

TURNING THE TIDE ON TRASH

A LEARNING GUIDE ON MARINE DEBRIS



The Definition, Characteristics, and Sources of Marine Debris



Marine debris is 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. Two characteristics of some types of marine debris – buoyancy and the ability to be blown around – affect how easily an item becomes marine debris, while the ease with which debris degrades dictates how long it remains intact in the marine environment. However, not all debris is buoyant, and some debris will sink underwater and out of sight. There are several sources of marine debris, both on the ocean and on land. Proper collection, handling, and disposal of trash, as well as reduction of consumption and packaging can help to reduce the marine debris problem.

WHAT IS MARINE DEBRIS?

Marine debris is 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. It may enter directly due to human action, or indirectly when washed out to sea via rivers, streams and storm drains. Marine debris has become one of the most pervasive pollution problems facing the world's oceans and waterways.¹

¹ U.S. Environmental Protection Agency, "Report to Congress: Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows" August 26, 2004, (EPA Publication 833-R-04-001), http://cfpub.epa.gov/npdes/cso/cpolicy_report2004.cfm



Marine debris includes objects that typically do not naturally occur in the marine environment (i.e., oceans, **salt marshes**, **estuaries**, and **beaches**). The most common materials that make up marine debris are cloth, glass, metal, paper, plastic, rubber, and wood. Another way to classify marine debris is by the type of activity that created the waste item and the associated behaviors that caused the waste to become marine debris. Some of these categories are “ocean and waterway activities,” “illegal dumping,” and “smoking-related activities.” As you will see in **The Effects of Marine Debris** section, debris items differ in the potential impact they have on the environment and wildlife. Some debris items are much more harmful than others.

Since 1986, the Ocean Conservancy (formerly the Center for Marine Conservation)

has coordinated the International Coastal Cleanup (ICC) – an annual volunteer cleanup of debris along coastlines, rivers and lakes. Volunteers collect debris items and complete a “Marine Debris Data Card” to record their findings. The information on these data cards contributes to a worldwide database that helps people understand the extent of the marine debris problem. The Ocean Conservancy compiles and analyzes the data and publishes the results, which have shown that significant quantities of marine debris litter US coastlines. According to the ICC, over a 25-year period (1986 – 2010), the 10 most frequently collected marine debris items were:

TOP 10 DEBRIS ITEMS

Item	25 Year Total
Cigarettes and Cigarette Filters	52,907,756
Food Wrappers and Containers	14,766,533
Caps, Lids	13,585,425
Cups/Plates/Utensils	10,112,038
Beverage Bottles (Plastic)	9,549,156
Bags (Plastic)	7,825,319
Beverage Bottles (Glass)	7,062,199
Beverage Cans	6,753,260
Straws/Stirrers	6,263,453
Rope	3,251,948
Total	132,077,087

Source: http://act.oceanconservancy.org/pdf/Marine_Debris_2011_Report_OC.pdf

What Characteristics Affect the Presence of Debris in the Marine Environment?

Two well-known characteristics of some types of marine debris – buoyancy and the ability to be transported easily – affect how easily it can enter the marine environment. Another characteristic, **degradability**, affects how long debris will remain in the marine environment. The more likely it is that a piece of debris will enter and remain intact in the marine environment, the greater the threat it poses to people, wildlife, and vessels. However, not all debris is buoyant, and some debris will sink underwater and out of sight.

Buoyant Pieces of Debris

Buoyant objects are those that float in water. Buoyant objects are more likely to become marine debris than those that sink because they can easily be carried by wind, water, and waves. Buoyant items can be washed into the ocean by heavy rainfall, carried out to sea by rivers and streams, or carried off a beach by wind and waves. In the ocean, buoyant debris causes problems because it can easily come in contact with marine animals, people,

boats, fishing nets, and other objects. Floating debris can also travel long distances over the ocean, far from its point of origin. Consequently, when these items get into the ocean they can cause problems over a wide-ranging area. The most buoyant types of debris are

made of plastic and some types of rubber. Paper and wood initially float, but tend to sink once they become water-logged (**saturated** with water). Unless air is trapped inside, articles made from glass, metal, and some kinds of rubber will sink. Cloth items also tend to sink.



Fishing buoys

Easily Blown Pieces of Debris

Items that are blown by the wind can easily find their way into the marine environment. 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 marine debris even when they are originally disposed of in a proper manner. For example, a napkin that is thrown in a trash can at the beach may be blown out of the can, onto the beach, and eventually into the water. Paper, as well as some kinds of rubber, plastic, and cloth, can all be carried by the wind. During storms and other periods of high winds, almost any kinds of trash (including glass, metal, and wood) can also be blown into the ocean.



