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Severe Marine Debris Event Report: Japan Tsunami Marine Debris

Overview and Update to Congress | August 2013

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

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INTRODUCTION

This Severe Marine Debris Event Report provides an update on the activities federal agencies have undertaken between March 2011 and May 2013 to address marine debris associated with the March 2011 Japanese tsunami, declared a Severe Marine Debris Event by the National Oceanic and Atmospheric Administration (NOAA). As required in the Marine Debris Act (33 U.S.C. 1951 et seq., as amended by Title VI of Public Law 112-213), NOAA is tasked with developing, in consultation with the Interagency Committee, interagency plans for the timely response to events determined by the Administrator to be severe marine debris events, including plans to: coordinate across agencies and with relevant State, tribal, and local governments to ensure adequate, timely, and efficient response; assess the composition, volume, and trajectory of marine debris associated with a severe marine debris event; and estimate the potential impacts of a severe marine debris event, including economic impacts on human health, navigation safety, natural resources, tourism, and livestock, including aquaculture. This report will serve as a comprehensive resource summarizing federal progress and involvement related to this effort as of May 2013. This information is only a snapshot in time. Activities and efforts described in this report are ongoing and changing rapidly.

BACKGROUND

Photo Credit:U.S. Pacific Fleet, March 2011

An aerial view of damage and remaining debris in Wakuya, Japan after a 9.0 magnitude earthquake and subsequent tsunami devastated the area in northern Japan (March 2011).

On March 11, 2011, an earthquake with a magnitude of 9.0 rocked the country of Japan, triggering a tsunami with waves up to 130 feet that devastated over 200 miles of land. The events produced a staggering loss of human life and property, and in its wake the problem of marine debris unfurled. As the tsunami receded from land, it washed much of what was in the inundation zone back into the ocean. Heavier materials sank closer to shore, while buoyant materials went on to make up the debris fields initially captured by satellite imagery and aerial photos of the waters surrounding Japan immediately after the tsunami. In the months that followed the tsunami, it became apparent that the untold amount of property loss was to become a marine debris issue not just for Japan, but also for its neighbor across the Pacific, the United States.

Because of the size of the potential debris area and the narrow coverage of high resolution satellite imagery, it became clear that a full coverage survey of the situation was not possible or practical. Shortly after the tsunami, a variety of types of satellite imagery (e.g., ENVISAT, LANDSAT, SPOT, ASTER) became available from a variety of sources, including U.S. Geological Survey, the International Disaster Charter, the European Space Agency rolling archives, and a joint NASA/JAXA Web site. This imagery was analyzed by the National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite, Data and Information Services (NESDIS), and indicated fields of debris that were visible in 15–30 m resolution data. More recently, the National Geospatial-Intelligence Agency (NGA) has provided

NOAA with higher resolution (1–5 m) satellite imagery.

Although debris fields are no longer visible by satellite, dispersed, buoyant items continue to float in the North Pacific. This assorted debris, referred to henceforth as Japan Tsunami Marine Debris (JTMD), ranges from derelict vessels and large floating docks to small household items, with fishing gear and construction items of various sizes and compositions in between. NOAA and its federal and non-federal partners are leading efforts to collect data, assess the debris and possible impacts based on sound science, and protect our natural resources and coasts.

As debris continues to wash ashore, NOAA is working with federal, state, and local partners in the areas of potential impact to identify and implement rapid response protocols to respond to and remove the debris as quickly as possible in order to minimize the negative effects of the landings. Because of the wide diversity of debris types and potential impacts, contingency planning has required significant coordination at local, state, and federal levels. This type of coordination is critical, and several mechanisms exist to ensure a good flow of information. Workshops on the JTMD issue have been conducted with partner agencies and organizations to provide a common foundation of understanding about the debris and to facilitate development of response contingency plans. Plans developed are particularly valuable for identifying existing capabilities, mandates, and gaps relative to responses to any large or hazardous items that make landfall on U.S. coastlines.

The potential area of debris drift in the North Pacific Ocean is quite large, and thus it is essential to explore all possibilities for JTMD detection. Many variables affect where the debris will go and when, including the composition of the debris itself. Items will sink, disperse, and break up along the way, and winds and ocean currents constantly change, making it very difficult to predict an exact date and location of arrival on U.S. shores. In addition, the objects themselves behave differently based on their buoyancy and composition—objects that sit high in the water such as buoys, floats and small boats material will be most affected by wind, while objects that sit lower in the water such as construction debris, fishing nets and lumber will be affected primarily by currents. Objects of different kinds that start in the same place may move not only at different speeds, but also in different directions. Researchers rely on computer models to predict the path and drift rate of debris items. These model simulations show debris spread over an area three times the size of the continental United States, much of it in the middle of the Pacific Ocean, thousands of miles from land. This large target area combined with the diversity and spread of debris required a holistic approach to detection, leveraging resources across agencies, detection platforms, and sensor types. Federal and state partners have focused on all areas of potential impact to develop contingency plans for potential landfall of Japan tsunami marine debris.

As a result of an updated modeling effort that incorporated wind speed and ocean current data from the past two years, there is now a better understanding of how fast the debris may travel. This modeling effort showed that the fastest moving and most buoyant simulated debris items would reach the Pacific Northwest coast during winter 2011–2012. Sightings of debris items such as small boats, palettes and even large docks found ashore in both Oregon and Washington have supported that hypothesis model. The models also tell us that the bulk of the debris is likely still dispersed north of the Hawaiian Islands.

POTENTIAL IMPACTS

As the debris travels and finds its way to the coast, it can have numerous adverse impacts on both the physical and biological environment. Coral reef, wetland and fish habitats, beaches, migratory species breeding grounds and pathways may all be affected. Ecological impacts can also vary depending on the type of marine debris. In terms of JTMD, observed items such as abandoned nets, plastic tarps, and small boats can smother or crush sensitive ecosystems and their bottom dwelling species. Derelict or lost fishing gear that has come ashore has the potential to impact habitats and fisheries, capturing target and non-target species as well as local and migratory species, many of which are protected under the Endangered Species Act. Fishing line, nets, rope and other debris can entangle, maim and even drown many wildlife species by encircling or ensnaring the animals. While there haven't been documented accounts of animal entanglement with JTMD as of the date of this report, the potential exists. Entanglement can occur accidentally or when animals are attracted to the debris as part of normal behavior or out of curiosity. The impacts to species aren't limited to just large debris items; smaller debris items such as bottle caps, lighters, and plastic pieces are also hazardous to wildlife. This debris can behave like and resemble food to animals. Once ingested, these materials can cause starvation and/or choking.

There are potential indirect impacts to the environment associated with marine debris as well. An impact of marine debris on shoreline habitats occurs on beaches as a result of debris reduction and removal efforts. Mechanical beach raking, accomplished with a tractor or human labor, is used to remove debris from the shoreline and can help to remove floatable material from beaches and marine shorelines. However, beach raking can also be harmful to aquatic vegetation, nesting birds, sea turtles, and other types of aquatic life. Natural storm events, such as the Japan tsunami, often mobilize marine debris, impacting various species and habitats as it moves throughout the water column. Marine debris can also indirectly damage the environment if it causes vessel accidents that spill oil or hazardous materials. Alien species transport and the introduction of invasive species such as those carried on a floating dock that washed ashore in Oregon in June 2012 and was confirmed to be JTMD, are also indirect impacts to an ecosystem that can have long lasting effects. In the case of the aforementioned dock, it carried a biofouling community that included over 90 marine species that were not native to the West Coast of North America. Some of these species were known to be invasive and could cause ecosystem and economic harm; however these invasives were treated and removed from the area.

Impacts from marine debris are not only environmental; they also include adverse effects to human health and safety, and the economy. Beachgoers can be injured by stepping on broken glass, cans, needles or other items. Swimmers and divers can also become entangled in abandoned netting and fishing lines. Vessels may directly strike floating or submerged marine debris, which may lead to human injury or severe damage to the vessel. Passengers may be injured or killed if the vessel is damaged or disabled. Although lack of comprehensive economic assessments limits the ability to fully estimate the overall economic impact of marine debris, evidence of economic losses for specific cases point to a significant impact. In the case of a dock which landed within the Olympic National Park along the coast of Washington state, removal alone cost $628,000, an expense fortunately leveraged by funds provided to NOAA from the government of Japan to help with cleanup of marine debris from the tsunami. Efforts to survey and assess the scope of the debris problem also come at a significant cost; the state of Alaska spending over $200,000 on aerial surveys alone.

Direct economic losses from marine debris can be measured in a number of different ways, including analysis of impacts on tourism, losses in catch revenues, loss of fishing gear, damaged vessels, and human injuries. Marine debris can be detrimental to the tourism industry when unsightly, dangerous beaches become less desirable destinations or when local authorities are forced to close beaches over concerns for public safety. Even the possibility of JTMD arriving on shores can impact tourism as once-appealing destinations may seem less so with the threat of items such as Styrofoam, floats, construction debris approaching. This was seen during the 2010 Gulf oil spill when tourists avoided beaches in the region that had not been impacted by oil. Highlighting the concern for tsunami debris, National Park Service staff in Alaska have recently reported a noticeable increase in calls regarding the status of beaches within their parks. Beach closures can result in a significant decline in visitor fees while the costs associated with cleanups and disposal of debris, habitat restoration, and repair of damaged infrastructure can greatly impact the budgets of the responsible state, federal or local agencies. These costs can quickly exceed the entire budget of these agencies.

Environmental contamination from the debris can also have significant impacts to tourism, commercial and recreational fishing, as well as the overall health of the ecosystem. In the case of the Japan tsunami, early concerns arose over the possibility of human remains, contaminated seafood and radioactive items included in the debris that was approaching. Efforts by NOAA and State agencies however dispelled these potential concerns, and have worked together to communicate the facts about the potential risks associated with the tsunami debris and create a single website where the public can access the most up to date information (http://disasterdebris.wordpress.com/).

NATIONAL EFFORTS: MONITORING

NOAA, through its Marine Debris Program has developed a monitoring program (MD-MAP) to gain a better understanding of the overall picture of the pervasiveness of the debris that washes up onto our shores each year. Information on the types and quantities of debris that are present in the marine environment is essential to evaluate the scope of the problem, possible sources and mitigation efforts, and to be able to evaluate the effectiveness of measures to prevent marine debris. Regularly scheduled, standardized shoreline monitoring efforts help NOAA collect this baseline data. In addition, on local and regional scales, these studies can address specific questions to better assess the size of the problem and whether to allocate resources to address it. NOAA has created the MD-MAP to increase the use of its standardized protocols and set the stage for a nationwide monitoring network in the future. An online database to house and export MD-MAP data has been developed to facilitate data analysis (md-map.net).

The potential for Japanese tsunami debris to impact U.S. shorelines brought the importance of standardized shoreline monitoring protocols to the forefront. Regular, consistent monitoring of the types and abundance of marine debris on shorelines can provide important baseline debris information. This data can be used to identify a change in the amount and types of marine debris, and a potential influx of Japan tsunami debris. In 2012 the MDP developed and distributed a user-friendly Marine Debris Shoreline Survey Field Guide. Communities responded with much interest; to date the field guide has been requested by more than 300 individuals or organizations. Beginning in January 2012, NOAA began to partner with various groups on regular monitoring at sites potentially impacted by Japan tsunami debris. In exchange for project oversight, field supplies, and other support, monitoring teams committed to survey set shoreline sites on a monthly basis and provide data to the NOAA for a period of two years. The MD-MAP quickly grew to over 150 shoreline sites across Alaska, Washington, Oregon, California, and Hawaii. Partners include Olympic Coast National Marine Sanctuary, Gulf of Farallones National Marine Sanctuary, NOAA National Marine Fisheries Service Auke Bay Lab, US Fish and Wildlife Service, National Park Service, Oregon State University/Oregon Sea Grant, and numerous non-governmental organizations and volunteers from the public.

Computer models created by multiple agency and academic subject matter experts predicted, in gross estimate, that marine debris generated by the Japan tsunami would make landfall in the Northwestern Hawaiian Islands by winter 2012, then approach the West Coast and Southeast Alaska in 2013, and circle back to the main Hawaiian Islands in 2014. Consistent reports of sightings and confirmed JTMD in California, Oregon and Washington have supported these predictions, while confirmed JTMD in Hawaii shows that the models were conservative in their estimates in terms of time of landfall in the main Hawaiian Islands. This was not unexpected due to the uncertainty in predicting currents and wind months or years in advance.

