



Marine Debris: NOAA's Role

Researchers have found marine debris, especially plastic items, to have some effects on humans, wildlife, and the environment, but the extent of these impacts is currently unclear. Congress has directed the National Oceanic and Atmospheric Administration (NOAA) or the Secretary of Commerce (through NOAA) to lead federal government efforts to address marine debris and has enacted additional marine debris-related legislation in recent years. Members of Congress are considering further NOAA provisions, and other federal agency actions, to support marine debris prevention efforts, domestically and internationally.

What Is Marine Debris?

Congress has defined *marine debris*, also known as *marine litter* and *anthropogenic debris*, to include “any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes” (33 U.S.C. §1956). According to NOAA, marine debris can be made of plastic, glass, metal, or wood. Plastic is the most abundant type of marine debris in shoreline and oceanic surveys. Plastic debris comes in a range of sizes and types, from tiny pieces (microplastics) to larger items (macroplastics) such as food wrappers, bottles, bags, foam materials, and fishing gear.

NOAA identifies microplastics as plastic particles less than 5 millimeters (0.2 inches) in size. Microplastics can be categorized as primary or secondary. Primary microplastics are manufactured as microbeads, capsules, fibers, nodules, or pellets and are used in cosmetics, personal care products, industrial products, and synthetic textiles. Secondary microplastics form through the degradation and fragmentation of larger plastic items.

Location of Marine Debris

According to NOAA, marine debris has been recorded in numerous marine environments extending from the ocean surface to the sea floor, including shorelines (**Figure 1**), coral reefs, polar regions, and estuaries. Marine debris also can be found within oceanic *garbage patches*—areas of rotating ocean currents that can accumulate dense concentrations of marine debris. A dynamic combination of factors influences local accumulation, including marine debris size and density, proximity to human population centers, ocean currents, and wind. These factors also make it difficult to determine an item's provenance or establish an accurate estimate of the total mass of marine debris currently in or entering the marine environment. For example, NOAA's estimate of the total number of pieces of plastic on the U.S. shoreline in 2017 ranged from as few as 20 million pieces to as many as 1.8 billion pieces, a near 100-fold difference.

Figure 1. Marine Debris on a Hawaiian Shoreline



Source: NOAA Marine Debris Program.

Sources of Marine Debris

Marine debris originates from ocean- or land-based sources. However, determining the exact source of an item can be difficult. Ocean-based sources primarily include derelict fishing gear (e.g., nets, lines), abandoned and derelict vessels and structures, and equipment or waste released from at-sea vessels and structures. Some countries also may allow the disposal of municipal and industrial waste directly into the ocean, although the practice is prohibited or regulated in many developed countries.

Land-based mismanaged waste has found pathways to marine environments, as well. Mismanaged waste generally includes littering or inadequate disposal (i.e., disposal in an open dump or a poorly contained landfill). The United States and other developed countries have laws prohibiting such practices. However, countries with vast amounts of waste are known to allow inadequate disposal. Rain events can wash litter and poorly managed wastes into storm drains, discharging it to rivers and streams that may provide a pathway to the ocean; some researchers have found that rivers act as major transport pathways for waste into the ocean. Extreme natural events (i.e., flooding, tsunamis, mudslides, or hurricanes) also may create debris or carry it into nearby waterways. There may be other sources of land-based debris that are more difficult to identify. For example, recent studies have found that some wastewater treatment plants discharge microplastics. How much debris is discharged, what amount reaches the ocean, and its original source may be uncertain.

Impacts on Humans, Wildlife, and the Environment

According to NOAA, marine debris has varying effects on humans, wildlife, and the environment; however, many

aspects are poorly understood. Debris at the water’s surface can cause navigation and boating hazards, whether through damage to vessels on impact or via tangled propellers and clogged intake pipes. Shoreline communities with high amounts of marine debris may experience adverse economic effects on local tourism. Some researchers have found microplastics in several food items and in the air, although the effects of these items on human health are still unknown.