Plastic bag

The characteristics of buoyancy and the ability to be blown around are generally correlated. Lightweight objects tend to float and are also the items that are easily blown around. Some lightweight objects will sink, however, if they become saturated with water or become encrusted with living organisms that attach to hard surfaces, such as barnacles.

Degradable or Non-Degradable

An object is **degradable** if natural forces cause it to be broken down into smaller pieces. In nature, materials are typically broken down through a process known as **biodegradation**.

Biodegradation occurs when microorganisms (such as bacteria and fungi) decompose a material, causing it to be broken down into compounds (such as nutrients) that can be reused in the environment. Temperature and moisture levels affect the



rate of biodegradation. Generally, the higher the temperatures (up to a certain point) and the greater the moisture level, the greater the rates of biodegradation. Natural materials are usually more biodegradable than synthetic materials. Plastic, glass, synthetic rubber, synthetic fabrics, and metal are typically resistant to biodegradation. Natural rubber and cloth can biodegrade, but it takes a relatively long period of time. Paper can also biodegrade, unless it is coated with plastic or other nondegradable products. In addition, some plastics can breakdown into small pieces when exposed to sunlight, a process called **photodegradation**.

Some materials can break down due to chemical interactions (for example, rust on steel), and others breakdown due to physical forces, including erosion or weathering, where the material actually falls apart into smaller pieces. It should be noted that debris made from natural materials, while potentially biodegradable, can still be considered a pollutant and can still be harmful to the marine environment.

Debris that does not easily degrade remains in the environment for a long time and is therefore **persistent**. Plastic and synthetic rubber are the most persistent materials that compose marine debris. Glass, **foamed plastic**, and metal are less persistent because even though they are not biodegradable, wave action and rusting can cause these materials to break into smaller pieces. Wood, natural rubber, and cloth are only moderately persistent because they can biodegrade. Paper is not persistent, because it is biodegradable and can be torn apart easily.



Diver in Florida

Debris made from natural materials, while potentially biodegradable, can still be considered a pollutant and harmful to the marine environment.

BALLOONS CAN BE DANGEROUS!

Every year, thousands of helium-filled balloons are released into the atmosphere. Some of these balloons are released accidentally, while others are released in large numbers during weddings, mall openings, and other kinds of celebrations. Some car dealerships have been seen cutting balloons off of sale cars at the end of the day. Although the floating balloons seem to disappear, they ultimately lose their helium and fall back to earth. Some of these balloons come down on the ocean, where they can become a harmful form of marine debris. Some marine animals, especially sea turtles, have been known to ingest balloons. It is believed that they mistake balloons for jellyfish, their natural prey. The swallowed balloons can block air passages, causing the animals to suffocate, or may lodge in intestinal tracts, where they may disrupt digestion. In 2004, a dying leatherback sea turtle (one of world's most **endangered** animals) was found in North Carolina. After it died, its stomach contents revealed a Mylar balloon and plastic bags.² The ribbons and strings that are often tied to balloons can last much longer than the balloons, and can lead to **entanglement**.

If a balloon release is planned in your school or community, suggest other ways that the occasion can be celebrated without littering and endangering wildlife. For example, balloons can be released in a gymnasium or ballroom rather than outdoors. Or trees and bushes – which are helpful to wildlife and the environment – could be planted to mark the celebration.

² http://www.seaturtle.org/blog/mgodfrey/2004_05.html



Entangled loon

Where Does Marine Debris Come From?

Marine debris comes from many different sources. There are many places and activities that generate the debris that enters the marine environment. Any trash that is improperly disposed of, as well as any materials that are improperly transported or stored, have the potential to become marine debris.

The main sources of marine debris include:

- Beachgoers
- Improper disposal of trash on land
- **Stormwater sewers** and **combined sewer overflow**
- Ships and other vessels
- Industrial facilities
- Waste disposal activities
- Offshore oil and gas platforms



Beachgoers

Beachgoers

Every year, thousands of people visit US beaches. Many of these beachgoers leave behind materials that can become marine debris, such as food packaging and beverage containers, cigarette butts, and toys like shovels, sand pails, and Frisbees. This trash can be blown into the ocean, picked up by waves, or washed into the water when it rains. Some of the most harmful debris includes discarded fishing line and nets, which fishermen lose, leave behind, or dispose of improperly.

Improper Disposal of Trash on Land

People **inland** from the oceans also can generate marine debris. Trash can be blown or washed directly into the ocean if it is littered or disposed of carelessly. Even trash that is generated hundreds of miles inland can become marine debris if it is blown or washed into rivers or streams and carried to sea. Rainwater can move litter from streets and parking lots into storm drains that empty into streams, rivers, and other bodies of water.