Efforts to monitor current debris issues and create baseline data on the “normal” amount of debris along the shores to be affected will allow us to detect tsunami debris by observing changes in composition of the types of debris as well as volume. Many monitoring sites already exist, but we are expanding these throughout potential impact areas. A shoreline monitoring database has been developed and launched to keep up with ever developing information that comes in from the 160 different monitoring sites, over 40 of which are monitored monthly. In the state of California alone, for example, over 10 federal, state and local partners have established 24 shoreline monitoring sites.

Further complicating efforts, these coasts were already impacted by a tremendous amount of marine debris before the tsunami occurred. It is difficult or even impossible to positively identify a particular item as having originated from the Japanese tsunami. Just because an item has Japanese markings does not mean it is tsunami debris because some of the historical debris was also of Japanese origin.

NATIONAL EFFORTS: FEDERAL COORDINATION

It is important to mention that while the Japan tsunami was indeed a severe marine debris event, significant amounts of debris from the open ocean and local uses come ashore every year. The debris resulting from the tsunami truly adds to an already existing problem impacting our shores. The JTMD issue has affected more than just the coastlines of the United States. On an international level, NOAA is coordinating with the Governments of Japan and Canada to exchange information on the tsunami debris. Representatives from NOAA, along with State Department partners, have met regularly with the Government of Japan and its consulates in impacted states. NOAA MDP also hosts a bi-weekly call open to all interested federal, state and local agencies to present the latest information on the situation. The participant list exceeds 200 representatives from all affected states, including remote coastal areas ranging from Midway Atoll, Hawaii to British Columbia, to King Salmon, Alaska.

Efforts to mitigate marine debris specific to this event will prevail, but it is imperative that we continue to approach this issue by understanding and addressing the larger historical marine debris problem as a whole. To do this, the problem must continue to be addressed across all relevant federal agencies and in partnership with state and local groups. The following paragraphs give a brief overview of activities and involvement by federal agencies to address the JTMD issue along U.S. shores.

National Oceanic and Atmospheric Administration (NOAA), Department of Commerce

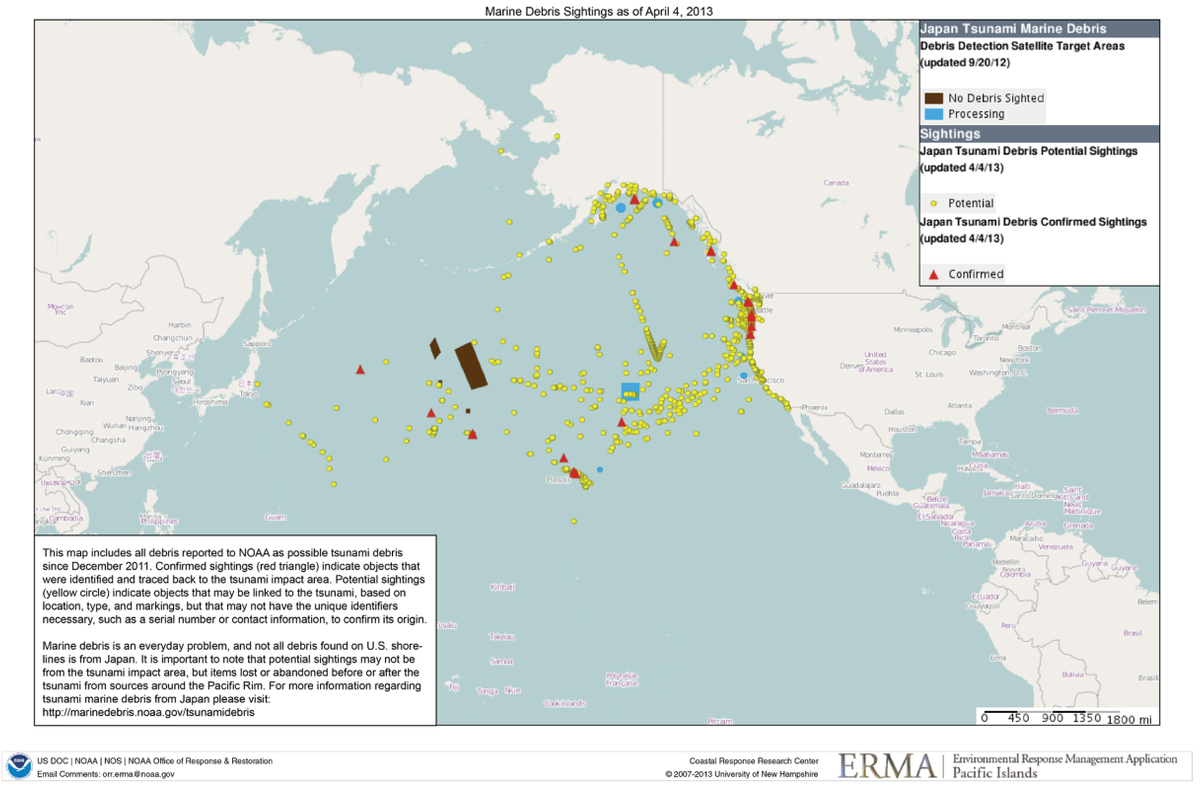
Any potential tsunami debris sigthings at sea or from the gerenal public on shore may be reported to:

DisasterDebris@noaa.gov

NOAA is leading efforts with federal, state, and local partners to collect data on JTMD quantity, location, and movement; assess potential impacts; and plan for efforts to reduce possible impacts to our natural resources and coastal communities. The efforts undertaken by NOAA include a wide range of activities from detection and modeling, to establishing a debris sightings database and visualization, to monitoring and removal.

NOAA provides regular updates to members of Congress and is coordinating with the Governments of Japan and Canada to exchange information on the tsunami debris. Representatives from NOAA, along with the Department of State, have met regularly with the Government of Japan and its consulates in impacted states.

NOAA established an email address, DisasterDebris@noaa.gov, where any sightings at sea or from the general public on shore may be reported. In turn, those sightings are entered into a tracking database. NOAA has widely distributed the debris sightings e-mail address to ensure the database contains current and accurate debris tracking information. NOAA is also loading sightings data into the Environmental Response Management Application (ERMA) to graphically display the geographic distribution of the sightings at-sea and shoreline reports of debris. Reports of hazardous materials or debris that could be a hazard to navigation are immediately reported to the U.S. Coast Guard for further action.

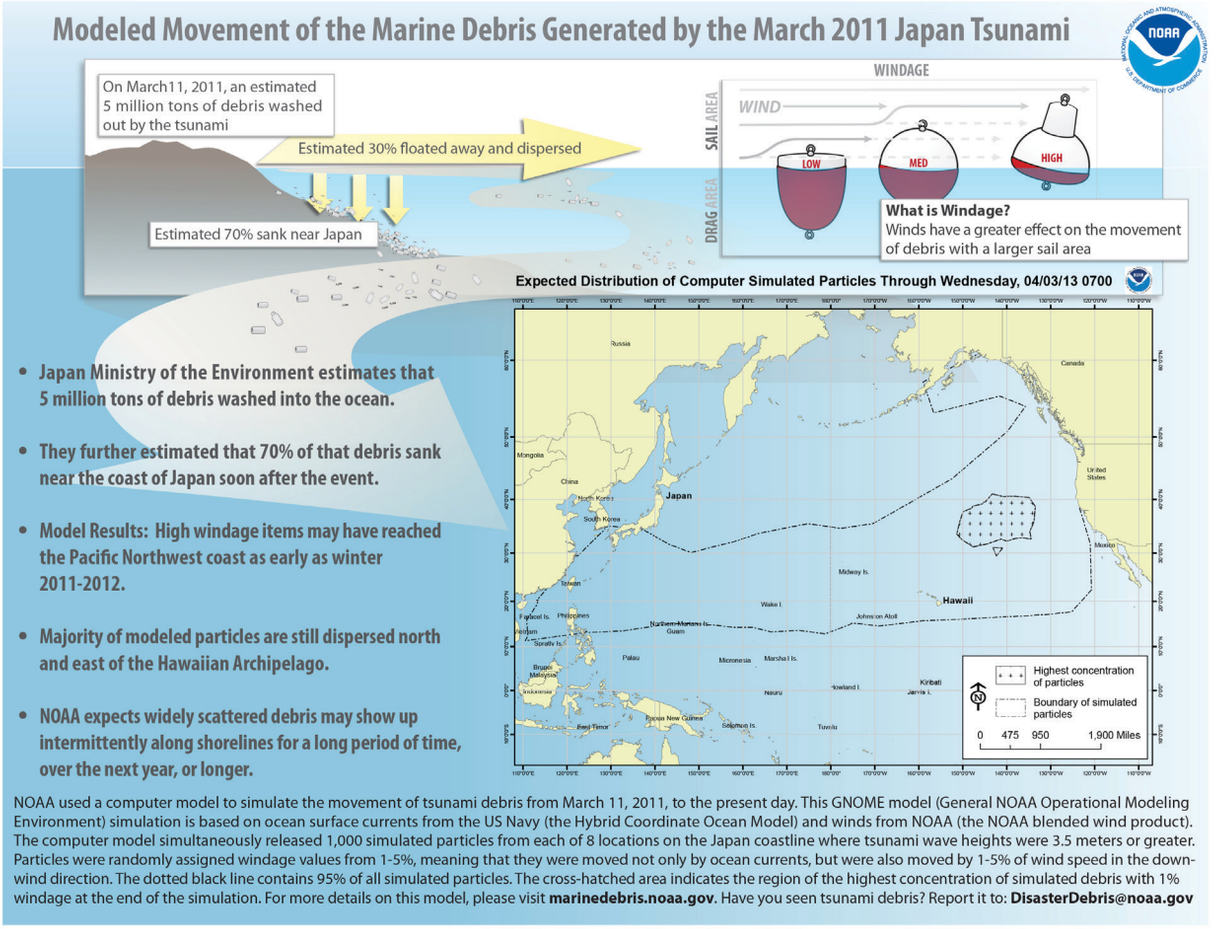


NOAA has mapped all marine debris sightings reported to DisasterDebris@noaa.gov as possible tsunami debris, using NOAA's ERMA® (Environmental Response Management Application) tool. This ERMA snapshot is from April 2013.

NOAA has worked with the U.S. Department of Transportation's Maritime Administration (MARAD) to place ocean-going vessels on alert, and has asked partners across shipping, science, fishing, and recreational fleets who regularly travel the Pacific Ocean to report back any significant sightings. This information has also been disseminated to shipping fleets (through the World Ocean Council), commercial and recreational fishing vessels, scientific expeditions, and government vessels and fleets.

Initial satellite imagery of the JTMD was analyzed by NOAA NESDIS, and indicated fields of debris that were visible in 15–30 m resolution data. More recently, the National Geospatial-Intelligence Agency (NGA) has provided NOAA with higher resolution (1–5 m) satellite imagery for four requested target areas. NOAA is continuing to analyze these images and to communicate with NGA through the Civil Applications Committee and U.S. Geological Survey to access satellite imagery over areas of high interest (based on modeling) to locate and map marine debris.

In December 2011, NOAA formed a Subject Matter Expert (SME) Group of modelers from across NOAA line offices as well as the University of Hawaii. This group works to share information on modeling approaches and data sources, and includes the leads for the University of Hawaii's Surface Currents from Diagnostic (SCUD) model, the NOAA Ocean Surface Current Simulator (OSCURS) model, and NOAA's General NOAA Operational Modeling Environment (GNOME) model. The SCUD and OSCURS model were the first applied to tsunami debris, and utilized long term historical averages for weather and currents to forecast the movement of debris, primarily focused on lower-floating current driven debris. Later modeling efforts have focused on the integration of U.S. Navy HyCOM blended winds data with the GNOME model (see Appendix 4, GNOME Modeled Movement of the Marine Debris Generated by



Modeled movement of the debris generated by the March 2011 Japan tsunami. The model gives NOAA an understanding of where debris from the tsunami may be located today, because it incorporates how winds and ocean currents since the event may have moved items through the Pacific Ocean. This model is a snapshot from April 2013, of where debris may be now, but it does not predict when debris will reach U.S. shores in the future. It's a "hindcast," rather than a "forecast."

the March 2011 Japan Tsunami). This approach uses the best available real-world weather and currents data to update the model outputs, rather than projections based on historical data. In addition, and as mentioned, previous modeling efforts focused primarily on low-windage objects, objects with a smaller sail area that are less affected by wind. The GNOME model approach includes particles with a range of windage values to represent diverse debris types and behaviors, including high windage objects, with values derived from experimental data in the USCG windage/leeway library. Because it is based on real-time data, this model is a hindcast, meaning that it shows where debris may be now, but not where it will be in the future. Based on these refinements, the GNOME model shows the fastest high-windage particles arriving in the Pacific Northwest and Alaska in the winter of 2012. The model is updated with new data every two weeks. It is important to keep in mind that while modeling is helpful and informative, a model is not reality. NOAA has emphasized that all modeling should be considered with their limitations in mind, and this is particularly applicable to forecast modeling.

