

ABSTRACT

Developing an Inventory of Abandoned Vessels Impacting Coral Resources

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ABSTRACT

Derelict and abandoned vessels pose significant threats to coral ecosystems by releasing pollutants, physically destroying habitat, and causing algal blooms by iron deposition. Each of these threats has been anecdotally documented in the recent academic literature and popular press, but the scale and scope of the problem is poorly understood because of reporting inconsistencies at the local level and the lack of data collection and analysis at the national level. NOAA's Damage Assessment Center has attempted to address these issues by creating a comprehensive database of abandoned vessels threatening coral reef ecosystems. This paper summarizes the current state of the database, analyzes emergent trends, and makes recommendations for improved legal authorities and funding mechanisms that would improve governments' ability to remove currently grounded vessels and prevent further abandonment.

BACKGROUND

[from one-pager and other docs]

The Coast Guard's mandate is to remove the threat of pollution. Normally, this limits the agency to removing oil, but leaving the vessel. A number of cases have shown that this is not always an adequate means of limiting pollution threats. Additionally, as was evidenced by the \$6,000,000 price tag for the longliner removals from Pago Pago Harbor, American Samoa, leaving the vessel has the potential to be a more expensive policy than removing the vessel outright.

Another purpose of the AVP is to challenge the conventional (and legally engrained) notion that pollution is the primary cause of environmental damage in a grounding event. Even if limited clean up actions are taken after an oil spill, a few years will bring a site back to full ecological function. A steel or fiberglass vessel, however, will remain at an incident site for many more than a few years. As the vessel shifts with currents and storms, often breaking into multiple pieces in the process, it is a source of continual liability on an ecosystem's ability to function fully.

The Abandoned Vessel Project is composed of a number of pieces, the inventory being one of them. A legal analysis of existing regulations and legal precedents has been performed and a detailed white paper has been drafted describing the issue and summarizing recommendations based on the database and legal review. Ultimately, however, the database, legal review and issue analysis are to be the foundation for local capacity building assistance and removal projects that will address the issue in a direct and tangible manner. (see Figure 1) (*which is a Venn diagram!)

This paper addresses the database component of the project in detail, but it is merely one of a few aspects that build on each other to create the Abandoned Vessel Project.

CASE STUDIES

Grounding of the Fishing Vessel *Swordman I*

On June 5, 2000, the longline fishing vessel *Swordman I*, struck the eastern fringe of Pearl and Hermes Reef in the Northwestern Hawaiian Islands. At the time of the incident, the 77-foot fishing vessel had more than 70 miles of longline, 500 pounds of fishhooks, and about 10,000 gallons of diesel fuel onboard. In addition to concern for the physical and oil related impacts to coral habitats, Pearl and Hermes Reef is critical habitat for birds, turtles, and monk seals. These resources were at risk of being entangled in or hooked by the fishing gear.

The USCG responded to rescue the crew, stabilize the vessel, and address the pollution threat. The vessel owner did not have the necessary assets to conduct the response and the USCG took over the pollution response. The USCG removed 7,500 gallons of fuel and oil-contaminated water off the *Swordman I*. As the vessel became lighter wave action pushed the vessel higher up the reef. The response team was then able to access lower compartments, where they found an additional 2,500 gallons of diesel fuel. The initial plan was to remove contaminants and floatable debris from the wreck, but the USCG in consultation with the Trustees, determined that the remaining fuels and oil could not be removed safely and effectively and concluded that removing the vessel from the reef was warranted. A salvage vessel was contracted to refloat and tow the *Swordman I* to an authorized scuttling site 3.5 nautical miles southeast of Southeast Island, where it was sunk in 6,000 feet of water.

Since the purpose of the wreck removal was to address the residual pollution threat from the vessel, the USCG could use the Oil Spill Liability Trust Fund. The fund

was opened to cover the costs of the response and vessel removal, which totaled over \$1.5 million.

The *Swordman I* incident illustrates the benefits of prompt vessel removal. Although vessel removal was expensive, the prompt action eliminated the threat of fishing gear entanglement, residual releases of oil, and collateral reef injury if the vessel had been left to deteriorate on the reef. Because these threats were eliminated, no further site cleanup or restoration is anticipated. The initial response plan of removing the fuel but leaving the vessel would have resulted in long-term impacts to the reef ecosystem. If only the oil had been removed, the trustees would have had few options for removing the vessel since it was not a hazard to navigation. Furthermore, the absence of a pollution threat would likely have precluded use of the OPA fund for any further removal or damage assessment and restoration actions.