Stormwater Sewers and Combined Sewer Overflows

Stormwater runoff (the water that flows along streets or along the ground as a result of a storm) can carry street litter into sewer pipes, which carry this water and debris to a nearby river or stream, or even directly to the ocean. In some older US cities, the stormwater runoff goes into storm drains, and then is carried in the same underground pipes as **sewage** (the **waste water** from homes and businesses, including what is flushed down toilets). Pipes that carry a combination of sewage and stormwater are known as combined sewers. Unlike independent storm sewers, 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 water. The sludge is dried and either disposed of in a **landfill** or treated and sold as a fertilizer. The treated water is discharged into a river or other nearby waterway, free of solid waste.



Litter on a stormdrain



Ships, boats, and other vessels

Combined sewer pipes cause problems when heavy rainstorms cause too much water to enter the sewer system. When this happens, the amount of water in the sewer pipes exceeds the sewage treatment plant's handling capacity. To prevent major operating problems at the plant, a safety overflow valve diverts the excess water from the plant into a nearby waterway. The problem with this system, however, is that untreated sewage and debris are also diverted into the waterway. According to the Environmental Protection Agency, cities are spending millions of dollars to correct this problem.³

Ships, Fishing Boats and Other Vessels

Boats of all kinds can also be sources of marine debris. Sometimes, trash is thrown overboard on purpose, although

it is illegal in the United States to put any type of plastic trash into the navigable waters of the US. On the Great Lakes, no trash is allowed from boats and ships, no matter how far you are from the shore. Sometimes people dispose of trash overboard on older ships because 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 can cause, or are unaware that it is illegal. Trash can also accidentally fall, blow, or wash off of vessels into the water.

In addition, fishing nets, crab pots, fishing lines, and other types of fishing equipment can be accidentally lost at sea or purposefully discarded and become marine debris. Lost or abandoned nets and fishing gear are referred to as **derelict fishing gear** and pose a dangerous threat to wildlife and essential habitats such as coral reefs and coastal nursery areas. For example, derelict crab pots, otherwise known as "ghost" crab pots, can be lost during storms, or can be accidentally cut loose from their buoys by boat motors. Studies show these crab pots have a detrimental effect on the Chesapeake Bay: the crab pots continue to catch blue crabs and other important living bay resources without ever being retrieved.⁴

More information about how anyone, including boaters, can reduce marine debris can be found on this web site:

www.MarineDebris.noaa.gov

According to MARPOL (an international treaty controlling marine pollution from ships) Annex V (referring to trash), it is illegal to put any type of trash into the water from a vessel that is on a US lake, river, or in coastal waters up to three miles offshore.

³ U.S. Environmental Protection Agency, "Report to Congress: Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows" August 26, 2004, (EPA Publication 833-R-04-001), http://cfpub.epa.gov/npdes/cso/cpolicy_report2004.cfm

⁴ Identification, Mapping and Assessment of Derelict Fishing Gear in the Chesapeake Bay <http://www.noaanews.noaa.gov/stories2006/s2693.htm> and Abandoned, ghost crab pots haunt Bay's bottom, luring creatures to their doom <http://www.bayjournal.com/article.cfm?article=2729>



Industrial Facilities

Industrial facilities can contribute to the marine debris problem when waste items generated by industrial processes (e.g., production scraps, flawed products, and packaging material) are disposed of improperly. Finished products can also become marine debris if they are lost during loading and unloading at port facilities, or if they are lost when they are transported through waterways or over land. Another common type of marine debris generated from industrial facilities is **plastic resin**

pellets. Plastic resin pellets, or pre-production plastic pellets, which are small spherical particles, are the raw material form of most plastic resins. Plastic processing facilities use them to make plastic products. Plastic resin pellets are normally contained from their creation through processing into a plastic product, but they may be inadvertently released into the environment during transportation or handling. As with other types of materials, wind and stormwater can carry these pellets to nearby water bodies.

The Plastics Division of the American Chemistry Council and the Society of the Plastics Industry, Inc. work together to educate the plastics industry about the impact of released plastic pellets. Their joint program, called “Operation Clean Sweep,” provides best management practices for plastic industry companies to effectively contain these materials. For more information, visit www.opcleansweep.org.