NOAA expects that most of the marine debris generated by the Japan tsunami will be difficult to distinguish from the normal marine debris that washes ashore every day in Hawaii, Alaska, and along the West Coast of North America. In some cases, specific objects may have unique identifiable marking such as a name or license/registration number. NOAA continues to be in close contact with the Consulate General of Japan in each affected state, discussing significant JTMD events and requesting verification of

significant items to be related to Japan and the tsunami. To date, the number of these objects with specific identifiers has been low. Rather, a primary indication of Japan tsunami marine debris items making landfall in a region may instead be a change in the quantity or the composition of debris as compared to what is normally observed for that region. NOAA, through its national monitoring program (MD-MAP) assists in the understanding of the overall JTMD picture as previously mentioned.

Interagency Marine Debris Coordinating Committee (IMDCC)

NOAA, as the chair agency of the Interagency Marine Debris Coordinating Committee, has had the opportunity to engage in activities with various federal agencies to address the problem of marine debris on a wider scale as well as on a case-specific basis such as the JTMD. The IMDCC receives regular situational updates and has discussed how to best leverage capabilities without duplicating efforts.

The IMDCC is made up of the following agencies:

Department of Commerce/National Oceanic and Atmospheric Administration (NOAA); Department of Defense/Army Corps of Engineers (COE), U.S. Navy (USN); Department of Homeland Security/U.S. Coast Guard (USCG); U.S. Environmental Protection Agency (EPA); Department of Interior/U.S. Fish and Wildlife Service (USFWS), National Park Service (NPS); Bureau of Safety and Environmental Enforcement (BSEE); Department of State (DOS); Marine Mammal Commission (MMC); Department of Justice (DOJ), and any other federal agency or organization that has an interest in ocean issues and water pollution prevention and control. Many of these agencies, as well as others, have been directly involved in efforts to mitigate the potential and confirmed existence of JTMD along U.S. coasts. The following paragraphs entail specific information in regards to the participation of other federal agencies in the JTMD effort.

Bureau of Land Management (BLM), Department of Interior

The Bureau of Land Management has been involved in the JTMD issue primarily along the 35-mile long coastline of the Kings Range National Conservation Area, a Wilderness Area in northern California, and in the state of Alaska, where land ownership and management within the coastal zone is very diverse. Multiple federal agencies hold or manage significant areas of shoreline, as do Native organizations and private groups. The BLM provides maps and graphical representations of public land ownership/management by federal and State agencies in Alaska. In many areas, the large contiguous ownership or management areas of agencies are broken up by inholdings–small areas of land within the larger division that are owned or controlled by private parties or other organizations. The importance of this information to the JTMD issue is the fact that jurisdiction over a particular coastal area gives authority to determine how or whether to proceed if marine debris is found in that area. For example, an agency or private landowner would have the authority to decide who can come onto the land to survey or clean up marine debris and what equipment or methods may be used. The maps generated by the BLM assist with efforts to identify the correct landowners and expedite the process of survey, mitigation and/or remediation.

Department of State (DOS)

The role of the Department of State (DOS) in interagency efforts to address potential impacts of marine debris originating from the March 2011 Japan tsunami is to engage in bilateral and multilateral cooperation/coordination with other countries (e.g., bilaterally between the United States and Japan, possibly including Canada and Mexico, and potentially multilaterally, such as within the framework of the International Maritime Organization). DOS conducts high-level meetings as needed with the Japanese Ministry of Environment to ensure effective diplomatic cooperation on tsunami marine debris. In addition, staff from the Department of State Bureau of East Asian and Pacific Affairs and Bureau of Oceans and International Environmental and Scientific Affairs engage with staff from the Embassy of Japan in Washington, D.C., and work through the U.S. Embassy in Japan to facilitate meetings between other U.S. agencies and the Government of Japan. These meetings help the U.S. government establish a common understanding with Japanese counterparts on various aspects of the tsunami marine debris issue, such as information sharing and public communications.

The Government of Japan and the United States maintain a cooperative relationship to address the issue of tsunami marine debris. The Department of State assists in coordinating with the Government of Japan to receive updated information on Japanese models of tsunami marine debris timelines and trajectories, as well as information about the type and quantity of debris that was carried away by the tsunami. This information assists in U.S. tsunami marine debris preparedness efforts.

DOS works closely with the Government of Japan to determine how to handle specific cases involving items that are clearly linked to the tsunami, such as the case of a derelict fishing vessel that posed a hazard to navigation in U.S. waters. It is important to both the United States and Japan that items of personal value identified as Japan tsunami debris are treated with respect, and, to the extent possible, are returned to their original owners if identifiable. While only a fraction of the marine debris that is washing ashore in the United States originated from the March 2011 Japan tsunami, members of the public are being advised to contact NOAA if they find an item that they suspect may have originated from the tsunami. NOAA will in turn coordinate with Japanese consulates to try to determine whether the item did in fact originate from the tsunami. If so, the Japanese consulates will assist in trying to identify the owner to determine what to do with the item. DOS assists as needed in coordinating these efforts. DOS also facilitates communication between the Government of Japan and U.S. government agencies regarding any offers of assistance from Japan to help with the cleanup of tsunami marine debris washing ashore in the United States.

Fish and Wildlife Service (FWS), Department of the Interior

The FWS-managed National Wildlife Refuge System includes 180 refuges that are routinely affected by marine debris of all sorts. At least 32 National Wildlife Refuges (NWR) in Alaska, Washington, Oregon, California, and remote U.S. Pacific islands could be impacted by Japan tsunami-generated debris over the next several years. The FWS has drafted tsunami debris response plans to provide guidelines for visitors, volunteers, and responders to ensure their safety and help minimize disturbance to wildlife and sensitive habitat on refuges. The FWS will continue to coordinate with partners (e.g. NOAA, USCG, states, and local volunteer groups) to identify priority cleanup sites and assist in with cleanups where possible. The FWS does not have specific budget allocations for marine debris response and removal. Refuges allocate funding for marine debris removal through their operations and maintenance budget as needed.
Many of the refuges most impacted by marine debris, and also most likely to receive additional tsunami

debris, present tremendous logistical challenges and are difficult, dangerous, and expensive to access. For example, the Alaska Maritime NWR in the Aleutian Islands encompasses more than 2,400 islands stretching over thousands of miles of extremely hazardous waters. Midway Atoll and Hawaiian Islands NWRs in the Papahānaumokuākea Marine National Monument span over 1,000 miles and include hundreds of small islands and shallow coral reefs that collect great amounts of marine debris. Coastal refuges in Washington and Oregon include hundreds of offshore islands that could be impacted by debris. FWS staff will continue to monitor refuge coastlines for marine debris particularly large hazardous objects and work with partners to organize more frequent cleanups if needed. Debris likely attributed to the tsunami has been observed in Alaska (Alaska Maritime and Kodiak NWRs), Washington (Dungeness and Willapa NWRs), and at Midway Atoll NWR in the Northwestern Hawaiian Islands.

Midway Atoll NWR and remote field stations in the Hawaiian Islands NWR were heavily impacted by the initial tsunami wave. The staff and residents received four hours of notice and promptly initiated their tsunami response plan. No personnel were injured but the wave killed tens of thousands of nesting sea birds. The Midway staff quickly responded and rescued many birds and sea turtles that were entangled in debris.

The FWS's Fisheries and Habitat Conservation's (FHC) Aquatic Invasive Species program is working with the Refuge System and other state and federal agencies to develop plans to mitigate the risks associated with the introduction of non-native species associated with the tsunami debris. Consequences of an invasion of non-native species include competition with or predation upon native species, hybridization, carrying or supporting harmful pathogens and parasites that may affect wildlife, aquacultural stocks and human health, disturbing ecosystem function through alteration of food webs and nutrient recycling rates, acting as ecosystem engineers and altering habitat structure, degradation of the aesthetic quality of natural resources, and increased fouling to marine structures (e.g. aquaculture, energy facilities, etc.) causing significant economic impacts.

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), as amended by the National Invasive Species Act (NISA) of 1996, established the ANSTF to coordinate ANS activities among federal agencies and between federal agencies, regional, State, Tribal, and local organizations. The Director of the Fish and Wildlife Service and the NOAA Administrator were designated as the ANSTF chairpersons. FWS administers the ANSTF and provides funds to support ANSTF administration, its six regional panels, ANSTF-approved state/interstate ANS management plans, and ANSTF-approved species management and control plans.

State/interstate ANS management plans often identify strategies for early detection, rapid response (EDRR) actions. The Western Regional Panel includes members from Washington, Oregon, Alaska, Hawaii, and California. These states received ANSTF-approval for their ANS management plans in 1998, 2001, 2002, 2003, and 2007, respectively. NANPCA authorizes $4,000,000 to support the implementation of State/Interstate ANS management plans. In 2011, FWS allocated $1,075,000 of its ANS Program appropriation to support this activity. On average, approximately $29,800 was provided for implementation of each of the 36 approved State/Interstate ANS Management Plans that applied for funding. FWS provides $50,000 for each of its Regional Panels, which advise the ANSTF and play a critical role collaborating and coordinating at the regional and local level to address AIS issues.

National Park Service (NPS), Department of the Interior

The National Park System includes 85 units on the ocean and Great Lakes with more than 11,000 miles of shoreline and 2.5 million acres of coastal waters. Potentially affected by the JTMD are 31 NPS units on the West Coast, Alaska and Pacific Islands. The Service is working with NOAA Marine Debris Program and other federal and State partner agencies to assess the potential impacts of the JTMD. In general, protection of health and safety and feasibility factors will determine removal methods for JTMD-related debris. The NPS has distributed a document to potentially affected parks entitled Tsunami Debris Response Policies and Procedures. This handbook has guidance on JTMD issues, NPS policies, mitigation of threats to human health and wildlife, and communications protocols that parks can adapt to local resources and conditions. NPS also utilizes the Response Protocols for Biofouled Debris and Invasive Species Generated by the 2011 Japan Tsunami.

Tracking and responding to debris in remote locations is a significant challenge. In December 2012, a large dock washed onto Mosquito Beach, a remote stretch of beach in a designated wilderness area of Olympic National Park, Washington State. This area of the park overlaps with the shoreward boundary of the NOAA Olympic Coast National Marine Sanctuary and is adjacent to the Washington Islands National Wildlife Refuge Complex. The dock measured over 65 feet long and 20 feet wide and weighed more than 185 tons, and is similar to one that washed ashore near Newport, Oregon in June, 2012. Both have been positively identified by the government of Japan as JTMD. Olympic National Park staff led a team consisting of the Washington State Department of Fish and Wildlife, National Science Foundation JTMD Invasive Species Team (Williams College, Oregon State University and Los Angeles County Museum) and NOAA to safely reach the site and collect samples of non-native species. A total of 63 exotic species were identified and cleaned up, 10 of which are known to have invaded environments outside of Japan. Tracking beacons also were attached to the dock. Removal of the dock involves logistical and financial challenges as well as compliance with wilderness protections.

To remove more typical marine debris, the National Parks collaborate with local agencies and nonprofit organizations to sponsor cleanups during the annual International Coastal Cleanup, National Public Lands Day and other events. Thousands of volunteers remove tons of debris from shorelines in parks each year. The National Park Service also collaborates with NOAA and U.S. EPA on marine debris monitoring and removal. A pilot monitoring program conducted over several years in 10 ocean parks contributed to development of monitoring protocols, volunteer training and education modules, and identification of the sources of debris. (See Cole, C.A. and Kliwinski, S. 1998. Final Report of the National Park Marine Debris Monitoring Program. Pennsylvania State University, University Park, PA.; See also J. Miller, and Jones, E. Shoreline Trash – Studies at Padre Island National Seashore, 1989-1998, 2003. University of Arizona).