Wildlife may become entangled in marine debris and, as a result, can experience injury, illness, suffocation, starvation, and death. Wildlife also are at risk of ingesting marine debris, which may lead to starvation, internal injury, and blockage; it also may provide a pathway for toxic constituents associated with certain marine debris, such as plastics, to be absorbed by wildlife. According to NOAA, marine debris may negatively affect individual organisms, but its impacts on populations and communities remain unclear. Marine debris may cause habitat degradation to varying degrees, including by providing transport to alien and invasive species. However, to date, few large-scale studies have attempted to quantitatively and qualitatively assess the occurrence and magnitude of habitat impacts.

NOAA’s Marine Debris Program

In 2006, Congress enacted the Marine Debris Research, Prevention, and Reduction Act (Marine Debris Act; P.L. 109-449; 33 U.S.C. §§1951 et seq.). The Marine Debris Act established NOAA’s Marine Debris Program (MDP) to identify, determine sources of, assess, prevent, reduce, and remove marine debris and to address the adverse effects of marine debris on the U.S. economy, marine environment, and navigation safety. According to NOAA, the MDP achieves its mission through five program pillars: prevention, removal, research, regional coordination, and emergency response. Congress directed NOAA to track the location of marine debris, financially and technically support community- and region-based efforts to remove it;

and research its effects on humans and the environment. NOAA’s current research priorities include exposure and response analysis, ecological risk assessments, fate and transport studies, and economic impacts.

The Marine Debris Act has been amended several times, most recently by the Save Our Seas Act of 2018 (P.L. 115-265). The 2018 act authorized NOAA to develop strategies with other federal agencies to address marine debris sources, promote international action, and assist in responding to a “severe marine debris event,” among other provisions that directed other federal agency actions. The act also authorized appropriations for the MDP at \$10 million annually for FY2018 through FY2022.

Interagency Coordination

The Marine Debris Act established the Interagency Marine Debris Coordinating Committee (IMDCC; 33 U.S.C. §1954), with NOAA as chair. The IMDCC coordinates federal agency activities and makes recommendations on research priorities, monitoring, and regulatory action. The Marine Debris Act requires the IMDCC to include senior officials from the Departments of Commerce, the Interior, and State; the U.S. Coast Guard; the U.S. Environmental Protection Agency; and the U.S. Navy. The act provides the Secretary of Commerce the discretion to invite representatives from other federal entities; these currently include the Department of Justice; Marine Mammal Commission; and the U.S. Army Corps of Engineers.

Recent Legislative Efforts by Congress

Some Members have continued to express concern over global and domestic issues related to marine debris. In the 116th Congress, Congress has enacted laws (P.L. 116-20 and P.L. 116-113) that provide NOAA with appropriations for marine debris assessments and removal in specific areas and for the MDP broadly. Some provisions of proposed legislation would provide additional authorities or direct NOAA’s activities (**Table 1**).

Table 1. Selected Legislative Proposals with NOAA Provisions in the 116th Congress

Bill Number and Name	Marine Debris Provisions
H.R. 1305 – Albatross and Petrel Conservation Act	Would direct the Secretary of Commerce to support marine debris research and albatross/petrel conservation measures.
H.R. 3969/S. 1982 – SOS 2.0 Act Several provisions of each bill have been introduced as separate pieces of legislation (i.e., S. 2260, S. 2364, S. 2372).	H.R. 3969 would (1) create a Marine Debris Trust Fund available to NOAA to respond to certain marine debris events; (2) create a Marine Debris Foundation to support MDP activities; (3) require the Secretary of Commerce to establish a prize competition to encourage technological innovations; and (4) change existing marine debris activities, request several reports, and amend or provide related authorization of appropriations. S. 1982 is similar to H.R. 3969, with differences related to the Marine Debris Trust Fund, prize competition, and required reports, among other provisions.
H.R. 5845/S. 3263 – Break Free from Plastic Pollution Act of 2020	Would direct the Secretary of Commerce to report on the scale and impacts of derelict fishing gear, make recommendations, and plan their implementation.

Source: Congress.gov.

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