Plastic resin pellets

SUNLIGHT & SIX-PACK HOLDERS

Six-Pack holders (or **ring carriers**) can also become a dangerous form of debris when littered or carelessly discarded by consumers. Because the ring carriers have holes in them, it is possible for an animal to become entangled or even strangled. In order to reduce this risk, since 1988 ITW Hi-Cone (the world’s largest manufacturer of six-pack holders) has made every ring carrier from **photodegradable** plastic. This special plastic becomes brittle and breaks into increasingly smaller and smaller pieces when it’s exposed to sunlight. As a result, six-pack holders that become marine debris will degrade relatively quickly, preventing many marine animals from becoming entangled. You can also help alleviate the problem. Recycle your six-pack holders wherever #4 plastics are accepted. If you can’t recycle #4 plastic in your community, you can always cut or tear the rings to prevent unintended harm to marine animals should the ring holder enter the marine environment before the photodegradable process can take effect. Classrooms and schools can help recycle six-pack holders by signing up to be a Ring Leader. Details on this free school recycling program can be found by contacting ITW Hi-Cone at www.ringleader.com or at www.hi-cone.com.

Waste Disposal Activities

Waste disposal activities can cause a problem when trash is lost during collection or transportation, or when trash blows or is washed away from disposal facilities. For example, trash can blow out of a dumpster, or a raccoon can knock over a trash can and scatter trash all around. **Landfills** (which are sites specially engineered for disposing of solid wastes on land while protecting water quality and reducing any public health and safety hazards) can also be a source of marine debris. The trash in landfills is periodically covered with soil so that it will not be released into the environment; however, the trash can blow or be washed from the landfill before it is covered up or can be unearthed due to high, gusting winds or a rain storm.

Offshore Oil and Gas Platforms

Offshore oil and gas platforms are structures that are built 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 that are lost from these structures can become marine debris. As with ocean vessels, trash has sometimes been purposefully discarded directly into the ocean from these structures. MARPOL Annex V prohibits the dumping of plastics and garbage containing plastics from these structures. Efforts have been made by oil and gas companies to prevent the disposal of trash into the ocean from oil and gas platforms. Typical debris generated from these platforms includes drill pipes and drill pipe protectors, hard hats, gloves, 55-gallon storage drums, and everyday regular trash items.

Because offshore oil and gas platforms are surrounded by water, any items that are lost from these structures can become marine debris.



Offshore Oil and Gas Platform

Tracing Sources

Once the debris has found its way into the ocean, it is **very difficult** to trace the exact source of the debris. A plastic drinking cup, for instance, could come from multiple sources; left on shore by a beachgoer, littered on a city street and washed into a storm sewer, blown off of a recreational boat, used on a shipping vessel and disposed of overboard, etc. Clearly, marine debris is a complex issue and its abatement requires that many sources of marine debris be controlled. Prevention of marine debris is preferred to just cleaning it up. Like most pollution problems, prevention is less expensive than a cleanup after the fact – pay now or pay much more later.



Plastic debris

What Trash Management Practices Can Reduce the Marine Debris Problem?

The United States generates significant quantities of trash – otherwise known as **municipal solid waste** or garbage – every year. According to the US Environmental Protection Agency (EPA), in 2010, US residents, businesses, and institutions produced more than 250 million tons of municipal solid waste, which is almost 5 pounds of waste per person per day. At 28.5%, paper and paperboard made up the largest component of generated solid waste.⁵

Practicing the “3 Rs” (reduce, reuse, recycle), plus proper disposal of trash will go a long way to reducing the amount of marine debris.

Recycling

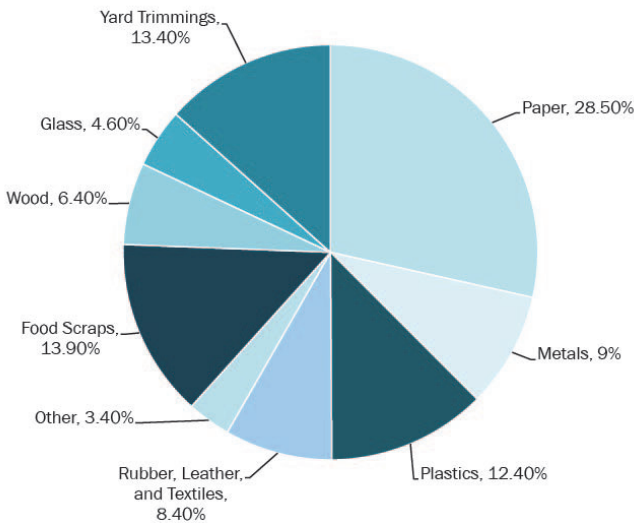
In 2010, about 34% of trash in the United States was recycled or composted, up from 16% in 1990. Almost all of the rest was buried in landfills (54%) or burned (12%).

Disposal means permanently storing or removing the trash from the environment. Landfilling and burning are considered disposal methods.