U.S. Coast Guard (USCG or Coast Guard), Department of Homeland Security

The U.S. Coast Guard supports NOAA's commitment to marine debris monitoring and tracking efforts that ensure safe navigation for shipping and to protect the marine environment by actively monitoring for debris that would create a potential hazard to navigation or present a substantial threat of pollution.

Along with sharing National Response Center reports of pollution threats, the Coast Guard also reports substantial marine debris sightings and encourages commercial vessels to report their sighting to the NOAA Marine Debris Program.

Coast Guard actions in support of NOAA are based on the type of the debris. While NOAA is the lead federal agency for marine debris and the Coast Guard supports NOAA, there are certain instances in which Coast Guard authorities result in them taking on specific roles. In cases where debris poses a potential oil or hazardous substance threat to the environment, the Coast Guard, as the federal On Scene Coordinator (FOSC) for the Coastal Zone, will lead removal actions under the National Contingency Plan (NCP).

The Coast Guard may also develop and issue Broadcast Notice to Mariners (BNMs) to advise vessel traffic of potential hazards to navigation. In certain circumstances the Coast Guard may destroy or sink a hazard to navigation.

Additionally, the Coast Guard frequently works with the U.S. Army Corps of Engineers (ACOE) to manage debris that creates a hazard to navigation in navigable channels or waterways. ACOE is the lead federal agency for all obstructions determined to be in federally maintained navigable channels and waterways. All other types of simple debris that do not pose a pollution threat or a hazard to navigation would be managed by state, local, or tribal jurisdictions.

At the regional and local levels, the operational commanders of Coast Guard Pacific Area, the Thirteenth District in the Pacific Northwest, the Fourteenth District in Hawaii, and the Seventeenth District in Alaska are actively engaged with other federal, state, local and tribal partners to provide a common operational picture and alignment of responsibilities. The Coast Guard is working with NOAA to develop a public outreach and awareness communication strategy. The USCG Fourteenth District recently facilitated a workshop in Honolulu to identify shortfalls and gaps in current plans/strategies specifically for large, nonhazardous marine debris. This workshop was well attended by federal, state and local agencies, as well as the Consul of Japan and resulted in several response and planning objectives that will help guide efforts to respond appropriately should the need arise.

Coast Guard resources and personnel may also be requested by NOAA to support NOAA's mission of debris monitoring and tracking. For example, the USCG has already conducted several over flights with NOAA representatives onboard to help identify debris in locations such as Montague Island, Alaska and O'ahu, Hawaii. These over flights will continue and information will be shared with the relevant federal, state, and local partners. In October 2012, the Coast Guard conducted three over flights near Maui, Hawaii, in an attempt to relocate a dock that was reported by fishermen to local news.

U.S. Environmental Protection Agency (EPA)

The authority to remove debris, including but not limited to tsunami debris from open water and from shorelines rests with the U.S. Army Corp of Engineers, per the Section 19 of the Rivers & Harbors Act (33 USC § 414) and U.S. EPA and the U.S. Coast Guard when characterized as containing hazardous substances or pollutants or contaminants which may present an imminent and substantial danger to public health (per Section 104 of CERCLA), and/or oil or hazardous substances (per Section 311(c)(1 &

2) of CWA and amendments to OPA). USCG and EPA's implementing regulations for these authorities are found in the National Contingency Plan (NCP) for Oil and Hazardous Substances 40 CFR Part 300. Under the NCP, the USCG is responsible for the removal of oil discharges and hazardous substance releases that occur in the coastal zone. EPA is responsible for the emergency removal of oil, pollutants or contaminants, hazardous materials and their containers from the inland zone. The precise boundaries of coastal and inland zones are determined by an interagency agreement between the EPA and the USCG and are agreed upon by the National Response Team. In practice, jurisdictional boundary response has been case-by-case resulting in some EPA and USCG cross boundary response.

The Government's response authority under CERCLA may be invoked where there is a release or a threatened release of a hazardous substance or a release or threatened release of a pollutant or contaminant that may present an imminent and substantial endangerment. CERCLA also provides information gathering authority to the Government to determine if there as has been a release or if there is a threat of a release. Thus, to the extent it is determined that the debris either does not include hazardous substances (including radioactive materials) or include pollutants or contaminants that may present an imminent and substantial endangerment, the Government's authority to respond under CERCLA is limited. It may be most appropriate that debris determined to be non-radioactive solid waste, be addressed through state solid waste management authorities.

U.S. Forest Service, Department of Agriculture

The U.S. Forest Service (USFS) has jurisdiction over the two largest National Forests in the U.S., both of which are located in Alaska. These forests are adjacent to 16,700 miles of salt-water shoreline that could be impacted by tsunami debris. The 5.4-million-acre Chugach National Forest in Southcentral Alaska is the second-largest National Forest in the U.S., and includes Prince William Sound, the Copper River Delta (a major salmon fishery), and much of the Kenai Peninsula. The Tongass National Forest encompasses nearly 17 million acres (80% of Southeast Alaska), and is the nation’s largest National Forest. The majority of National Forest lands in Alaska are off the road system, accessible only by boat, aircraft, or foot. Within the Chugach National Forest, the USFS conducts general monitoring annually as part of regular foot and vessel ranger patrols in Prince William Sound, including the Nellie Juan-College Fiord Wilderness Study Area. This annual monitoring includes documentation of areas impacted by marine debris. Within the Chugach National Forest, USFS conducts general wilderness character monitoring annually as part of regular foot and vessel ranger patrols in Prince William Sound, also including documentation of areas impacted by marine debris. Within all Ranger Districts inside the Tongass National Forest, especially within the Sitka Ranger District and Admiralty Island National Monument, shorelines have been monitored for oil and gas use and impacts, as well as marine debris.

To date, USFS has not been directly involved in responding specifically to large and/or hazardous tsunami debris accumulating on shorelines within the Chugach or Tongass National Forest. The Alaska Region does have a representative engaged in the Biofouling Framework to identify Forest Service roles in coordination with other entities and the public, and support response efforts as appropriate. A special use authorization may be necessary to conduct debris surveys and/or cleanups on National Forest System lands. The Ranger District where surveys/activities will occur should be contacted for

permit requirements. The need for permits would consider: location (including area designations such as Wilderness/Wilderness Study Area, heritage sites, proximity to selected lands), group size, proposed equipment/transportation (camps, structures, vehicles), and coordination/timing with other potential uses. If cleanup is at and/or below mean high tide water, the Forest Service will coordinate with State of Alaska Department of Natural Resources (consistent with an existing MOU) on permit requirements.

U.S. Navy, Department of Defense

The U.S. Navy (Navy) has focused its marine debris efforts at the organizational level by implementing means of minimizing and preventing marine debris from entering the oceans. Navy has several programs to minimize the amount of packaging brought aboard our ships and submarines to reduce the amount of waste generated while at sea. At our installations, Navy continues to partner with State and local authorities to assist in the removal of marine debris, as well as conduct beach and shore clean-ups at our Navy/Marine Corps coastal bases to help protect our shorelines. JTMD modeling efforts have blended Navy HyCom data with NOAA data in the GNOME model to provide real-world weather and currents information for the most accurate movement projections.

TSUNAMI MARINE DEBRIS BY STATE

In regards to U.S. regions specifically affected by this event it is only necessary to look to those states that border the Pacific Ocean, namely Alaska, California, Hawaii, Oregon and Washington. In preparation for the potential impact of JTMD, these states have developed Japan Tsunami Marine Debris Assessment and Response contingency plans (see Appendix F) . The development of such plans includes the efforts of many subject matter experts from each state and across the nation, sharing their information and knowledge to develop response plans for this issue including priority resources and areas at risk, shoreline assessment and monitoring, modeling and trajectories, aerial and at-sea information gathering, as well as impacts to commerce, wildlife, human health and safety and the economy.

The NOAA Marine Debris Program regional coordinators are working with local representatives from federal agencies in Alaska, California, Hawaii, Oregon and Washington, and are also working directly with state and local agencies to ensure they receive and share the most current information. In response to the immediate need for aid NOAA worked to provide $50K from their FY12 budget to assist each of the five affected states in addressing the rapidly approaching JTMD issue and is now working to distribute funding given to the United States from the country of Japan. In addition to response to confirmed JTMD arrival, NOAA and the states have collaborated to put in place a Memorandum of Agreement, Statement of Work, and National Environmental Policy Act (NEPA) review for funding received as a gift from the Government of Japan. The states will receive $250,000 to support JTMD operations.

The following paragraphs include specific activities and information related to this event for the states that have been directly affected.

Alaska

Photo Credit: U.S. Coast Gaurd, April 2012

This 170-foot squid fishing vessel was the first confirmed Japan tsunami marine debris item. The vessel was sunk at sea in Alaskan waters.

Alaska, with its large shoreline area and position relative to winds and currents, received a significant amount of debris that fits the profile of JTMD, primarily light plastics and polystyrene. While these types of debris had arrived consistently over previous years, the increase in these debris types was notable; in some areas it was much as 1000% over pre-tsunami baseline data points. This increase was also noted in a State of Alaska funded aerial survey of the Gulf of Alaska region which showed high densities of light, high-floating materials. Large debris objects were also sighted, with the most notable being the derelict Japanese squid vessel Ryou-Un-Maru sighted off the coast of British Columbia in March and sunk off the coast of Alaska in April 2012.

While other states also received debris, the density of debris in Alaska combined with its rugged shoreline means that debris detection, assessment and removal is challenging, and what could be accomplished through volunteer engagement is often limited in comparison to other states. The established presence of debris, combined with the high cost of field activity, highlights the need for coordinated action planning in this state. Ongoing cleanups by organizations such as the Gulf of Alaska Keeper, Marine Conservation Alliance Foundation, Center for Alaskan Coastal Studies, and Island Trails Network are supplemented with consistent shoreline monitoring by NOAA Auke Bay Labs as well as many others. NOAA also contributed $50,000 towards removal of JTMD in Prince William Sound.

In addition to a state response contingency plan, other proactive measures are also being taken to prepare for JTMD in Alaska. These include public presentations, conferences, Webex meetings, and a specific website devoted to JTMD in the state (http://dec.alaska.gov/commish/tsunami-debris/). A Prioritization Workshop was held in January 2013 to prioritize areas for marine debris removal during the 2013 field season; identify data gaps; and specify needs for invasive and hazardous debris assessment and response activities. The goal is to use data on debris densities from 2012 aerial surveys combined with inputs on impact from land and resource managers to geographically prioritize cleanup/mitigation actions for 2013, and then expand for long term use.

The NOAA Marine Debris Program developed state-specific outreach material for the state of California to address concerns with Japan tsunami marine debris.

California

The natural resources of the coast and coastal ocean along California are a solid foundation for state's economy both in terms of employment and gross state product. Negative impacts to these resources may have serious ramifications on the ocean economy which provides much of the income for the state; thus it not difficult to understand why the protection of the coastline remains a high priority. The state has been very busy in their proactive approach to addressing the issue. One of the first actions was to create a state-specific working group consisting of subject matter experts within the California Emergency Management Agency (CalEMA Ports and Harbors, Debris Management, Hazardous Materials), NOAA, USCG, U.S. EPA, California EPA, the Japanese Consulate, and

other state and federal partners. The JTMD work group maintains regular communications and was tasked with development of the JTMD Concept of Operations (ConOps). The ConOps serves as a resource reference document for local emergency responders, landowners and land managers. The ConOps directs affected localities (Operational Areas) to request assistance from the state in case of emergency. In addition to this, NOAA has also formed a partnership with CalEMA, NPS, CalParks, and the California Department of Natural Resources to develop "Marine Debris Advisory" posters for beach access points to raise awareness in general and promote good stewardship during a time of heightened focus on the marine debris issue. Through NOAA's $50K grant awarded to the California Coastal Commission (through CalEMA), mini-grants will be distributed to Adopt-a-Beach partners to address JTMD issues along the coast.

A positive outcome of this event in California is the reinvigoration of the Ocean Protection Council Marine Debris Steering Committee for information sharing on marine-debris related activities in the state. Other proactive plans include CalEMA, NOAA and US EPA planning to host a workshop and tabletop exercise in May 2013 and the Thank-You Ocean campaign (a partnership between NOAA Office of National Marine Sanctuaries and California Natural Resources) developing a new state-centric marine debris webpage with specific focus on JTMD.

