Biological Times

Volume No. 3| Issue No. 4|Pages 7-8

# The Causes and Impact of Litter Pollution on Marine Life: A List of Concerns

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## ABSTRACT

The growing amount of marine litter being dumped on beaches and in oceans around the world is currently a serious environmental issue. This is particularly true for the majority of litter found in the seas, which is made up mostly of plastics, industrial chemicals, mining, sewage dumping, land runoff, eutrophication, and oil spills that stay in the water for an undetermined amount of time. Littering is killing animals, endangering human health, and disrupting ecosystems in the world's oceans in more and greater quantities. Improved land-based waste management and waste prevention are the key to the solution to these problems. Reducing plastic pollution at its source, cleaning up beaches, utilizing the circular economy, educating people, and using less packaging are some of the common solutions. The main recommendations for removing litter from the ocean include education, prevention, mitigation, removal, and behavioral modification.

**Introduction**

Seawater is essential to the health of our ecosystem. Oceans are essential to humanity for a variety of reasons, including industry, trade, adventure, sales, food, and environmental preservation [1]. Ecology depends on marine life as well, and human pollution of marine life has upset the ecology. Billions of pounds of waste and other pollutants find their way into the ocean every year [2]. What is the source of this pollution? How far does it travel? Oceans are now being used by humans for a variety of purposes, and they are also successful.

The term "marine pollution" refers to the negative effects that human-produced materials—such as noise, excess carbon dioxide, industrial, residential, and agricultural waste—have on water bodies when they find their way into the water [3]. Numerous plant and animal species can be found in seawater habitats, and they are impacted by marine pollution. Water creatures are suffering from a variety of diseases brought on by ecological imbalances, which are hazardous for the ecosystem [4]. Most people agree that plastic trash poses a serious risk to marine ecosystems. Its effects are most noticeable around coasts where a lot of plastic debris washes up on the shore. The problem of marine trash impacts seafloors and coastal regions globally [5].

The hazards that marine litter poses to both humans and the natural world have been recognized for approximately 58 years, and its impact is significant on a global scale [6]. Nevertheless, despite its significance, it has only just come to be truly recognized. It can originate from both marine and land sources, such as oil rigs and shipping waste dumping. However, the majority originates from rivers and beaches. At varying ocean depths, marine litter can drift, sink, and build up depending on its content, buoyancy, features of the water, and numerous other variables [7]. It can be found frozen in arctic ice, floating amid the ocean, inside marine animals, and on the most distant beaches on Earth [8].

**Sources and Causes:**

There are several reasons for marine pollution.

- **Sewage Dumping**

The simplest and least expensive way to dispose of sewage is frequently thought to be to dump it into the ocean. The majority of untreated sewage that contains deadly compounds enters ocean waters through sewer systems, negatively impacting the health of marine wildlife and flora.

- **Surface Runoff**

Runoff, also known as non-point pollution, results from the maximum amount of water entering the soil and then flowing off the land into the ocean through drainage systems like rivers and streams. Harmful poisons, such as pesticides, fertilisers, and other soil pollutants, as well as litter deposited in populated areas, are carried by this runoff water [9]. After that, the runoff and all of these pollutants are thrown into the ocean.

- **Industrial Pollutants**

Hazardous poisons like mercury, DDT, Bisphenol-A, and other chemicals are found in waste from industries like fossil fuel, plastic production, agrochemicals, and medicines. These damage the oceans by changing the water's pH, which causes the majority of aquatic plants and animals to die. These poisons infiltrate the bodies of aquatic creatures as well, building up in their tissues.

- **Eutrophication**

Researchers have shown that eutrophication is caused by a rise in the quantity of dangerous substances in the ocean. The ocean ecology is disrupted by the enormous growth of marine algae and other life-threatening microbes brought on by the presence of nitrogen-rich fertilisers, animal wastes, and human sewage [10]. Dead zones will develop in the ocean waters and marine life will be dying off as a result of loss of oxygen caused by eutrophication.

- **Acidification of the Ocean and Thermal Pollution**

Ocean acidification is the term used to describe the process by which the ocean's waters are getting more acidic due to an increase in CO2 levels brought on by global warming [11]. Worldwide, the pH shift is already having an impact on coral reefs, causing coral bleaching, which is harmful to marine life that depends on these reefs for survival.

- **Oil Spills**

Oil spills destroy beneficial marine microorganisms that produce oxygen and alter the chemical composition of marine ecosystems. Fish die as a result of these ecological imbalances, which also suffocate the biodiversity of the ocean and decrease fish migration and reproduction.