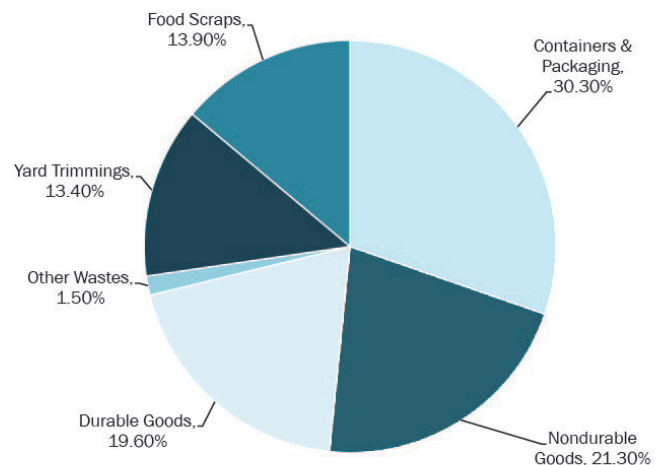
Recycling is one way to reduce the amount of trash that must be disposed. Recycling is the collection and reprocessing of materials so they can be used again. Recycling not only reduces the amount of solid waste going to landfills, but also prevents the emission of many greenhouse gases and water pollutants, saves energy, supplies valuable raw materials to industry, creates jobs, stimulates the development of greener technologies, conserves resources for the future and reduces the need for new landfills and combustors.



2010 Total MSW Generation (by type) - 250 Million Tons (before recycling)



2010 Total MSW Generation (by category) - 250 Million Tons (before recycling)



⁵ Municipal Solid Waste Generation, Recycling, and Disposal in the United States: 2010 Facts and Figures, Executive Summary. U.S. Environmental Protection Agency, Office of Solid Waste. 2011. http://www.epa.gov/waste/nonhaz/municipal/pubs/msw_2010_rev_fact_sheet.pdf

Before materials can be processed for reuse, they must be separated into different types (such as plastic, glass, and metal). Although recycling has become widespread and is increasing in the United States, not every type of material can currently be recycled in every area of the country.

Currently, paper is the most frequently recycled type of trash. Three types of paper are recycled: high-grade paper (such as computer paper), newspaper, and corrugated cardboard. In 2010, 62.5% of paper and cardboard was recycled in the United States. Metals, particularly aluminum soft drink and beer cans, are valuable and easily recycled, yet only 20% of aluminum cans were recycled in 2010, as was 34% of all steel waste (mostly food cans).⁶

Currently, all types of glass, except ceramic glass, dishes, and plate glass, can be recycled. In 2010, Americans recycled about 27% of glass waste. Florescent light bulbs, including the small compact ones that are used in homes instead of the energy-wasting incandescent bulbs, contain small amounts of mercury. These light bulbs should be recycled so the mercury can be recaptured, and not end up in our atmosphere or our waterways. Even florescent bulbs marketed as low-mercury should be recycled.

Plastic recycling, a growing industry in the United States, faces many challenges, including an unpredictable supply of plastic items to recycle and transportation costs. There are many types of plastic resins, each with different recycling requirements. Most plastic items, including beverage bottles, have a code number that tells consumers and

recyclers which resin type was used in manufacturing the item.

The common plastic bottle resins, as listed in the resin identification code, are:

1. Polyethylene Terephthalate (PET)
2. High Density Polyethylene (HDPE)
3. Polyvinyl Chloride (PVC)
4. Low Density Polyethylene (LDPE)
5. Polypropylene (PP)
6. Polystyrene (PS)
7. Other

In 2010, over 2.6 billion pounds of post-consumer plastic bottles were recycled, according to the Plastics Division of the American Chemistry Council and the Association of Postconsumer Plastics Recyclers.⁷ PET and HDPE plastics comprised 99.6% of these recycled pounds. There is high market demand for HDPE post-consumer plastic as it is a valuable raw material for many products. Examples of highly-used HDPE plastics include non-food bottles, pipe, lawn and garden products, plastic film and sheets, plastic lumber, auto parts, and pallets, crates, and buckets. Examples of PET plastics include fiber for carpet, pillows, and comforters, strapping, food and beverage containers, non-food containers, and plastic film and sheets. Despite the fact that there is high demand for recycled plastic resins, according to the EPA, about 13% of plastic waste was recycled in 2010, and this was mainly soft drink, milk, and water bottles.⁸ Convenient access to plastics recycling collection programs, plus more consumer education, will hopefully raise the percentage of recycled plastic in the years to come.