Guam and the Commonwealth of the Northern Mariana Islands

For Guam and the Commonwealth of the Northern Mariana Islands (CNMI), JTMD has not been seen thus far; however communications and collaboration has begun. Educational outreach materials created by NOAA on the subject have been shared with partners in both areas. Currently, NOAA's GNOME model outlook shows a very limited number particles widely scattered across the Western Pacific. There is a small potential for JTMD to come ashore on these islands; however due to the small island sizes, landfall rate will likely be low.

Hawaii, including the Papahānaumokuākea Marine National Monument

Photo Credit:NOAA, November 2012

A derelict fishing vessel, traced back to the area affected by the Japan tsunami, washed ashore along the Northwestern Hawaiian Islands at Midway Atoll. This vessel was the sixteenth overall confirmed Japan tsunami marine debris item, the third item confirmed in Hawaii, and the first for the Northwestern Hawaiian Islands.

Due to their location in the Pacific, models have indicated that the Hawaiian archipelago, including the

Papahānaumokuākea Marine National Monument (encompasses the Northwestern Hawaiian Islands), are particularly vulnerable to the onslaught of debris from the Japan tsunami. In preparation for this, federal, state, local, and non-governmental partners have been working to coordinate planning and response within the Main and Northwestern Hawaiian Islands. Early on in the process, subject matter experts from Hawaii worked to provide ocean circulation modeling information, data visualization, remote sensing and Unmanned Aerial Systems testing in cooperation with various NOAA offices. Surveys of JTMD through aerial observation were assisted by the U.S. Coast Guard D14, U.S. Coast Guard Auxiliary, and U.S. Air Force (as part of the NOAA Winter Storms Reconnaissance). Radiation monitoring has occurred throughout the Main Hawaiian Island and on Midway Atoll in the Northwestern Hawaiian Islands (NWHI).

NOAA and government agency partners created the Hawaii Interagency Marine Debris Working Group and coordinated with the USCG to perform a table top exercise to prepare for potential response to large non-hazardous marine debris. Monitoring and shoreline data collection has taken place on Kure and Midway Atolls in the NWHI as well as in the Main Hawaiian Islands.

Proactive activities to address and prepare for the JTMD issue in Hawaii also include numerous public events, presentations, briefings and media on JTMD throughout the state. Most recently as part of the Honolulu Festivals, information was shared by government representatives (Department of Land and Natural Resources, Department of Health, USCG, and NOAA) as well as the government of Japan on JTMD, followed by media availability with representatives.

Oregon

Photo credit: Oregon Department of Parks and Recreation, June 2012

The ninth confirmed Japan tsunami marine debris item was this 66-foot dock found on Agate Beach in Oregon. This dock sparked interest in state and federal agencies, along with the science community, to take a closer look at biofouling as it relates to marine debris.

The state of Oregon has seen quite a bit of activity related to JTMD since items began arriving on U.S. shores. With over 11 confirmed sightings of JTMD from vessels, small boats, floats and even a large floating dock, the impact of JTMD in Oregon has been substantial. This fact supports NOAA's long range

JTMD dispersion outlook, which includes a general forecast of JTMD deposition along the Oregon coast. NOAA trajectory modeling has been used to predict the location and movement of several JTMD items, and to estimate of where debris may make landfall, and thus narrow the search area. Department of State, USCG, and NOAA officials inform each other about reports and sighting of tsunami debris, which facilitates a more efficient response as well as more immediate recording of information into the NOAA sightings database. Information sharing has been a large part of the response to the JTMD situation in Oregon, with many community forums and presentations, workshops, conferences and state and federal agency meetings focused on the subject. Collaboration is critical in all aspects of this type of response, and NOAA has been in contact with the Consulate General of Japan in Portland, especially to request verification of significant JTMD items such as small vessels.

Invasive species has also been a concern in Oregon, and NOAA has collaborated with Oregon state agencies and universities as well as with other academic, federal and tribal agencies to conduct a workshop to discuss the presence of Aquatic Invasive Species (AIS) related to JTMD and the best response to it. The state is working closely with experts in the field to identify and monitor potential AIS attached to JTMD.

State response contingency plans have been developed in collaboration with many entities to address JTMD of all shapes and sizes. There is an offshore team devoted to addressing large JTMD items as well as a team consisting of NOAA, Sea Grant and other organizations to conduct consistent shoreline surveys to monitor the Oregon coast.

Washington

Photo credit: Washington Department of Fish and Wildlife, March 2013

NOAA confirmed this 65-foot, 185 ton dock that washed ashore within the Olympic Coast National Marine Sanctuary and within a designated wilderness portion of Olympic National Park as the nineteenth piece of Japan tsunami marine debris. According to the Consulate-General of Japan, the docks located at the Misawa Fishing Port washed away when the tsunami struck.

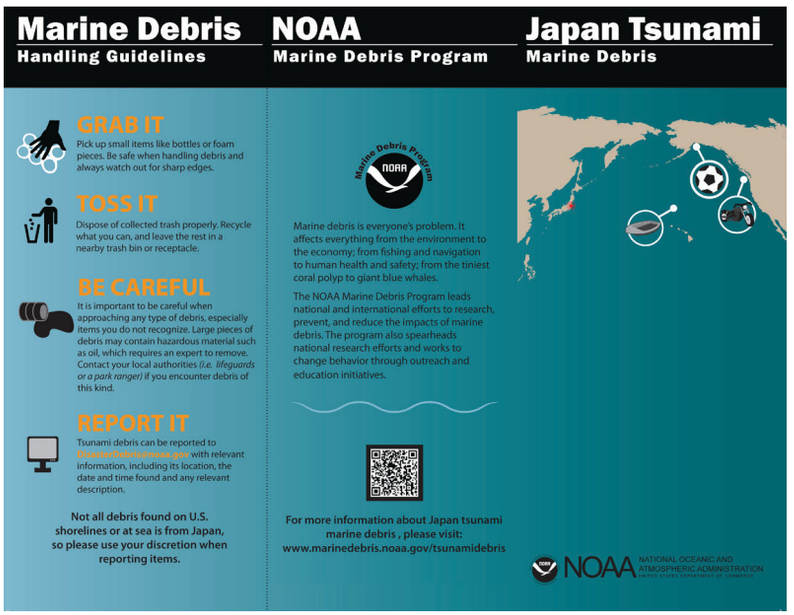
The state of Washington, like its neighbor Oregon to the south, has also seen quite a bit of activity as far as JTMD arrival is concerned, most notably a large floating dock out of Misawa, Japan in Olympic National Park. Officials began preparing for items washing ashore using NOAA trajectory models to predict the location and movement of several JTMD items, including the Misawa dock, floating pontoons,

small vessels, and other JTMD floating items. NOAA collaborated with the state and other federal agencies and Indian Tribes to develop a state response contingency plan for JTMD. NOAA supported a workshop to solicit input on the main plan elements, and worked with the state to draft the plan. The Washington state JTMD team, of which NOAA is part, has conducted 17 presentations at community public forums including Indian tribal meetings, workshops and conferences, community events, and state and federal agency meetings.

As of February 2013, Washington State has spent over $100,000 on expenses related to JTMD including outreach, a dedicated response phone line, JTMD cleanup and removal operations, and biofouling or Aquatic Invasive Species assessment and remediation. NOAA is leading the shoreline monitoring efforts in Washington state with a total of 11 sites being monitored. Removal efforts include collaboration of NOAA and State to respond to the Misawa dock that landed within NOAA's Olympic Coast National Marine Sanctuary and Olympic National Park areas. NOAA supports the state removal efforts of various marine debris items, ranging from normal beach debris to unique JTMD items and has been in close contact with the Consulate General of Japan in Seattle, updating regarding significant JTMD events development of interest, and requesting verification of significant JTMD items.

The state of Washington also works closely with experts to identify and monitor potential Aquatic Invasive Species (AIS) attached to JTMD. NOAA supports both the state and the AIS experts' efforts by sharing information and reporting JTMD sightings of interest.

COMMUNICATIONS EFFORT



The Japan tsunami marine debris brochure is a public outreach product with information about tsunami debris, detachable cleanup tips and general marine debris handling guidelines.

Media and public interest in tsunami debris has remained high for the duration of the two-year time frame of this report. In order to provide the best information to a widespread audience, NOAA as the lead federal agency has given nearly 300 interviews to international, national, and local media outlets, ranging from NBC Nightly News to the *Ventura County Recorder* (see Appendix 6 for a listing of media interviews conducted by the NOAA Marine Debris Program through the end of March 2013).

NOAA's Marine Debris Program maintains a high-traffic webpage, which has received more than 723,144 page hits since January 2012, with the latest information on the debris including FrequentlyAsked Questions and updates on the response effort. The MDP website also provides outreach materials for download, including informational brochures, marine debris handling guidelines for beachgoers, videos, and infographics. Products have been designed around the JTMD issue on a national scale, and also being designed specifically for each state affected. These materials include NOAA's latest model results and debris maps as well as information on how to report, assess and carefully handle the debris.

NOAA also broadcasts information through social media on what the public can do if they find significant amounts of debris, including through a successful, highly publicized Tweetchat. Public outreach and messaging information exchange occurs regularly between communicators from partner federal and state agencies, and NOAA has taken a leading role in communications teams formed to respond to high-profile incidents, such as the dock washed ashore in Washington State.

Since October 2011, the NOAA Marine Debris Program's regional coordinators have led or participated in over 100 briefings for state and local stakeholders in regions affected by tsunami debris. Those briefed include local emergency response agencies, city and county managers, fishermen, tribes and non-profit organizations. For example, in Oregon, NOAA participated in ten public meetings from April 11-15, 2012 on Japan tsunami marine debris in Seaside, Bay City, Pacific City, Newport, Florence, North Bend, Bandon, Port Orford, Eugene, and Portland. Similar meetings with diverse groups have been held in Hawaii, Alaska, Washington, and California.

The NOAA Marine Debris Program hosts a bi-weekly conference call to present the latest information and status update on the situation. This call is open to all interested federal, state, and local agencies, including partners in Canada. The notification list for the biweekly calls exceeds 200 individuals at all levels, and includes representatives from government agencies from all affected states.

NOAA provides regular updates to members of Congress and is coordinating with the Governments of Japan and Canada to exchange information on the tsunami debris. Representatives from NOAA, along with the Department of State, have met regularly with the Government of Japan and its consulates in impacted states.

SUMMARY

This document was developed as a comprehensive resource summarizing federal progress and involvement related to this effort as of May 2013. It seeks to describe coordination and planning between federal, State, local, and tribal agencies and organizations by describing the actions of federal agencies that are currently involved in Japan tsunami marine debris issue. It is important to note once again that this information is only a snapshot in time. Activities and efforts described in this report are ongoing and changing rapidly.

To date, federal agencies have undertaken a variety of actions related to marine debris, from data collection and analysis, to debris removal, and public outreach. The majority of direct federal agency efforts have focused on data collection and monitoring work conducted as part of the agencies' existing activities and responsibilities. Some data collected by federal agencies, such as NOAA NMFS debris survey data set, long predate the 2011 Japan tsunami. Because tsunami debris is typically very difficult to distinguish from "normal" marine debris, such historical data is especially valuable for characterizing the influx of tsunami debris in terms of measurable change in composition and/or quantity, rather than by specific item-by-item identification.

Data from monitoring efforts, integrated into the overall reporting system, have helped to create an overall picture of tsunami debris. Field observations from monitoring sites, aerial surveys, citizen science reports, and other sources also add to the understanding of the issue of tsunami debris approaching U.S. shores. Continued coordination is essential and it is imperative that we continue to approach this issue by understanding and addressing the problem as a whole. To do this, the problem will continue to be addressed across all relevant federal agencies and in partnership with state and local organizations.

APPENDICES

Appendix A. Related terminology

Biofouling – also known as biological fouling, is the undesirable accumulation of microorganisms, plants, algae, and/or animals on wetted structures.

Mitigation –the act of making a condition or consequence less severe.

Remediation – the act of reversing or stopping environmental damage.

Resolution (spatial) – in regards to satellites, resolution refers to the pixel size of an image representing the size of the surface area being measured on the ground.

Trajectory – the described path of an object moving under the action of given forces.

Tsunami – an unusually large sea wave produced by a seaquake or undersea volcanic eruption. Also known as seismic sea wave.

