This document covers Section 2: Types and Origins of Floatable Debris for the document: Assessing and Monitoring Floatable Debris, published in August 2002. The reference number is: EPA-842-B-02-002. Download the full document at: http://www.epa.gov/owow/oceans/debris/floatingdebris/

ASSESSING AND MONITORING FLOATABLE DEBRIS

August 2002

Section 2
Types and Origins of Floatable Debris

Storm Water Discharges
Combined Sewer Overflows
Beachgoers and Other Nonpoint Sources
Ships and Other Vessels
Solid Waste Disposal and Landfills
Offshore Mineral and Oil and Gas Exploration/Production
Industrial Activities
Illegal Dumping or Littering

Section 2: Types and Origins of Floatable Debris

Floatable debris comes from many sources, including the ocean, land, and atmosphere. Floatables can be washed into the ocean by heavy rainfall, carried out to sea by rivers and streams, picked up off a beach by waves and tidal action, or deposited in streams or oceans from the atmosphere (i.e., balloons). Floating debris also can travel long distances over the ocean, and when these items get into the ocean they can cause problems over a large area. The most buoyant types of floatable debris are plastics and some types of rubber. Paper, wood, and cloth items initially float but tend to sink once they become saturated with water. Glass, metal, and some types of rubber sink unless air is trapped in pockets of the material.

Activities on land can also generate floatable debris. Such debris can be blown directly into the ocean or can be transported to the ocean if blown into a river or stream that empties into the sea. Objects that can be easily blown around are a particular problem because they can become floatable debris even when originally disposed of in an appropriate manner. During storms and other periods of high winds or high waves, almost any kind of trash (including glass, metal, wood, and medical waste) can be deposited into the ocean. Careful collection, handling, and disposal of trash, as well as attempts to reduce the amount of trash that must be disposed of, can help to reduce the floatable debris problem. Sections 2.1 through 2.8 provide some examples of the most common types and sources of floatables. Specific examples of types of debris released from different sources are provided in Table 1.

Table 1. Types and Sources of Floatable Debris

Source	Examples of Debris Released
Storm Water Discharges	Street litter (e.g., cigarette butts, filters, and filter elements), medical items (i.e., syringes), resin pellets, food packaging, beverage containers, and other material from storm drains, ditches, or runoff
Combined Sewer Overflows	Street litter, sewage-related items (condoms, tampons, applicators), medical items (i.e., syringes), resin pellets, and other material from storm drains, ditches, or runoff
Beachgoers and Other Nonpoint Sources	Food packaging, beverage containers, cigarette butts, toys, sewage, pieces of wood and siding from construction projects, and trash (e.g., beverage containers, food packaging) left behind by workers in forestry, agriculture, construction, and mining
Ships and Other Vessels	Fishing equipment (e.g., nets, lures, lines, bait boxes, ropes, and rods), strapping bands, light sticks (used by fishermen to light up fishing lines and recreational divers), plastic salt bags, galley wastes, household trash, plastic bags and sheeting, and beverage yokes (six pack rings for beverage containers)
Solid Waste Disposal and Landfills	Materials such as garbage and medical waste
Offshore Mineral and Oil and Gas Exploration	Data-recording tape, plastic drill pipe thread protectors, hard hats, gloves, and 55-gallon drums
Industrial Activities	Plastic pellets and other materials
Illegal Dumping or Littering	Food packaging, beverage containers, cigarette butts, appliances, electronics, and ocean and street litter

2.1 Storm Water Discharges

Storm water runoff (the water that flows along streets or along the ground as a result of a storm-derived runoff) can carry street litter into storm drains, which convey this water and debris to a nearby river or stream or even directly to the ocean. Typical floatables from storm water include

street litter (e.g., cigarette butts, filters, and filter elements), medical items (i.e., syringes), resin pellets, food packaging, beverage containers, and other material that might have washed down a storm drain or ditch or run off from land (e.g., styrofoam coffee and drink cups).

2.2 Combined Sewer Overflows

Pipes that carry a combination of sewage and storm water are known as combined sewers. In many areas of the country with older sewer systems, sewage is carried in the same pipe system as storm water runoff. Unlike separate storm drains, combined sewer pipes run to a sewage treatment plant rather than directly into a nearby body of water. At the sewage treatment plant, sewage is separated into sludge (solid waste materials) and wastewater. The sludge is dried and either disposed of in a landfill or treated and sold as a fertilizer. The treated wastewater is discharged into a river or other nearby waterway, free of solid waste. During heavy rains, combined sewer overflows (CSOs) can occur, which is a result of too much volume. The combined raw sewage and storm water are diverted directly into the nearest receiving waters. The typical floatable debris from CSOs include street litter, sewage-related items (e.g., condoms, tampons, applicators), medical items (i.e., syringes), resin pellets, and other material that might have washed into the storm drains or run off land, as well as industrial wastes from non-residential users of the sewer system.