In addition to post-consumer waste, many industries also recycle plastic. For example,

⁶ *ibid* – all the numbers in this section are from the same EPA document

⁷ <http://plastics.americanchemistry.com/Education-Resources/Publications/2011-National-Post-Consumer-Plastics-Bottle-Recycling-Report.pdf>

⁸ *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: 2010 Facts and Figures, Executive Summary*. U.S. Environmental Protection Agency, Office of Solid Waste. 2011. http://www.epa.gov/waste/nonhaz/municipal/pubs/msw_2010_rev_fact_sheet.pdf

every winter thousands of recreational boats and yachts are wrapped in plastic sheeting to protect them. More and more shipyards and marinas are collecting the sheeting in the spring for recycling instead of disposing of it in a landfill. Most companies that create plastic items also recycle their own plastic waste.

“Reduce” and “Reuse”: Ways to Produce Less Waste

Adopting pollution prevention strategies that produce less waste in the first place is an even better solution than recycling alone. There are many ways to produce less waste, including reusing materials, using reusable items rather than disposable ones, and reducing the amount of packaging that is used. For example, when shopping, use fabric bags instead of the plastic or paper bags provided by stores, and purchase items that have less packaging. Carry water in a reusable bottle rather than buying multiple bottles of water. Use cloth napkins and kitchen towels rather than disposable paper products.

Keeping Trash Out of the Ocean

Marine debris can only be truly managed by changing the behavior that causes it to enter the environment. Proper disposal of trash is the responsibility of every business, boater, and person. Most importantly, boaters should ensure that trash and other items do not blow away, and that they bring back all of their trash to shore to dispose of it properly. Before trash is left out for collection, it should be tightly secured in bags or trash cans with secured lids. Garbage trucks should always be covered, and landfills should be fenced in to capture any trash that may temporarily escape. Industrial facilities that produce, transport, or use plastic resin pellets can modify handling processes to control the accidental release of materials into the environment. All of these methods can help

to ensure that trash is put, and stays, in its proper place.

Key Points

- Marine debris includes all objects found in the marine environment that do not naturally occur in those areas.
- Trash that is buoyant and/or easily blown around is more likely to become marine debris.
- Biodegradable trash, which can be broken down by microorganisms, stays intact in the environment for a relatively short period of time. Non-degradable trash will persist in the environment.
- There are several sources of marine debris, including beachgoers, litter from people living inland, storm sewers and combined sewer overflows, commercial and recreational vessels, industrial facilities, waste disposal activities, and offshore oil and gas platforms.
- Proper handling of trash and practicing the “3 Rs” (reduce, reuse and recycle) are pollution prevention activities that will help to reduce marine debris.



Waste bins at beach

DIVE DEEPER:

Other Resources on Marine Debris

- NOAA's Marine Debris website: www.marinedebris.noaa.gov
- EPA's Marine Debris site: <http://water.epa.gov/type/oceb/marinedebris/index.cfm>

Turning the Tide on Trash

abandoned fishing gear: See derelict fishing gear.

abandoned net: See derelict fishing gear.

abandoned vessels: Lost or discarded ships, boats, or other watercrafts.

annex: An addition to an established structure or document. The annexes in the MARPOL regulations are the sections containing the specific provisions of the law.

aquatic habitats: Freshwater or marine home or environment of a plant or animal; examples include streams, rivers, bays, salt marshes, sea grass beds, oyster beds, coral reefs, and oceans.

awareness: To be acquainted with an issue or fact.

beach: The part of a coast that is washed by waves or tides, which cover it with sediments of various sizes and composition, such as sand or pebbles.

best management practices (BMPs): A method, activity, maintenance procedure, or other management practice for preventing or reducing the pollution resulting from an activity. The term originated in the Clean Water Act. Specific BMPs are defined for each pollution source.

bioaccumulation: An increase in the concentration of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. The accumulation process involves the biological storage of substances that enter the organism through respiration, food intake, epidermal (skin) contact with the substance, and/or other means.

biodegradable: A process by which microorganisms (bacteria) break materials down into compounds that can be reused in the environment.

biodiversity: Short for biological diversity, which

refers to the diverse forms of life on Earth and involves three main components:

1. Genetic diversity – diversity within a species, including individuals, eggs, sperm, etc.
2. Species diversity – the different kinds of organisms and their numbers and distribution within an ecosystem.
3. Ecosystem diversity – the variety of habitats and communities of various species that interact in complex, interdependent relationships.

biomagnification: An increase in concentration of a pollutant from one link in a food chain to another; the tendency of pollutants to concentrate as they move from one trophic (feeding) level to the next.

buoyant: Capable of floating in water.