Tweetchat – virtual meetings or gatherings held on Twitter, a social networking website.

Appendix B. Media interviews

Date	Outlet
1/6/2011	KGO TV
10/21/2011	KPLU
10/24/2011	Discovery News
10/31/2011	Mercator Media
11/3/2011	Seattle Times
11/11/2011	KCLU National Public Radio
12/9/2011	KITV4 News (Hawaii)
12/13/2011	Island Sun Weekly
12/16/2011	Agence France-Presse
12/19/2011	KRBD Radio Ketchikan
12/25/2011	Alaska Dispatch
12/27/2011	CBS News
12/28/2011	Del Norte Triplicate
12/29/2011	Free Surf magazine
1/2/2012	KMTR TV
1/5/2012	The Scientific American
1/5/2012	OurAmazingPlanet.com
1/5/2012	Radio New Zealand
1/6/2012	Times Colonist
1/11/2012	KUOW Puget Sound Public Radio (NPR affiliate)
1/20/2012	Alaska Daily News
1/29/2012	Peninsula Daily News
2/12/2012	Corona Del Mar Today
2/12/2012	Ventura County Reporter
2/13/2012	Discovery Channel Canada
2/13/2012	NHK Japan Broadcasting
2/15/2012	Eureka Times Standard
2/15/2012	TV Asahi America
2/15/2012	Fox News
2/16/2012	Los Angeles Times
2/16/2012	KMUD Radio
2/21/2012	NBC News
2/21/2012	Environment and Energy News
2/21/2012	MSNBC
2/27/2012	The Weather Channel
2/28/2012	CBS Radio Network
2/29/2012	KGO Radio (San Francisco)
3/1/2012	National Geographic
3/3/2012	Atlantic Monthly
3/3/2012	CBC TV
3/3/2012	FUJI TV
3/5/2012	Channel 2 News (Portland)
3/8/2012	Oregon Outdoors Radio Show
3/8/2012	Canadian Press
3/9/2012	ABC World News Tonight
3/9/2012	Sequim Gazette
3/9/2012	Tokyo Broadcasting System International
3/9/2012	PBS News Hour
3/12/2012	Al Jazeera
3/13/2012	New York Times
3/14/2012	Canadian Press
3/15/2012	World News (Coos Bay, OR)
3/20/2012	Hawaii News Now
3/20/2012	Homer News
3/22/2012	ABC Melbourne
3/22/2012	KOIN
3/23/2012	The Daily News (Washington)
3/26/2012	Bay Nature Magazine
3/26/2012	NPR All Things Considered
3/27/2012	Reuters
3/28/2012	The Oregonian
3/30/2012	Santa Cruz Sentinel
4/6/2012	BBC World News television
4/11/2012	Channel 8 News (Portland)
4/12/2012	KCBY
4/12/2012	KEZI Eugene, OR
4/12/2012	Fox 12 Oregon
4/13/2012	KMTR TV
4/13/2012	KHON2 News
4/14/2012	Christian Science Monitor
4/16/2012	Los Angeles Times
4/21/2012	NIPPON TV
4/21/2012	Peninsula Daily News
4/23/2012	BBC Radio 5 Live
4/23/2012	NBC Today Show
4/23/2012	KING 5 TV
4/23/2012	KOMO Radio
4/23/2012	KYODO NEWS
4/24/2012	The Guardian (UK)
4/24/2012	The Globe and Mail (Canada)
4/25/2012	KING 5 TV
4/25/2012	NBC Nightly News
4/26/2012	Radio Melbourne
4/26/2012	CNN.com
4/27/2012	KING 5 NEWS (Seattle)
4/30/2012	NBC Nightly News
4/30/2012	KTUU News (Anchorage)
4/30/2012	KTVA News (Anchorage)
4/30/2012	NIPPON TV
5/3/2012	American Public Radio - Marketplace
5/7/2012	Anchorage Daily News
5/8/2012	Alaska Dispatch

5/11/2012	Wall Street Journal
5/15/2012	New Scientist
5/17/2012	Australian Broadcasting Corp., Washington Bureau
5/17/2012	Public Radio Olympia Bureau
5/17/2012	KITV4 News (Hawaii)
5/18/2012	Cox Television News Syndicate (for KIRO TV, Seattle and 12 other major to mid-market TV stations
5/21/2012	CBS This Morning
5/21/2012	The Associated Press, Juneau
5/22/2012	NBC Evening News With Brian Williams
5/23/2012	CBC Online
5/23/2012	Chinese Central Television Network -English Broadcasting Division (Los Angeles Bureau)
5/23/2012	The Associated Press, Juneau
5/23/2012	American Public Media
5/23/2012	Star Advertiser
5/24/2012	GEA Magazine
5/25/2012	KEZI Eugene, OR
5/25/2012	Asahi Newspaper
5/27/2012	Honolulu Star Advertiser
5/28/2012	CBC News
5/29/2012	KGW
5/30/2012	Channel 11 News Anchorage
5/30/2012	KTVA News (Anchorage)
5/30/2012	Australian Broadcasting Corporation
5/31/2012	North Coast Journal
5/31/2012	BeachConnection.net
6/1/2012	USA Today
6/1/2012	Maui News
6/1/2012	Maui Weekly
6/1/2012	NIPPON TV
6/4/2012	Radio Australia--Pacific Beat
6/5/2012	Tracy Loew, USA today
6/5/2012	Radio Australia--Pacific Beat
6/5/2012	The Oregonian
6/5/2012	The Register-Guard
6/6/2012	The Oregonian
6/6/2012	NKH Broadcasting
6/7/2012	CBC
6/7/2012	Voice of America
6/7/2012	KGW (Portland)
6/7/2012	KATU (Portland)
6/7/2012	Q13 FOX
6/7/2012	Focus magazine (Poland)
6/7/2012	KION
6/7/2012	The Associated Press, Grants Pass, Oregon
6/8/2012	USA Today
6/8/2012	ABC News Online
6/8/2012	CBC National News
6/8/2012	ABC World News with Diane Sawyer
6/8/2012	ABC Network News ·
6/11/2012	Santa Cruz Sentinel
6/11/2012	KATU
6/11/2012	Hiromi, Tokyo TV
6/11/2012	KGW Media Group
6/11/2012	CBS News, Los Angeles
6/11/2012	Statesman Journal Media
6/12/2012	The Daily Astorian
6/12/2012	Siaslaw News Florence OR
6/12/2012	KFKB Radio Forks 1490
6/12/2012	Vera Productions
6/12/2012	Seattle Times
6/12/2012	The PBS NewsHour
6/12/2012	CBS News, San Francisco Bureau
6/12/2012	PBS News Hour
6/13/2012	New Republic
6/13/2012	Newport News Times (OR)
6/14/2012	BBC 5live Radio Program
6/14/2012	The Times-Standard
6/15/2012	Fox News Channel
6/18/2012	National Public Radio
6/18/2012	BNA
6/19/2012	KCBS Radio 740AM 106.9FM
6/19/2012	Seattle Times
6/19/2012	KGW TV, Portland OR. NBC Affliate
6/19/2012	CBC Daybreak North
6/19/2012	Bellingham Herald
6/20/2012	KGW
6/20/2012	Coast River Business Journal
6/20/2012	Seattle Times
6/21/2012	Three Sheets Northwest
6/21/2012	Alaska Journal of Commerce
6/21/2012	Statesman Journal Media
6/21/2012	Anacortes American
6/22/2012	The World
6/25/2012	Ciência Hoje das Crianças
6/25/2012	Kyodo News, Washington Bureau
6/27/2012	Radio Anchorage
6/28/2012	CBC 5th State Program
6/28/2012	Discovery Canada
6/29/2012	Public Radio NW News Network

6/29/2012	Manichi
7/2/2012	NBC Bay Area
7/2/2012	Voice of America
7/3/2012	HawaiiReporter.com
7/5/2012	The Press Democrat
7/5/2012	NBC Bay Area
7/11/2012	KNOM Radio
7/11/2012	Gawker
7/16/2012	The New Republic
7/17/2012	San Diego Union-Tribune
7/17/2012	AP Alaska
7/17/2012	KING TV
7/17/2012	KIRO TV
7/17/2012	KCBS
7/17/2012	Kyoto News
7/17/2012	NHK
7/18/2012	Hawaii Public Radio
7/19/2012	Singtao Daily
7/20/2012	VOA Science World
7/23/2012	Statesman Journal
7/23/2012	GEA Magazine
7/25/2012	NHK
7/26/2012	Freelance for NY Times
7/31/2012	The Yomiuri Shimbun
8/2/2012	Freelance
9/5/2012	The Newsweek Daily Beast Company
9/5/2012	The Weather Channel
9/5/2012	NBC News
9/11/2012	The News Tribune (Takoma)
9/11/2012	BBC News Brasil
9/17/2012	KTVU San Francisco
9/24/2012	Honolulu Civil Beat
9/28/2012	APRN
10/4/2012	NHK
10/5/2012	TV Asahi America, Inc.
10/9/2012	Hawaii Tribune Herald
10/10/2012	Canadian Broadcasting Company
10/11/2012	Honolulu Weekly
10/11/2012	NHK
10/12/2012	Pacific Business News
10/15/2012	World Today (Korea)
10/23/2012	NHK
10/23/2012	NHK
10/24/2012	CBS-58, Milwaukee
11/9/2012	BigIslandNOW.com
11/13/2012	NBC Portland
11/14/2012	Guardian
11/14/2012	KOMO Newsradio
11/15/2012	NBC News
11/15/2012	AP Juneau
11/16/2012	The Daily Herald (Everett, WA)
11/26/2012	KOMO TV
12/4/2012	Radio Austrailia
12/6/2012	Spokesman-Review
12/7/2012	The Mainichi Newspapers
12/12/2012	Hawaii Public Radio
12/17/2012	AP Seattle
12/17/2012	The Daily World
12/17/2012	KING5
12/17/2012	Alaska Dispatch
12/18/2012	MSNBC
12/18/2012	KOMO
12/18/2012	AP Portland
12/18/2012	KIMO
1/21/2013	Neue Zürcher Zeitung
1/22/2013	Freelance for Pacific Boating
1/23/2013	Telegraph
2/8/2013	Honolulu Civil Beat
2/13/2013	Vancouver Sun
2/14/2013	Accuweather
2/19/2013	Honolulu Star-Advertiser
2/26/2013	CNN Western Region
3/2/2013	Honolulu Star-Advertiser
3/7/2013	Hawaii News Now
3/13/2013	KITV4 News
3/15/2013	KITV4 News
3/15/2013	NHK Japan Broadcasting
3/15/2013	KIRO RADIO
3/15/2013	AP Seattle
3/16/2013	Peninsula Daily News
3/17/2013	Peninsula Daily News
3/18/2013	The Mainichi Newspapers
3/21/2013	North Coast News and Daily World
3/21/2013	KIRO TV Seattle
3/21/2013	Port Townsend
3/21/2013	NBC Seattle
3/21/2013	KBKW News
3/21/2013	KIRO TV Seattle
3/21/2013	NHK
3/21/2013	King 5 Television
3/22/2013	The Weather Channel
3/25/2013	NBC Nightly News
3/25/2013	NBC News
3/26/2013	Nippon Television, Los Angeles News Bureau
3/28/2013	CFAX Radio Canada
3/28/2013	KIRO Radio
3/29/2013	Cannon Beach Gazette
3/31/2013	Wilkes Creative/Freelance

Appendix C. Interagency Marine Debris Coordinating Committee (IMDCC) Authorities

Department of State

The Department of State is granted the legal authority to conduct the foreign affairs of the United States on a day-to-day basis under 22 USC § 2656. Other statutes and regulations that may be relevant to particular circumstances provide various more specific authorities for the certain Department of State activities, including many of the statutes and regulations cited above that provide authorities to other U.S. agencies.

Environmental Protection Agency

Marine Debris Research, Prevention, and Reduction Act (MDRPRA - Reestablishes the IMDCC
Marine Plastic Pollution Research and Control Act (MPPRCA) - Initially established the IMDCC and authorizes EPA and NOAA to develop a public education program for outreach and volunteer monitoring
Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act) - Prohibits transportation for the purposes of dumping materials into ocean waters without a permit.