Scuttling of the Sailing Vessel *Karma*

In the summer of 2000, the *S/V Karma* was stripped down and intentionally scuttled by its owner to make an artificial reef in an ill-conceived ecotourism venture, in seagrass beds offshore of Luis Peña Key, a small island 17 miles east of the Fajardo, Puerto Rico. The vessel rests in 20-25 feet of water, less than 15 feet away from a coral reef. The National Marine Fisheries Service has designated seagrasses in this area as critical habitat for endangered Green Sea Turtles. The physical presence and the motion of the *Karma* are causing physical injury to the seagrass. The nearby coral reef is in danger of being directly impacted by the boat

The vessel owner refused to remove the vessel. In an effort to prevent further injury, the Puerto Rico Department of Natural and Environmental Resources (PRDNER) temporarily stabilized the boat with four anchors. Minimizing movement of the vessel slowed further injury to the seagrass beds and reduced the risk of injury to the coral reef. Concerned that winter storms would multiply the impact of the vessel and with direct appeals to the owner not effective, the PRDNER requested federal assistance in removing the vessel. The EPA considered fines and enforcement actions, but the vessel owner showed little response. The EPA apparently also determined that the Clean Water Act and the Marine Dumping Act were not applicable to the situation. The Army Corps of Engineers decided that their authority under the Rivers and Harbors Act could not be used because the vessel posed no threat to navigation. Because the owner had removed all fuels and fluids from the vessel, the Coast Guard determined that there was no oil pollution potential and concluded that they had no authority to remove the vessel. Even the U.S. Navy was contacted, but the removal project was too small to be used as a Navy training exercise. NOAA identified a source of funding but concluded that the vessel was still private property and the agency lacked clear removal authority and might be challenged for taking private property. NOAA took initial steps to determine whether the Endangered Species Act could be used to remove the vessel, either as a seizure and forfeiture for a knowing, criminal violation of the Act or through injunctive relief to terminate an unlawful taking due to the destruction of critical habitat. This authority is specifically delegated to the law enforcement office of the National Marine Fisheries Service, and agents which began an investigation into the incident couldn't establish clear

title in the vessel, including in the person that scuttled the vessel, and the agents have since been detailed to assist in terrorism investigations in the wake of the September 11 attacks on America.

Unlike the grounding of the *Swordman I*, the *Karma* scuttling was the result of an intentional and illegal act. Efforts to remove the *S/V Karma* highlight the lack of clarity in regards to federal authority to remove certain abandoned vessels that threaten sensitive marine environments.

DATA DISTRIBUTION & USERS

A single data source for grounded and abandoned vessels helps meet the goals of the US Coral Reef Task Force as well as NOAA.

Abandoned vessels are often an unnoticed pollution threat. Their presence on any federal agency's radar screen has hitherto been largely limited by lack of federal coordination as well as the absence of clear legal authorities and funding mechanisms.

Table 1 shows that the potential users of the Abandoned Vessel Project's data span a range of agencies, organizations and missions.

USCG	address potential pollution threats
ACOE	remove hazards to navigation
MPA governance (NPS, NMS, etc)	identify environmentally sensitive areas that are threatened with pollution or physical destruction
dive shops	identify candidates for sinking as artificial reefs
port authorities	identify potential future groundings (ie moored derelicts that may not be properly attended to prior to heavy storms)
local, state, territorial governments	address range of environmental threats posed by existing vessels and identifying potential future abandoned vessels; ALSO address economic, safety, and aesthetic problems posed by vessel abandonment (footnote: regions with coral generally depend on tourism for significant portions of the local economy. a derelict vessel sitting on a reef is certainly, then, an economic threat to the local community)

One of the goals of the project is to facilitate capacity building on the part of local, state and territorial governments. To this end, datasets are regularly exported in a variety of formats for distribution to resources managers and other interested individuals

or agencies in all of the areas addressed by the project. Data formats and distribution means are detailed in Table 1.