- **Mining**

In addition to being one of the sources of marine pollution, ocean mining also produces noise pollution. Deep-sea mining has an impact on the ocean's bottom level. The marine ecology is impacted by the contaminants that are released into the ocean as a result of the mining of metals like copper, gold, and silver [12].

- **Pollution of Noise**

Marine life is negatively impacted by the unnecessary loud noise that passing ships make for transportation and exploration purposes. Such needless noise causes chaos in the marine environment, as a result of interfering with the auditory information that many aquatic species, including dolphins and whales, rely on for survival and other activities.

- **Plastics**

Plastics that are only used once have been ruthlessly dumped as garbage into the ocean, where they may be found on beaches, in polar ice seas, and even on the edges of the world's most isolated, abandoned islands [13]. The accumulation of plastic garbage in certain marine locations has resulted in a plastic soup that suffocates marine life and may have far-reaching effects on the marine ecosystem.



To cite this article: Razzaq N, N Nazish, MA Rehman, A Shafqat & R Awan. 2024. The causes and impact of litter pollution on marine life: a list of concerns. Biological Times, 3(4): 7-8.

Around 1.15-2.75 million metric tonnes of debris are dumped into the ocean annually via storm drains and rivers that function as conveyor belts because of the movement of macroplastics carried by winds and rain, such as plastic bottles, bags, and other waste materials. The macroplastics are collapsed into smaller bits by the ocean waves and sunshine, and the resulting microplastics are now a common element of freshwater and marine ecosystems. The extent of marine pollution is highlighted because these tiny plastic particles have made their way to the Mariana Trench and are scattered throughout the water column.

**Impacts:**

- **A decrease in the water's oxygen content**

Since most rubbish put into oceans worldwide cannot collapse for many years, so the oxygen content of the water drops quite quickly. The rate at which the amount of oxygen in seawater is decreasing is concerning. Insufficient oxygen levels in the atmosphere have a direct effect on a wide variety of plants and marine life, including whales, penguins, dolphins, sharks, seals, sea turtles, and others.

- **Impact on the marine food web**

The river that finally flows into the ocean carries waste from agriculture and industry into the sea. Chemicals, insecticides, deposited radioactive waste, and other agricultural wastes and industrial contaminants sink to the bottom of the ocean and remain there for a long time. This deposited trash affects the surface of the water from the bottom to the top [14]. The smaller marine creatures swallow these substances, which are then ingested by the bigger species. This has an effect on the entire food chain.

- **Disruption of the coral reef cycle**

Oceanic plants cannot receive sunlight when oil spills blanket the surface of the sea. It thus influences the process of photosynthesis. Consequently, the coral reef's cycle is upset.

- **Impacts on aquatic creatures' reproductive systems**

Hazardous chemicals included in industrial and agricultural waste harm marine life. These substances are so harmful that they can harm aquatic animals' reproductive systems and other internal organs. Any issues with the reproductive system affect the process by which species of aquatic animals reproduce.

- **The detrimental impact of poisons on marine life**

The accumulation of toxins in oceans is causing harm to aquatic life, such as cancer, damage to cells and tissues, organ failure, abnormal behavior, and malfunctioning reproductive systems [15]. Hazardous chemicals, oil spills, and chemical pesticides are either accidentally or intentionally exposed to these creatures' bodies, which can lead to a range of health issues and occasionally even death.

**Prevention of Marine Pollution**

- Stop using plastic and throwing trash into the oceans as these things choke drains.
- Try to use less of the chemicals mentioned above and make sure they are not used anywhere near water streams.
- Farmers need to switch to organic farming practices and get away from synthetic pesticides and fertilizers.
- Use public transport and reduce your carbon footprint by making small but meaningful changes that will contribute to lowering environmental pollution and ensuring that future generations can live in a safe and healthy environment.

**Conclusion:**

The largest bodies of water on Earth are the oceans. Excessive human activity has damaged marine life in the world's waterways in recent decades. Ocean pollution is the discharge of hazardous materials into the water, including oil, plastic, industrial, and agricultural waste, as well as chemical particles. These compounds' sources, routes of action, and effects are still mostly unknown. Though there are still a lot of gaps to be filled, scientific understanding of the issues and a variety of feasible solutions has greatly improved. The goal of numerous programs, policies, initiatives, and tactics is to reduce and avoid marine trash. Improving waste management in underdeveloped nations is a major emphasis on short-term solutions. Fundamental system changes, such as the transition to a circular economy, and behavioral adjustments are the goals of long-term solutions. However, we must consider regulations and policy measures for managing land waste and disposing of litter at sea, as well as identify any knowledge gaps that should be the subject of future multidisciplinary research and policy initiatives.

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