Clean Water Act

- Provides for permits for point sources under Section 402 and Total Maximum Daily Loads ("pollution budgets") under Section 303 to control trash (e.g., Los Angeles, CA, and Anacostia Watershed, DC, to eliminate trash in waterways)

Resource Conservation and Recovery Act

- Authorizes EPA to control hazardous waste and provides general guidelines for waste management

Pollution Prevention Act

- Authorizes EPA to implement a strategy to promote source reduction (i.e., reduce the amount of pollution through cost-effective changes in production, operation, and raw materials use)

Oil Pollution Act / Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) – Region 9

- Authorizes EPA to conduct assessment and cleanup
- Implement emergency response plan consistent with National Contingency Plan (NCP)

The authority to remove debris, including but not limited to Tsunami debris from open water and from shorelines rests with the U.S. Army Corp of Engineers, per the Section 19 of the Rivers & Harbors Act (33 USC § 414) and U.S. EPA and the U.S. Coast Guard when characterized as containing hazardous substances or pollutants or contaminants which may present an imminent and substantial danger to public health (per Section 104 of CERCLA), and/or oil or hazardous substances (per Section 311(c)(1 & 2) of CWA and amendments to OPA). USCG and EPA's implementing regulations for these authorities are found in the National Contingency Plan (NCP) for Oil and Hazardous Substances 40 CFR Part 300.

Under the NCP, the USCG is responsible for the removal of oil discharges and hazardous substance releases that occur in the coastal zone. EPA is responsible for the emergency removal of oil, pollutants or contaminants, hazardous materials and their containers from the inland zone. The precise boundaries of

coastal and inland zones are determined by an interagency agreement between the EPA and the USCG and are agreed upon by the National Response Team. In practice, jurisdictional boundary response has been case-by-case resulting in some EPA and USCG cross boundary response.

The Government's response authority under CERCLA may be invoked where there is a release or a threatened release of a hazardous substance or a release or threatened release of a pollutant or contaminant that may present an imminent and substantial endangerment. CERCLA also provides information gathering authority to the Government to determine if there as has been a release or if there is a threat of a release. Thus, to the extent it is determined that the debris either does not include hazardous substances (including radioactive materials) or include pollutants or contaminants that may present an imminent and substantial endangerment, the Government's authority to respond under CERCLA is limited. It may be most appropriate that debris determined to be non-radioactive solid waste, be addressed through state solid waste management authorities.

Fish and Wildlife Service, DOI

The FWS has authority to address marine debris on any refuge through the National Wildlife Refuge System Administration Act, as amended (16 U.S.C. § 668dd). The FWS also has responsibilities identified under the Endangered Species Act, the Marine Mammal Protection Act, the Marine Plastic Pollution Research and Control Act, the Driftnet Impact Monitoring, Assessment, Control Act, and the Marine Debris Research, Prevention, and Reduction Act. None of this legislation directly allocates resources to the FWS to specifically address the multitude of impacts marine debris inflicts on refuge resources. The FWS also participates on the interagency task force coordinating the response to the tsunami marine debris and the IMDCC. FWS has the authority to clean-up debris on all NWRs and coordinates with States and other agencies when necessary.

National Oceanic and Atmospheric Administration, DOC

NOAA has numerous treaties, federal laws and state laws that provide mandates to address marine debris, some directly while others do so indirectly. These include the Marine Debris Research, Prevention, and Reduction Act, 33 U.S.C. §§ 1951 et seq. which is the direct mandate that establishes the Debris Prevention and Removal Program within NOAA; gives authority to provide Grants, Cooperative Agreements, and Contracts; includes Strategy & External Evaluation and Recommendations of Annex V; and also Interagency Coordination. Other direct mandates include the Marine Plastic Pollution Research and Control Act, 33 U.S.C. §§ 1901 et seq. which establishes a Marine Debris Coordinating Committee of which NOAA is chair; the Coral Reef Conservation Act of 2000, P.L. 106-562; 16 U.S.C. 6401 et seq; the Driftnet Impact Monitoring, Assessment, Control Act of 1987, P.L.100-220, Title IV which requires NOAA to collect statistical information on the impacts of marine resources from DFG; the Marine Protection, Research and Sanctuaries Act 33 U.S.C. §§ 1401-1445 (Ocean Dumping Act) which includes long-term research programs to study the effects of pollution, overfishing and man-induced changes of ocean ecosystems; the Magnuson Stevens Act, 16 U.S.C. 1801 et seq. which prohibits foreign fishing vessels from disposing fishing gear in the EEZ; the Nonindigenous Aquatic Nuisance Prevention and Control Act, 16 U.S.C. §§ 4701 which prevents the introduction of and to control introduced aquatic nuisance species in the environment; and the Coastal Zone Management Act of 1972, P.L. 104-150, 16 U.S.C. §§1451 et seq. which includes coastal zone management grants.

National Park Service, DOI

The National Park Service has authority to address marine debris impacts under the NPS Organic Act of 1916 (as amended and supplemented), which directs the Service to conserve the scenery, natural and historic objects and wild life of National Park System units unimpaired for the enjoyment of future generations. NPS Management Policies also prioritize and direct management and removal of exotic plant and animal species in units of the National Park System.

US Forest Service, USDA

Cooperative Forestry Assistance Act of 1978 – provides for the improvement and maintenance of fish and wildlife habitat; the prevention and control of insects and diseases affecting trees and forests. Provides for the broadening existing forest management, fire protection, and insect and disease protection programs on non-federal forest lands to meet the multiple use objectives of landowners in an environmentally sensitive manner

US Coast Guard, DHS

The Marine Debris Research, Prevention and Reduction Act of 2006 (MDRPRA), as amended, identifies the Coast Guard as one of the agencies that NOAA coordinates with to address marine debris. MDRPRA provides for Coast Guard actions and coordination with regard to plastics and other garbage from ships as well as actions to improve shipboard waste management. Coast Guard actions in support of NOAA are based on the type and characteristics of particular pieces of debris. The Coast Guard conducts boardings of foreign vessels that call in Honolulu and as a part of their comprehensive inspections, ensure that these vessels are properly disposing of garbage and wastes in accordance with the Act to Prevent Pollution from Ships, also known as MARPOL. In the event where possible, these cases are forwarded to the U. S. Attorney for prosecution as environmental crimes.

While NOAA is the lead federal agency for coordination planning, outreach and education regarding marine debris, and the Coast Guard supports NOAA, there are certain instances in which Coast Guard authorities result in the Coast Guard taking on specific roles. In cases where debris poses potential oil or hazardous substance threat to the environment, specifically the navigable waters of the United States, the Coast Guard as the federal On Scene Coordinator (FOSC) for the coastal zone, will coordinate removal actions under the National Contingency Plan (NCP) with other federal, State, local, and tribal agencies in accordance with the Area Contingency Plan. Any non-contaminated debris will be addressed by the states and/or locals (or effected private or federal owners) in accordance with their laws, regulations, and procedures under the State of Hawaii's Coastal Zone Management Plan.

The Coast Guard may also develop and issue Broadcast Notices to Mariners (BNMs) to advise vessel traffic of potential hazards to navigation. In certain circumstances the Coast Guard may destroy or sink a hazard to navigation at sea, as was the case with a Japanese vessel in the Gulf of Alaska. The exact nature of the risk posed by the object to safe navigation is fundamental to the USCG's decision making process and authority under 14 U.S.C. § 88.

US Navy, DOD

Navy has no specific statutory or regulatory marine debris authorities. However, through the Oceanographer of the Navy, Navy provides NOAA with wind and current data/predictions to support debris transport modeling. Through DoD's Innovative Readiness Training (IRT) program, Navy personnel can partner with the USCG and civilian agencies to provide assistance in removing marine debris such as sunken vessels, failed artificial reefs, and derelict fishing gear.

Appendix D. List of confirmed sightings as of May 2013

1. Derelict vessel found in the North Pacific

2. Derelict vessel found by STS Pallada in the North Pacific

3. Derelict squid vessel F/V RYOU-UN MARU found offshore Alaska

4. Soccer ball found in Alaska

5. Volleyball found in Alaska

6. Harley-Davidson motorcycle in a container, found in British Columbia

7. Fishing buoy found in Alaska

8. Fishing buoy found in Alaska

9. Floating dock found in Oregon

10. Derelict vessel found in Washington

11. Derelict vessel found in British Columbia

12. Blue plastic bin found in Hawaii

13. Derelict vessel found in the North Pacific

14. Blue plastic bin found in Washington

15. Soccer ball found in Washington

16. Derelict vessel found on Midway Atoll in the Northwestern Hawaiian Islands

17. Derelict vessel (broken into pieces) found in Hawaii

18. Derelict vessel found in Hawaii

19. Floating dock found in Washington

20. Steel tank found in British Columbia

21. Large yellow buoy found in Hawaii

22. Derelict vessel found in Hawaii

23. Derelict vessel found in Oregon

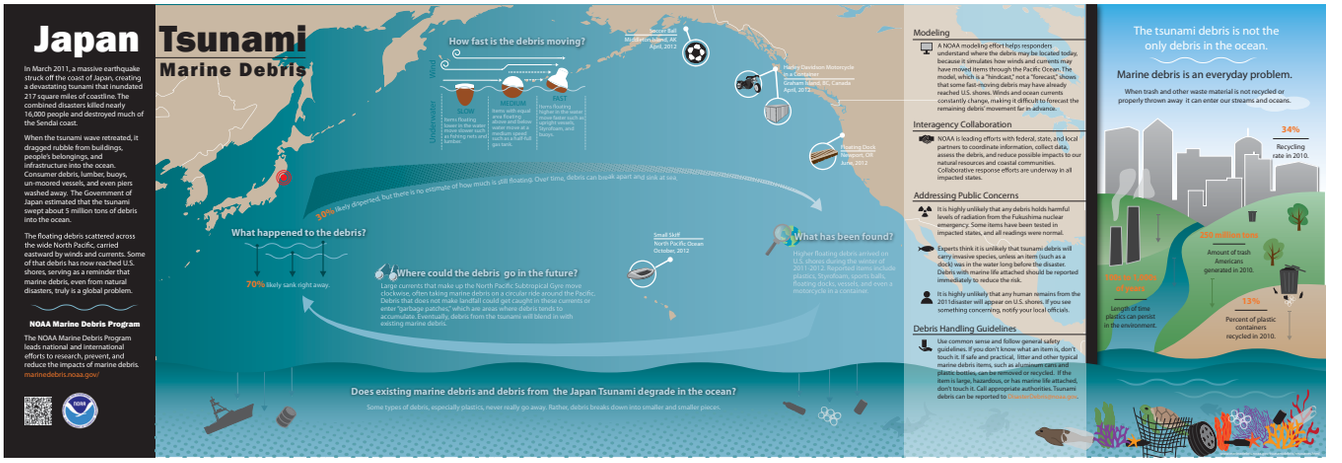
24. Derelict vessel found in Oregon

25. Plastic sign found on Midway Atoll in the Northwestern Hawaiian Islands Hawaii

26. Derelict vessel found in Washington

Appendix E Products and Links

Japan Tsunami Marine Debris Public Outreach - Infographic



To access and download the information online, visit:
http://marinedebris.noaa.gov/tsunamidebris/pdf/marine_debris_infographic.pdf

Japan Tsunami Marine Debris Public Outreach - Confirmed Sightings Map

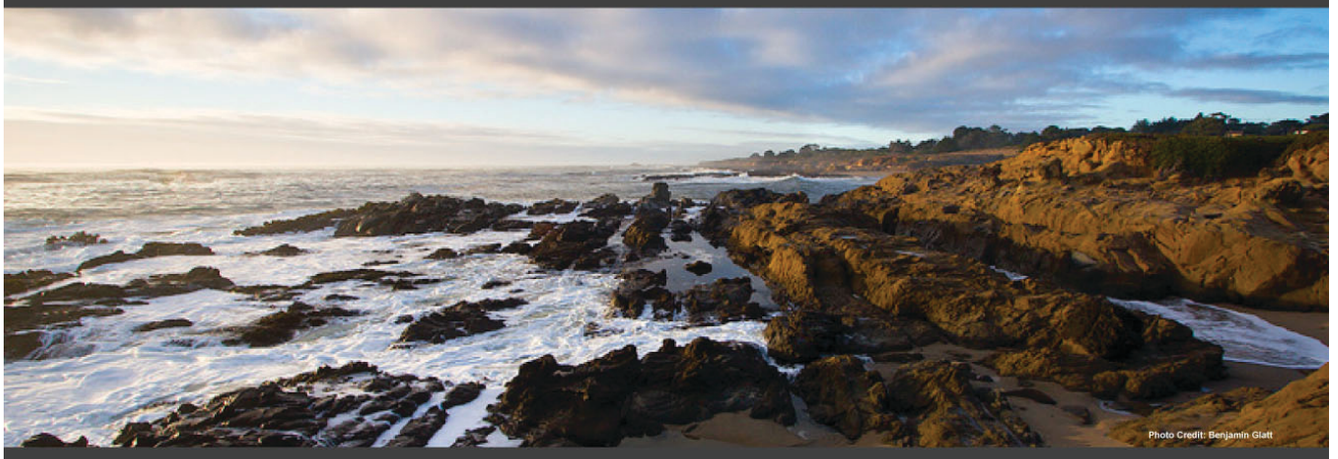
To access the online interactive map online, visit:
http://marinedebris.noaa.gov/tsunamidebris/debris-map.html

Japan Tsunami Marine Debris Public Outreach - Sightings Video

To access and download the program's "Japan Tsnuami Marine Debris - Sightings Video," visit:
http://marinedebris.noaa.gov/tsunamidebris/debris_sightings.html

Japan Tsunami Marine Debris Outreach - California Parks Poster

MARINE DEBRIS NOTICE



Marine litter is an everyday problem. Help keep California's beaches clean.