data type	means of access	requirements	server and address
spatial	viewable via online internet map server	none	NOAA's Coral Reef Information System http://coris.noaa.gov/
spatial	download	ESRI GIS software (minimum:ArcExplorer)	Abandoned Vessel Project http://response.restoration.noaa.gov/dac/vessels/
comma-delimited text	download	none (though any version of a spreadsheet or database are helpful)	Abandoned Vessel Project http://response.restoration.noaa.gov/dac/vessels/
PDF	download	Adobe Acrobat Reader	Abandoned Vessel Project http://response.restoration.noaa.gov/dac/vessels/

DATA COLLECTION & DATABASE STRUCTURE

Existing data describing abandoned vessels is scattered across a numerous databases, each with a different purpose, housed in different agencies. The project's first task was to mine these sources for relevant data; they included the USGS's Abandoned Vessel Information System (AVIS), NOAA's Automated Wrecks and Obstructions Information System (AWOIS), the State of Florida's Derelict Vessel Removal Grant Program, and others.

After compiling all of this electronic data compiled in one place, we found through internet and paper document research that there were numerous vessels not reported in existing databases. Further information was also gathered through telephone calls and other means of direct contact with local resource managers, dives shops, academics, and non-profit groups. In the project's first nine months, over 350 organizations, documents, and individuals were consulted.

Armed with what seemed to be the most complete abandoned vessel information in existence, project staff have conducted multiple field surveys. For every vessel in our database, these teams found in the field an additional one or two vessels we had not previously known about. The first two of these field surveys (conducted in summer 2002) found that about 50% of the database's vessels were still present in the field, but these database vessel accounted for only 40% of the total number of abandoned vessels found. These observations speak to the need for thorough, centralized data collection.

The inventory is housed in a Microsoft Access 2000 database. The database's relational structure (see Figure 1) allows for a high degree of flexibility in assigning

source, location, and field survey information. The database is also customized with Visual Basic code to allow for an easy execution of a variety of query, filter, and reporting operations. Customization also allows project staff to manage the data presented on the project website (Figure 3), and export full datasets for electronic distribution.

Additionally, the workstation housing the database is equipped with ArcGIS 8, geographic information systems (GIS) software that allows for spatial representation of the vessel locations. The GIS reads vessel data directly from the Microsoft Access database and also contains layers of related spatial information such as the NOAA Coastal Services Center's digital shorelines, aerial photography and habitat characterizations, and NOAA Hazmat's Environmental Sensitivity Index (ESI) maps. Spatial queries in the GIS allow for important analysis of the vessel data in conjunction with NOAA's most current and accurate environmental and ecosystem data.

FUTURE DIRECTIONS

With the existing geographic database and website, the Abandoned Vessel Project could easily be expanded to include non-coral areas and/or all undersea pollution hazards.

There are also research avenues that would support the project (footnote: the National Academy of Sciences has expressed interest in the issue of abandoned vessels from the perspective of research n

CONCLUSION

The Abandoned Vessel Project has caught the attention of a variety of federal agencies, US Congressional delegations, and State and Territorial governments. The National Academy of Sciences has consulted project staff with interest in potential research avenues related to the issue. Private individuals and dive shops have contacted project staff with local knowledge about particular vessels. It is clear that there is a n interest in removing abandoned vessels that is shared by a variety of entities and individuals.

Data collection that is not coupled with analysis or action is merely an exercise in numbers. The Abandoned Vessel Project is unique in that it couple data collection and action. Building on the success of the longliner removals in Pago Pago Harbor, the Abandoned Vessel Project is identifying further removal projects and helping to secure funding. By building the removal capabilities of local governments, this project has the potential for far-reaching impacts. The technical infrastructure is in place to support federal, state, territorial, and local efforts by (a) filling gaps in the existing model of decentralized data collection, (b) identifying high priority vessels, (c) efficiently distributing geographic information to resource managers in all applicable areas.

The Abandoned Vessel Project suggests a new standard for spill response – one that gives greater consideration to vessel removal as a response action. This would limit further pollution threats posed by the vessel as well as continual environmental damages caused by physical destruction, metal deposition, and gear dispersal.

REFERENCES

"Emergency Restoration Plan and Environmental Assessment: Pago Pago Harbor, American Samoa" (1999)

BIOGRAPHY of expected presenter

Andrew Smith worked on the early phases of the Abandoned Vessel Project at NOAA's Damage Assessment Center in Seattle. He now teaches middle school science in Tacoma, Washington.