Overview of Japan Tsunami Marine Debris Removal Costs

There is significant continued public interest in the marine debris generated by the devastating tsunami in Japan last year and its potential impact on U.S. coastlines. NOAA and our Federal, State and local partners are working to respond to the debris arriving now while continuing to plan for any long term response that may be necessary.

Background

The Japanese government estimated that the tsunami swept about 5 million tons of debris into the ocean, but that 70 percent sank offshore, leaving 1.5 million tons floating in the immediate aftermath of the event. There is no estimate of how much Japan tsunami marine debris is still floating today. However, the Japan tsunami marine debris is no longer in a "debris field" and there are estimated to be many items scattered across an area of the North Pacific that is roughly three times the size of the continental United States.

Marine debris is a longstanding and widespread problem that is only exacerbated by last year's tsunami. Since the passage of the Marine Debris Research, Prevention and Reduction Act and the establishment of NOAA's Marine Debris Program in 2006, NOAA has placed a significant focus on marine debris prevention, education, and outreach. NOAA has also funded marine debris removal projects, allocating approximately $1 million annually, or roughly a quarter of the Program's total funding, toward these projects.

Since marine debris is an on-going problem, determining whether particular items were washed into the sea by the Japan tsunami or from some other source is very challenging. Most marine debris is consumer waste, such as plastic bottles, and it is not possible to determine the source without a unique identifier, which most items do not possess. In addition, the overwhelming amount of debris in the Pacific pre-dates the tsunami (for the most part originating in Asia), making it extremely difficult to distinguish between marine debris from the tsunami and preexisting debris. Some of the more recent events in the Pacific Northwest have demonstrated a clearer linkage to the Japan tsunami. NOAA and our partners are using models, satellite data, and observations from many sources to try to estimate where the debris is located, what kinds of materials are still floating, and when it might come ashore.

We lack good estimates of the total amount of debris floating on the North Pacific Ocean, but we can strive to put the scope of the problem in perspective. As one measure, the Ocean Conservancy tracks the amount of debris removed each year from their International Coastal Cleanup events. This is just a one-day event each year, but over the course of 25 years (1985-2010), the Ocean Conservancy reports that nearly nine million volunteers from 152 countries removed 72,500 tons of debris. In 2011 alone, nearly 600,000 volunteers removed over 4,592 tons of debris.

Estimating Costs of Removal and Disposal

There are many difficulties when trying to estimate the potential cost of debris removal and disposal. First, the quantity, distribution, composition and timing of tsunami debris on shorelines are unknown. For example, a large amount of debris hitting a single location over a short period of time would require a different cost to remove than the same amount and type of debris washing up in the same location over a long period of time. Second, the type and accessibility of shoreline will impact the cost to remove and dispose of debris. Lastly, the type of debris, including large debris, such as vessels and containers, will require a different type of removal operation, expertise, permitting requirements, and associated cost structure than larger amounts of smaller debris items.

Vessel removal and disposal is inherently much more expensive than removal of other types of debris. The cost to remove the dock that recently washed ashore in Oregon will be $85,000. Vessel removal and recovery costs vary depending on a range of factors including vessel size, type, condition, and location. A few examples are listed below:

- **M/V New Carissa Stern: $19 million:** In 2008, the Oregon Department of State Lands removed and disposed of the grounded remaining stern section of the M/V New Carissa, which had grounded in 1999 off Coos Bay, Oregon. This cost did not include pollutant removal, which had been addressed during the initial response.
- **F/V Mar Gun: $3.6 million**: In 2009, the 112-foot F/V Mar Gun was grounded on St. George Island in the Pribilof Islands of Alaska. Salvage costs were for removal only; they do not include any disposal costs or the pollution response. Oil removal and pollution response was an additional $750,000.
- **Barge Davy Crockett: $ 22.5 million:** In 2011, the 431-foot derelict former WWII Navy Barge Davy Crockett was removed from the Columbia River, near Vancouver, WA, by the U.S. Coast Guard. Costs included removal and disposal of oil and hazardous materials.

Using previously funded projects, and information on projects funded by other groups, NOAA analyzed the range of removal and disposal costs that may be relevant to the tsunami debris. After considering the uncertainty associated with the location and type of debris, and the variation in costs by geographic area and shoreline type, NOAA estimated that it may cost approximately $4,300 per ton of debris. This estimate will change as more debris reaches shore and more is known about the type of debris (large vs. small items) and where it arrives (remote vs. easily accessed areas). This estimate does not account for the costs to address other related issues, such as aquatic invasive species.

As debris washes ashore, NOAA is working with other federal, state and local partners to ensure there are rapid response protocols in place to respond to and remove the debris as quickly as possible to minimize impacts. NOAA is fully committed to continuing to lead efforts with Federal, State and local partners to collect data, assess the debris, and reduce possible impacts to our natural resources and coastal communities

(This document was prepared by NOAA in July 2012 and is presented here with their permission.)