GRAB IT

Pick up small items like bottles or foam pieces. Be safe handling debris and always watch out for sharp edges.

TOSS IT

Recycle what you can, and leave the rest in a nearby trash bin or receptacle.

IF DEBRIS IS LARGE, HAZARDOUS, OR HAS MARINE LIFE ATTACHED:

DON'T TOUCH IT

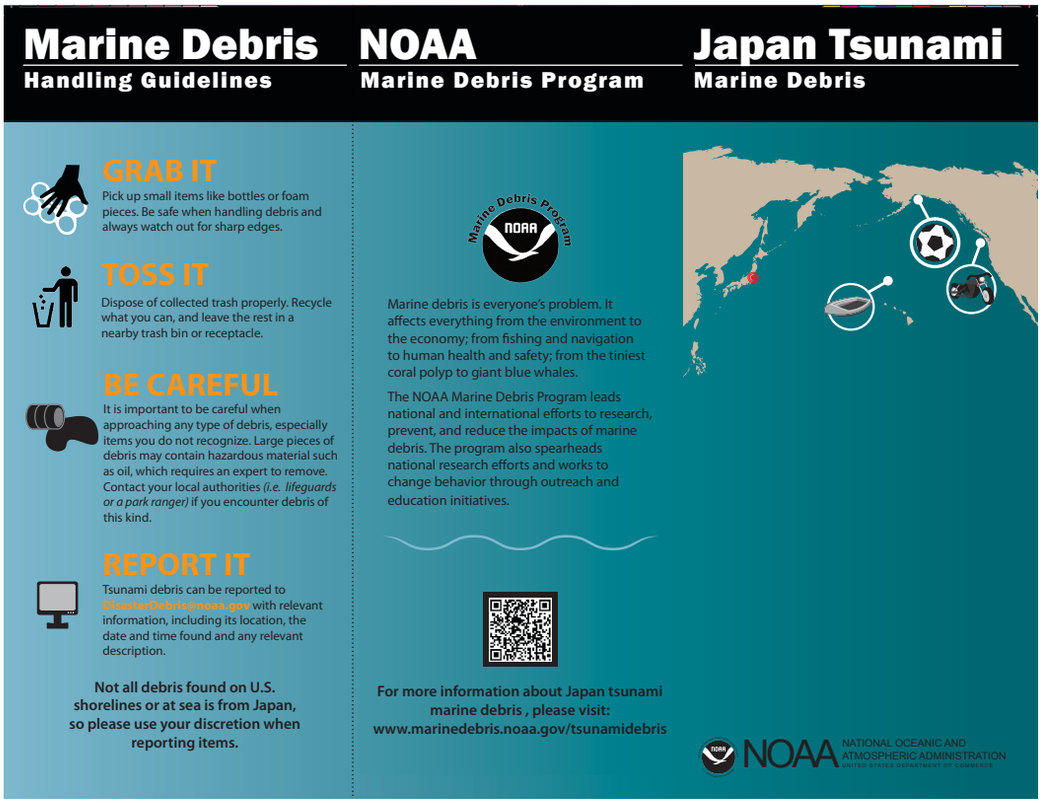
There are no radiation concerns, but debris may contain hazardous material like oil that requires an expert to remove it.

REPORT IT

Call
and report the item to authorities.

There may be debris on the beach from the tsunami that devastated parts of Japan in 2011. Alert NOAA at **DisasterDebris@noaa.gov** if you find debris that may be from the tsunami. Not all debris on U.S. shorelines is from Japan, so please use your discretion.

Japan Tsunami Marine Debris Outreach - Trifold brochure



Marine Debris
Handling Guidelines

GRAB IT
Pick up small items like bottles or foam pieces. Be safe when handling debris and always watch out for sharp edges.

TOSS IT
Dispose of collected trash properly. Recycle what you can, and leave the rest in a nearby trash bin or receptacle.

BE CAREFUL
It is important to be careful when approaching any type of debris, especially items you do not recognize. Large pieces of debris may contain hazardous material such as oil, which requires an expert to remove. Contact your local authorities *(i.e. lifeguards or a park ranger)* if you encounter debris of this kind.

REPORT IT
Tsunami debris can be reported to DisasterDebris@noaa.gov with relevant information, including its location, the date and time found and any relevant description.

Not all debris found on U.S. shorelines or at sea is from Japan, so please use your discretion when reporting items.

NOAA
Marine Debris Program

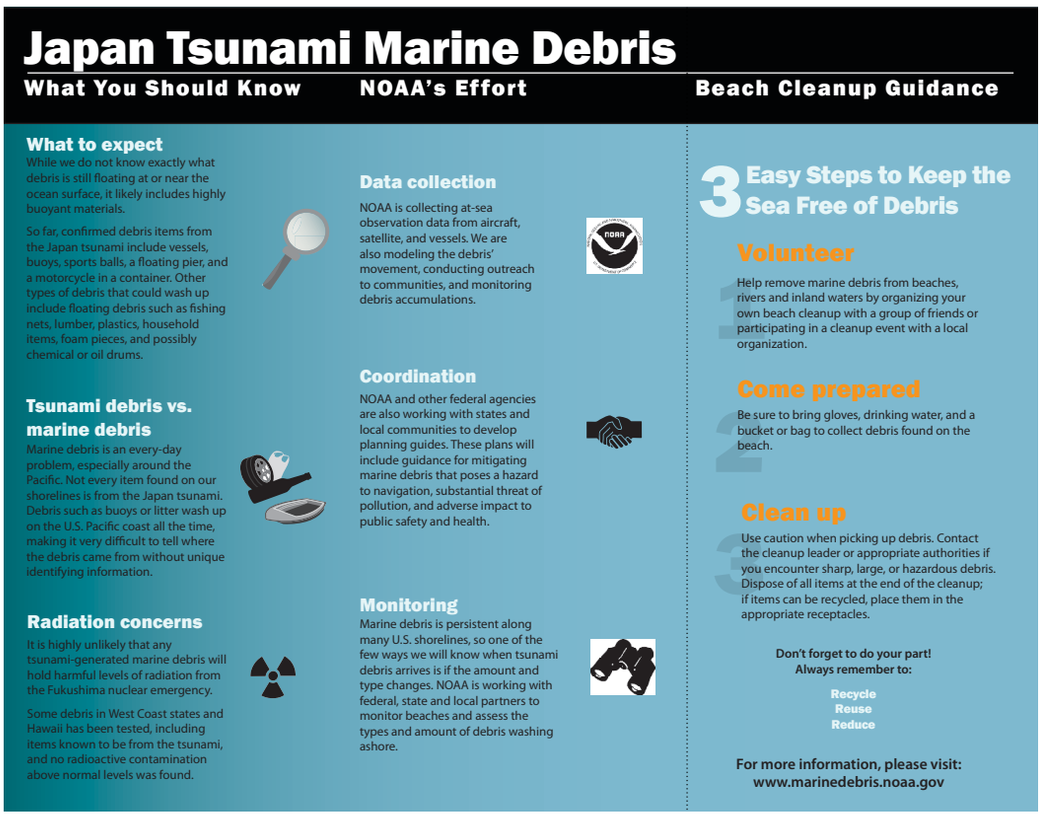
Marine debris is everyone's problem. It affects everything from the environment to the economy; from fishing and navigation to human health and safety; from the tiniest coral polyp to giant blue whales.

The NOAA Marine Debris Program leads national and international efforts to research, prevent, and reduce the impacts of marine debris. The program also spearheads national research efforts and works to change behavior through outreach and education initiatives.

For more information about Japan tsunami marine debris , please visit: www.marinedebris.noaa.gov/tsunamidebris

Japan Tsunami
Marine Debris

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Japan Tsunami Marine Debris

What You Should Know

What to expect
While we do not know exactly what debris is still floating at or near the ocean surface, it likely includes highly buoyant materials.

So far, confirmed debris items from the Japan tsunami include vessels, buoys, sports balls, a floating pier, and a motorcycle in a container. Other types of debris that could wash up include floating debris such as fishing nets, lumber, plastics, household items, foam pieces, and possibly chemical or oil drums.

Tsunami debris vs. marine debris
Marine debris is an every-day problem, especially around the Pacific. Not every item found on our shorelines is from the Japan tsunami. Debris such as buoys or litter wash up on the U.S. Pacific coast all the time, making it very difficult to tell where the debris came from without unique identifying information.

Radiation concerns
It is highly unlikely that any tsunami-generated marine debris will hold harmful levels of radiation from the Fukushima nuclear emergency.

Some debris in West Coast states and Hawaii has been tested, including items known to be from the tsunami, and no radioactive contamination above normal levels was found.

NOAA's Effort

Data collection
NOAA is collecting at-sea observation data from aircraft, satellite, and vessels. We are also modeling the debris' movement, conducting outreach to communities, and monitoring debris accumulations.

Coordination
NOAA and other federal agencies are also working with states and local communities to develop planning guides. These plans will include guidance for mitigating marine debris that poses a hazard to navigation, substantial threat of pollution, and adverse impact to public safety and health.

Monitoring
Marine debris is persistent along many U.S. shorelines, so one of the few ways we will know when tsunami debris arrives is if the amount and type changes. NOAA is working with federal, state and local partners to monitor beaches and assess the types and amount of debris washing ashore.

Beach Cleanup Guidance

3 Easy Steps to Keep the Sea Free of Debris

1 Volunteer
Help remove marine debris from beaches, rivers and inland waters by organizing your own beach cleanup with a group of friends or participating in a cleanup event with a local organization.

2 Come prepared
Be sure to bring gloves, drinking water, and a bucket or bag to collect debris found on the beach.

3 Clean up
Use caution when picking up debris. Contact the cleanup leader or appropriate authorities if you encounter sharp, large, or hazardous debris. Dispose of all items at the end of the cleanup; if items can be recycled, place them in the appropriate receptacles.

Don't forget to do your part!
Always remember to:

Recycle
Reuse
Reduce

For more information, please visit: www.marinedebris.noaa.gov

To download and access the brochure online, visit:
http://marinedebris.noaa.gov/tsunamidebris/pdf/jtmd_trifold.pdf

Appendix F. State Contingency Plans for Japan Tsunami Marine Debris

To obtain a copy of the contingency plan document(s) for those states affected by JTMD, please contact the following individuals:

Alaska
Peter Murphy, NOAA Marine Debris Program Alaska Regional Coordinator, peter.murphy@noaa.gov

California
Sherry Lippiatt, Ph. D., NOAA Marine Debris Program California Regional Coordinator, sherry.lippiatt@noaa.gov

Guam and the Central Northern Marianas Islands -
Carey Morishige, NOAA Marine Debris Program Pacific Islands Regional Coordinator, carey.morishige@noaa.gov

Hawaii and the Papahānaumokuākea Marine National Monument
Carey Morishige, NOAA Marine Debris Program Pacific Islands Regional Coordinator, carey.morishige@noaa.gov

Oregon
Nir Barnea, NOAA Marine Debris Program West Coast Regional Coordinator, nir.barnea@noaa.gov

Washington
Nir Barnea, NOAA Marine Debris Program West Coast Regional Coordinator, nir.barnea@noaa.gov


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE