agency (FEMA) (FEMA 2017).

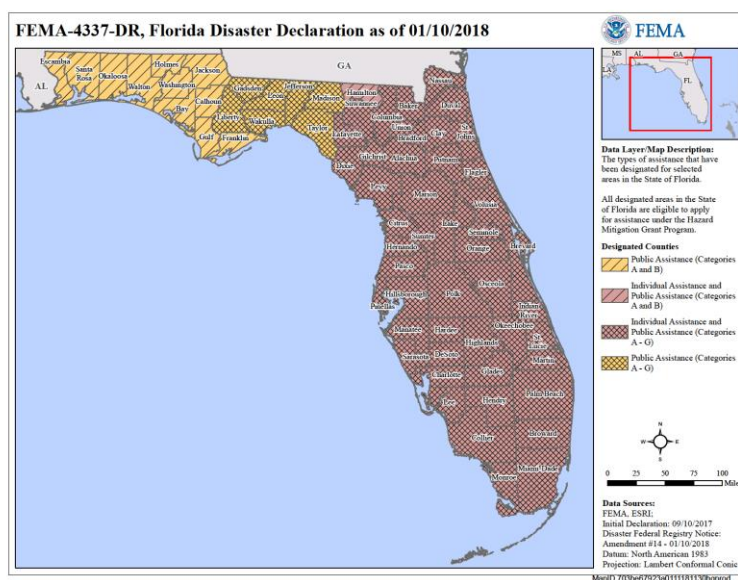


Figure 5. FEMA Declaration map of Hurricane Irma (source: <https://www.fema.gov/disaster/4337>)

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In the Keys, approximately 1350 boats were destroyed or damaged, and approximately 2000 boats were removed from the waters and shorelines from a Unified Command (UC) comprised of U.S. Coast Guard, EPA and Florida Fish and Wildlife Conservation Commission funded from the Federal Emergency Management Agency (FEMA), under an ESF10 Mission Assignment to remove those vessels displaced from the storm where they had sunk, submerged, or been stranded along the shoreline.

By September 28, however, this UC decided that boats that were on federal property were the responsibility of that agency to manage and dispose of appropriately. Since each of these vessels contained batteries and in most cases some type of fuel or other oil product on board, each of them posed an immediate hazardous substance and/or oil spill threat. The UC requested that the U.S. Navy undertake operations immediately as the lead Federal On-Scene Coordinator to address each of the vessels sunk, submerged, stranded or otherwise displaced on Navy property in the Key West area.

**METHODS**

On October 1, 2017, Navy Region Southeast (NRSE) deployed its Navy On-Scene Coordinator Representative (NOSC-R) to NASWK to manage the response. Adequate funds to needed to be identified and secured and then NRSE was able to contract Navy Supervisor of Salvage (SUPSALV), who quickly arrived on-scene with a contracted private salvor.

Operations fell into several components or strategies: (1) locating each vessel that was physically located on NASWK property and determining its condition; (2) identifying an



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owner/representative for each vessel; (3) retrieval and temporary storage of each vessel or its remains on Navy property; and (4) contacting vessel owners/representatives to make arrangements for owner or insurance company to retrieve the vessel, or surrender it to Navy custody for final destruction at Navy's expense.

A total of 80 recreational vessels were located throughout NASKAW property, either sunken or partially submerged, or stranded on the shore.



Figure 6. Sunken, partially-submerged and stranded recreational vessels on Navy property, post-Irma (source: Author).

The NOSC from NRSE once deployed on-scene established the need to utilize the Incident Command System (ICS) to manage the Navy's response to this incident, so he requested support from ICS-trained responders from other Navy installations and organizations within the SE Region as well as from other Navy Region Northwest (NW) and HQ to provide additional support managing the incident. Once they arrived on-scene, an Operational Period was established and a daily Incident Action Plan and other ICS components were implemented.

One of the key ICS Objectives for this response was to minimize and quickly mitigate any oil or hazardous substance spills from the vessel removal and relocation operations.



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SUPSALV brought spill response equipment, and NASKW's Port Operations department deployed hundreds of feet of oil boom around the work area where boats were stored and transferred from barge to land. Berms and visquine were deployed around drains near the stored vessels to prevent any potential leakages from entering the water. However, by the time the salvor had retrieved each vessel, most all of the oil or fuel onboard had already attenuated so oil spills were of very low incidence and if any were minor unrecoverable sheens.

SUPSALV's contracted salvor conducted a thorough survey of the area, including the seabed, and identified that 80 recreational vessels were clearly on Navy property and needed to be addressed. With that task completed, the salvor, under SUPSALV's supervision, then utilized 2 contracted barges with cranes to physically remove each boat from its location and bring it to Navy property for storage. Temporary storage space was made for these vessels along the pier at Truman Annex of NASKW. Those vessels that had adequate structural integrity were stored up on jack stands, to keep their keels off the ground. Other vessels were too extensively damaged, in some cases only pieces of hulls remained, and these were set on the ground for temporary storage.



Figure 7. Hurricane-displaced recreational vessels retrieved onto salvor's barge, being brought back to NASKW Truman Annex for temporary storage (source: Author).



Figure 8. Displaced vessels in temporary storage at NASKW Truman Annex; partial hull remains of one vessel in foreground (source: Author).

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With the vessels out of the water and retrieved from the shorelines, hull numbers, vessel names and any other identifying information was gathered and added to the boat database.