2.3 Beachgoers and Other Nonpoint Sources

Every year thousands of people visit U.S. beaches. Many of these beachgoers leave behind materials that become floatable debris—food packaging and beverage containers, cigarette butts, and toys like plastic shovels, pails, and frisbees. This trash can be blown into the ocean, picked up by waves, or washed into the water when it rains. Trash or materials that have blown directly into the tributaries, streams, and rivers from yards, recreational areas, and other nonpoint sources are also sources of floatable debris.

Nonpoint sources of marine pollution include agriculture, forestry, construction, urban runoff, atmospheric fallout, ground water seepage, oil and other chemical spills and disposal, solid waste disposal and its leachates, subsurface disposal of sewage and other wastes, and mining operations (Caribbean Islands Directorate, 1989).

2.4 Ships and Other Vessels

Boats of all types are also sources of floatable debris. Fishing vessels are sources of fishing nets, lines, lures, rope, bait boxes, strapping bands, light sticks, salt bags, galley wastes, household trash, plastic bags and sheeting, beverage yokes, and other types of materials accidentally lost at sea. Other types of vessels that are sources of floatable debris include recreational boats; military and other government vessels; merchant marine vessels (e.g., ocean-going and domestic cargo vessels, ocean and domestic tugs and barges, ocean liners, ferries, and small charter boats); and

educational, private research, and industrial vessels (USEPA, 1990). Trash can accidentally fall, blow, or wash off vessels into the water. In some cases, trash is deliberately thrown overboard. One major reason for the overboard disposal of trash is that there is limited storage space aboard these vessels. Most of the time, however, trash is disposed of in the ocean by people who are unaware of the problems this practice can cause.

2.5 Solid Waste Disposal and Landfills

Waste disposal activities can cause problems when trash is lost during collection or transportation or when trash blows or is washed away from disposal facilities. This floatable material can be of any type, but it is most commonly garbage. Medical waste is of particular concern; but it seems to be adequately controlled in recent years, compared to the late 1980s. EPA defines medical waste as cultures and stocks of infectious agents; human blood and blood products; human pathological wastes, including those from surgery and autopsy; contaminated animal carcasses from medical research; wastes from patients isolated with highly communicable diseases; and all used sharps (e.g., needles, scalpels, etc.) and certain unused sharps. Solid waste that is generated from hospitals includes administrative papers and records, wrappers from bandages and catheters, intravenous (IV) bags and used vials, syringes and needles, and disposable items such as tongue depressors and thermometer covers (USEPA, 1989).

2.6 Offshore Mineral and Oil and Gas Exploration/Production

Offshore oil and gas platforms are structures that are constructed in the ocean and form a base from which oil and gas drilling is conducted. Because offshore oil and gas platforms are surrounded by water, any items lost from these structures become floatable debris. As with ocean vessels, trash has sometimes been intentionally discarded directly into the ocean from these structures. Typical floatable debris generated from these platforms includes data-recording tape, items like plastic drill pipe thread protectors, hard hats, gloves, and 55-gallon storage drums. Oil and gas companies, however, are making an effort to prevent the disposal of trash into the ocean from their platforms.

2.7 Industrial Activities

Industrial facilities contribute to the floatable debris problem when waste items generated by industrial processes (production scraps, flawed products, and packaging material) are improperly disposed of on land. Finished products also can become floatable debris if they are lost during loading and unloading at port facilities or they are lost when they are transported through waterways or over land. An example is plastic resin pellets, the small spheres produced as the raw form of plastic. Manufacturing facilities use the pellets to make plastic products. During plastic resin pellet production, transportation, and processing, some resin pellets can be released into the environment. As with other types of trash, wind and storm water can carry these pellets to nearby water bodies.

2.8 Illegal Dumping or Littering

Littering and illegal dumping of waste are both sources of floatable debris. The land-based debris can blow or wash into water bodies. People who litter are a significant source of floatable debris. Litter sometimes directly becomes floatables when it is discarded in the ocean or on the beach. In addition to the obvious problem of debris in coastal recreation waters, litter discarded hundreds of miles inland also can become floatable debris when it gets into streams, rivers, estuaries, and the ocean. Littering and illegal dumping can also occur from vessels and oil and gas exploration and production platforms.