business/industry: Relating to companies, groups of companies, and their representatives engaged in commerce or trade in specific products or services.

campaign: An organized effort with a specific goal, such as informing a group of people about a particular subject.

combined sewer overflow: Pipes that carry a combination of sewage and stormwater are known as combined sewers. Unlike independent storm sewers, combined sewer pipes run to a sewage treatment plant rather than directly into a nearby body of water. During heavy rainstorms sewage treatment plants can be overwhelmed by the volume of water and discharge raw sewage directly into the receiving water body, bypassing the treatment plant. See outfall pipe.

coral reef: Limestone formations produced by living organisms, found in shallow, tropical marine waters. In most reefs, the predominant organisms are stony corals. Reef-forming corals do not grow at depths of over 100 ft (30 m) or where the water temperature falls below 72°F (22°C). Reefs are under numerous environmental pressures, including damage from derelict fishing gear.

data: A set of facts or information about a particular subject, which can be analyzed to learn more about the subject.

debris: Discarded items; trash and litter; man-made materials and solid wastes that are released accidentally or intentionally into the environment.

degradable: Capable of being broken down into smaller pieces by natural forces. See biodegradable and photodegradable.

derelict fishing gear: Fishing gear that has been lost or abandoned at some point during use; capable of catching marine life as it continues to float throughout the water column or trap animals. Also capable of smothering sensitive habitats such as coral reefs and sea grass beds. Examples of derelict fishing gear include: nets, crab pots, lobster traps, coils of abandoned or discarded monofilament fishing line.

disposal: The permanent storage or removal of trash from the environment.

diversity: A measure that combines the number of species in a community with the relative abundances of those species.

ecosystem: A natural community composed of biotic (living) creatures that live in connection with each other and abiotic (non-living) elements like sun, soil, and water. An ecosystem can be as big as a planet or as small as a puddle.

endangered species: Any species that is “in danger of extinction throughout all or a significant portion of its range,” according to the Endangered Species Act of 1973.

Endangered Species Act (ESA): A 1973 Act of Congress that mandated that endangered and threatened species of fish, wildlife, and plants and their habitats be protected and restored.

entanglement: The looping of a piece of debris around part of an animal's body. Entanglement may impair swimming and feeding, cause suffocation, decrease ability to elude predators, and cause open wounds.

environmental group: An organization of individuals concerned with reducing and preventing environmental degradation.

estuary: A body of water at the lower end of a river which is connected to the ocean and semi-enclosed by land. In an estuary, sea water is measurably diluted by freshwater from the land.

extinct: A species that is no longer in existence. In biology and ecology, extinction is the ceasing of existence of a species. The moment of extinction is generally considered to be the death of the last individual of that species.

fishing gear: Equipment used for fishing (e.g., gillnet, handline, harpoon, seine, longline, midwater trawl, purse seine, rod-and-reel, trap, trawler, etc. but not vessels).

foamed plastic: A type of plastic that is generally made from polystyrene and consists of small spheres that are fused together. Foamed plastic is very light and easily breaks into smaller pieces. It is frequently used in disposable cups for hot beverages.

food chain: A series of animals and plants, each depending on the next for food. A food chain usually forms part of a much larger, more complex food web.

food web: A network of living things that depend on each other for food.

garbage: Spoiled or waste food that is thrown away, generally defined as food waste. It is also a general term for all products discarded.

ghost fishing: The capability of lost or discarded fishing gear, such as nets, traps, or fishing line, to continue to catch fish, shellfish, or other marine life.

gillnets: A type of large fishing net designed so fish can get their head into the holes in the net, but not their bodies. Fish become caught by their gills.

gyre: A circular pattern of currents in an ocean basin.

habitat: The area in which a plant or animal naturally lives, grows, and reproduces that provides adequate food, water, shelter, and living space.

hatchling: A bird, fish, or reptile (including a turtle) that has just hatched.

ingestion: The consumption of a piece of debris by an animal. Ingestion may cause blockages in the digestive tract, suffocation, or a false feeling of fullness that can lead to malnutrition or starvation.

inland: Land areas away from the coast, associated with watersheds.

landfill: A specially engineered site for disposing of solid waste on land that is constructed to reduce any hazards to public health and safety. Landfills usually have liner systems and other safeguards to prevent groundwater contamination.

lifestyle: The way a person conducts his or her life and how this impacts other people, animals, and the surrounding environment.

litter: Improperly discarded wastes; see debris.

marine: Relating to the ocean.

marine debris: Any man-made object discarded, disposed of, or abandoned that enters the coastal or marine environment.

marine ecosystem: A salt-water ecosystem, including oceans and shorelines. Ocean ecosystems include pelagic (sea surface) and benthic (sea floor) communities. Shoreline ecosystems range from rocky and sandy beaches to tidal pools and salt marshes.