Florida Fish and Wildlife Conservation Commission and the US Coast Guard assisted in helping identify owners or representatives based on hull numbers and other identifiers.

With contact information in hand, Navy made contact with vessel owners and representatives. Owners/representatives were informed that their vessel had been stranded on Navy property as a result of Irma and that Navy had retrieved it and was storing it temporarily on their property. Owners/representatives were given an opportunity to decide if they wanted to: (1) Retrieve the vessel at their/insurance company's expense or (2) sign over custody of the vessel and authorize the Navy to dispose of it. Owners and representatives that wanted to retrieve their vessel were given an ample window of time in which to do so. Also, for those retrieving their vessels, Navy offered to pay for the use of their contracted crane to move the vessel onto another barge or truck that the owner or representative would fund for final removal off Navy property.

Throughout this process of vessel and owner identification, Navy worked closely with USCG Sector Key West (SKW) to ensure they were aware of each registered vessel and its condition as well as its final disposition. There were ~5 vessels that were still floating and appeared upon visual inspection to be seaworthy enough to allow the owners/representatives to tow them away. In these cases, USCG SKW agreed to allow the owner/representative to tow their vessel away only after some stringent conditions were met: a marine surveyor had to conduct a thorough inspection and provide written documentation of the vessel's seaworthiness; and a detailed towing plan had to be prepared and filed with USCG SKW and approved by the Captain of the Port.

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Of the 80 vessels identified, very few were found to be insured; only 13 vessels were removed by the owner's insurance companies. Fifteen vessels were retrieved by the owners themselves and either towed away or otherwise removed off Navy property. The bulk of the vessels, 52 in all, were left with the Navy for final disposition. SUPSALV's contracted salvor put all the remaining 52 onto large barges and sent them up to a commercial boatyard for final destruction at Navy's expense.

The operation took a total of 9 weeks, and approximately \$3M of Navy funds to accomplish.

**RESULTS/DISCUSSION**

This operation provided many lessons learned for Navy as well as many challenges that had to be overcome.

One of the primary issues was how to obtain funding rapidly to address this environmental pollution hazard as quickly as possible. Navy was told on 27 September that they were now financially responsible to retrieve and remove these pollution threats, right at the end of the Federal Fiscal Year. At the transition period between fiscal years for many federal agencies is a difficult time to try to expend funds, particularly funds that are not already programmed for ahead of time. Many federal agency accounting systems have to be "shut down" or otherwise undergo restricted use during the change over to the new fiscal year, so the requirement to expend large amounts of federal funds is quite challenging during the transition from one fiscal year to the next. Additionally, Navy Region SE had not programmed for such a large expenditure in Fiscal Year 2018, and as a general rule does not have large amounts of unaccounted for funds available on short notice. By being able to work directly with SUPSALV,

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NRSE was able to determine how best to identify the appropriate source of funds and how to compensate SUPSALV so they in turn could cover their costs and hire their contracted salvor.

Another challenge that arose during the operation was that of the 80 boats, 52 owners were not able to find the means to retrieve their vessels. This meant that 65% of vessel owners would never see their boats again. Most of the boats had personal belongings on them and many of the owners wanted to get onboard to determine if any of their belongings were salvageable. Allowing owners to view their vessels raised a host of concerns. First, these vessels were being stored on a Navy base, in a secure area. To allow owners or their representatives on base to visually inspect their vessels required that each person undergo a thorough base access procedure and undergo the appropriate vetting and credentialing. Secondly, once owners/representatives were appropriately credentialed and allowed on base, they still were required to be escorted so visits had to be scheduled ahead of time to ensure that adequate security personnel were available. Once the owners/representatives got on base and were able to see their vessels, most of them wanted to go onboard and look inside, resulting in a major safety concern. Most of the boats were destroyed or had undergone significant structural damage to hull, often with large holes and cracks visible in the hull. There was no good way to ensure that owners/representatives could safely step into the interior of these vessels without falling through. Also, these vessels were stored up on jack stands, to keep the keels or props off the ground, putting the main decks 3-6 or more feet off the ground. Access to the cockpit or interior of these boats would require climbing a ladder and then climbing around fouled rigging, and in some cases, broken masts, to get into these boats. There was no true way to ensure the safety to owners/representatives to board their boats and retrieve belongings.



Figure 9. Examples of damaged hull conditions (source: Author)

Managing the response through the use of ICS was important although a bit challenging. For a response that is primarily a salvage operation, how best to organize the various components such as where in the ICS organization to put the Salvage members can be a challenge and needs to be thought through carefully, and ICS is flexible enough to be able to support any response. Also, it was important to bring in experienced responders well-versed in ICS from other Navy organizations outside of the area as those members working and living in Key West had all been affected by the hurricane, and needed to focus on taking care of families and home life as well as continuity of operations for NASKW as a whole. To be able to have a trained, experience team of ICS practitioners come in from out of area to help manage the response was key to its success.



**CONCLUSIONS**

Although the Stafford Act provides funding to help respond to declared disasters such as Hurricane Irma, in the case of Federal agency lands, those responses must be conducted by the federal agency landowner under their own funding. Navy was able to find the right funding and rapidly respond to the environmental pollution concerns of the 80 displaced recreational vessels. Challenges included allowing owners access to their damaged vessels once they were stored on Navy property, ensuring ICS was utilized appropriately and adequate out of area support was brought in to not minimize personnel impacts in the affected area, and finding enough funding to ensure appropriate management till final disposition of each displaced vessel.

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