MARPOL Annex V: MARPOL refers to the International Convention for the Prevention of Pollution from Ships, a set of international conventions concerned with the prevention of pollution (oil, hazardous substances, sewage, plastic, and garbage) from ships. Annex V is the section of this convention that addresses prevention of pollution by garbage from ships.

medical waste: Waste that comes from hospitals or other medical institutions and that may be infectious. Medical waste includes needles, bandages, glassware, and other items.

municipal solid waste: Garbage or refuse that is generated by households, commercial establishments, and industrial offices; includes durable goods, non-durable goods, containers and packaging, food wastes, and yard trimmings.

navigable waters: generally speaking navigable waters are streams, rivers, lakes and other

bodies of water that can be used for commercial transportation.

nondegradable: Incapable of being broken down into simple compounds or components.

offshore oil and gas platform: A structure in the ocean or a bay that forms a base from which oil and gas drilling is conducted.

outfall pipe: A pipe that discharges water and other materials into a receiving water body.

persistent: In the environment this refers to the ability of a substance or material to remain in the environment for long periods of time without being broken into smaller components.

photodegradable: The ability to degrade due to exposure to ultraviolet radiation where the chemical bonds or links in the polymer or chemical structure of a plastic are broken.

plastic resins: Material used in making plastics; usually petrochemical-based.

plastic resin pellets: Small, round pellets that are produced as the raw form of plastic. Resin pellets are melted down and used to form plastic products. During plastic resin pellet production, transportation, and processing, some resin pellets can be released into the environment. The pellets resemble fish eggs, and can be mistaken for food by marine animals and sea birds.

press release: A brief report intended to provide news organizations with the basic facts of an event or issue and encourage them to cover it.

recycling: The collection and reprocessing of materials so they can be used again in a similar or different form.

ring carrier: See six-pack holders.

salt marshes: Low coastal grassland frequently overflowed by the tide. A maritime habitat found in temperate regions, but typically associated with tropical and subtropical mangrove.

saturated: Thoroughly wet; unable to absorb any additional liquid. Some marine debris items will float until they become saturated, and will then sink out of the water column to the bottom.

seagrass beds: Communities of grass-like marine

plants, usually on shallow, sandy or muddy bottoms of sea. Because these plants require sunlight to photosynthesize, they are limited to growing in shallow and sheltered coastal waters anchored in sand or mud bottoms. Highly diverse and productive ecosystems, seagrass beds are home to hundreds of associated species.

sewage: Used water and water-carried solids from homes that flow in sewers to a wastewater treatment plant. Also referred to as wastewater.

sewage treatment plant: See combined sewer overflow.

six-pack holders: Plastic rings that group a set of beverages and other liquids into a package for shipping and purchase.

sludge: Solids that remain after the wastewater treatment process that settle to the bottom of a septic tank or a treatment plant pond. Current regulations require that these materials are disposed of through land applications, incineration, or are land-filled.

solid waste: Any solid, semi-solid, liquid, or contained gaseous materials discarded from industrial, commercial, mining, or agricultural operations, and from community activities. Solid waste includes garbage, construction debris, commercial refuse, sludge from water supply or waste treatment plants, or air pollution control facilities, and other discarded materials.

species diversity: See biodiversity.

storm drain: A pipe system which includes grates, gutters, underground pipes, streams, or open channels designed to transport rain from developed areas to a receiving body of water.

stormwater: Runoff in the storm drain system.

stormwater runoff: The water that flows along streets or along the ground as a result of a storm.

stormwater sewers: See storm drain.

stranded: Run aground. See strandings.

strandings: A behavioral phenomenon where marine wildlife species that normally live in deeper waters swim into shallow waters or

ashore when ill or affected by changes in their environment; species commonly known to strand include sea turtles, whales, and dolphins.

tar balls: Crude oil from seeps and spills often form tar residues or tar balls that become stranded on the shoreline.

threatened species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. A threatened species is not in immediate danger of extinction, but is likely to become endangered if it is not protected.

trash: Materials that have been made or used by people and discarded. Also referred to as waste, garbage, and solid waste.

volunteer: To offer to work for a cause without pay, generally because the cause is deemed important and in need of support.

waste water: Used water and water-carried solids from homes that flow in sewers to a wastewater treatment plant. Also referred to as sewage.

zooplankton: Small, usually microscopic animals that are suspended or swim in the water column, including larvae of many fish and benthic invertebrates; the animal component of plankton; the first consumers in a marine food chain.