

FORUM:	Environment Commission
ISSUE:	Measures to Protect the Marine Environment Harmed by Waste Dumped into the Oceans
STUDENT OFFICER:	Yunsoo Cha
POSITION:	President of Environment Commission

Introduction

The oceans are a significant part of the Earth as over 70% of the world's surface is covered with our oceans. Currently, the oceans, full of mysteries and valuable resources, are directly harmed by none other than humans mainly due to the ocean dumping practice that humans carry out. Humans have lived beside water sources throughout civilizations to gain a steady habitat but

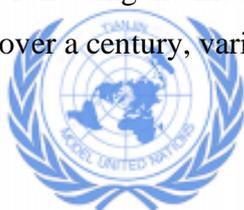


Waste being dumped underwater through pipes

have been polluting those sources simultaneously. This serious issue has now spread throughout the world among the connected oceans, and more and more parts of the sea are becoming harmful places for marine organisms that they have once embraced. Varying from house waste to toxic chemical waste, vast amounts of waste are still being dumped into the world's oceans despite international and domestic efforts to protect the marine environment. Keeping in mind that the marine environment is a crucial part of our nature, not only for the inhabiting organisms but also for humans themselves, the protection of the marine environment from dumped waste is necessary.

Background

Water bodies have been used as waste repositories ever since civilizations formed around them, even before the Agricultural Revolution. In the past, most of the waste was dumped in nearby lakes, rivers, and estuaries, while ship waste was nearly the only cause of ocean dumping. However, waste disposal expanded to the oceans as the smaller water sources started showing symptoms of water pollution, and local waste became more commonly discharged into the oceans. Furthermore, with the advent of technology following the Industrial Revolution, chemical waste emerged as another problem of ocean dumping. For over a century, various types of waste – such as sewage sludge, industrial waste,



military waste, trash, construction debris, dredged material, radioactive waste, and fishing gear – have been ocean dumped. This continuous practice of ocean dumping has posed a recognizable threat to the oceans. Among the numerous waste types involved, sewage, industrial waste, dredged material, and radioactive waste are the most toxic, as they can induce toxin accumulation in marine organisms. Fishing gear and other plastic waste may physically entangle or be consumed by marine animals. Ultimately, the marine ecosystem can be shaken from such marine health threats and eutrophication.

Problems Raised

Bioaccumulation and Biomagnification of Toxins

Dredged material, which contributes the most to ocean dumping, comes from the silt and sand removed from dredging rivers, harbors, canals, and other waterways. Dredged material is not entirely ocean dumped, as some are dumped into other water sources and landfills, or used for development. Still, about a tenth of all dredged material contains heavy metals like cadmium, mercury, or chromium. These toxic heavy metals, once released into the water, are open for consumption by marine organisms, which starts the chain of bioaccumulation and biomagnification. When an organism takes in toxins faster than they excrete them, the toxin gradually builds up inside the organism, causing a phenomenon called bioaccumulation. As the organisms live in an environment with a hierarchical food chain, higher-level consumers consume contaminated smaller organisms, thus the concentration of the toxin increases going up the food pyramid. This results in higher toxin concentration in the high-level consumers, which is not only a danger within the marine environment but also for humans, who harvest the fish for consumption.

Plastic Consumption and Entanglement

As plastic is widely used in the products we use, ocean-dumped waste also largely contains plastic. Not being biodegradable and having a long lifespan, plastic exists in various sizes in the oceans, ranging from large debris to minimal microplastic, all having the potential of harming marine animals. Broken down microplastic may be falsely recognized by animals for food and be



Three turtles entangled by “ghost nets” in Maldives

consumed. Many creatures cannot metabolize and excrete such plastic, which harms the animals. On the other hand, large pieces of plastic, especially disposed fishing nets, physically harm the animals by



entangling them, which leads to detrimental consequences such as exhaustion, suffocation, amputation, starvation, and even death.

Eutrophication

Domestic sewage, wastewater produced from daily sources such as bathrooms, kitchens, and laundries, is released into the oceans mainly in two forms: raw sewage and sewage sludge. Sewage in its raw state (containing the solid materials), and sewage sludge, the semi-solid residue from municipal wastewater treatment, both contain lots of organic impurities. These impurities, which contain nutrient chemicals such as phosphorus and nitrogen, mainly come from food, vegetables, and human waste. When they are released into the ocean, they become food that the algae and bacteria can consume, becoming the



Algal bloom caused by eutrophication

trigger for eutrophication. When a vast amount of necessary nutrients from such wasted organic matter become available, the algae and bacteria exceedingly consume the organic matter, using up the dissolved oxygen in the water for their metabolism. This can lead to algal blooms due to the drastic increase in the algae population and to other organisms suffering from the lack of oxygen, which may even be fatal.

International Actions

London Convention

The London Convention, also known as the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter of 1972, is one of the first international agreements aimed to protect the global marine environment. The London Convention aims for effective control and prevention of marine pollution, especially pollution caused by waste dumping. This convention's focus is on the deliberate disposal of wastes at oceans from man-made structures (vessels, platforms, aircraft, etc.). With 87 contracting parties, the convention requires the parties to implement regulatory programs for dumping as well as issue permits for ocean dumping, with the premise that hazardous chemicals are generally banned for dumping.

London Protocol

This protocol of 1996 is a free-standing treaty that aims to add on to the London Convention and was agreed on by the contracting parties to the previous convention. With 53 contracting parties, this



protocol seeks to protect the marine environment more actively by prominently banning coastal incineration and waste export for ocean dumping. While most types of wastes and materials are prohibited from being dumped under this protocol, the following materials are allowed to be considered for dumping: dredged material, sewage sludge, fish wastes, man-made structures (vessels, platforms, etc.), inorganic geological matter, naturally originating organic matter, bulky items comprising unarmful materials (iron, steel, concrete, etc.), carbon dioxide steam from sequestration, etc. The International Maritime Organization has responsibility for this protocol along with the previous London Convention.

Key Players

United States of America (USA)

The United States of America is a nation largely concerned by the issue of ocean dumping, with 17 million tons of industrial waste dumped in the 1970s and 8 million tons dumped in the 1980s. Internationally, the USA ratified the London Convention but has only signed the London Protocol without ratifying it. Domestically, the Environmental Protection Agency (EPA) of the USA has been taking active action to regulate and prevent ocean dumping. For instance, the US Congress enacted the Marine Protection, Research and Sanctuaries Act (MPRSA) in 1972 to regulate ocean dumping of all potentially harmful waste. Overall, under the London Convention and the MPRSA, and with permits required for waste dumping, the US is a nation largely involved in the issue of protecting the marine environment from ocean dumping.



Symbol for the US EPA

Australia

Australia is also a nation that shows great concern over the issue of ocean dumping and marine pollution. Australia has the Environment Protection Act 1981, also known as the Sea Dumping Act, which regulates the loading and disposing of dredged material at sea. Under this act, a sea dumping permit is required for all organizations wishing to dump such material into the oceans. Internationally, Australia is a party to the London Convention and Protocol, and thus abides by the regulations set under those agreements.

Possible Solutions

Minimizing Port Waste

Waste at port sites is one of the first types of waste to be dumped into the oceans due to the natural proximity to the oceans. As seaports are one of the main locations of waste discharge, regulation and minimization of waste at such sites are crucial. A method for implementing minimization is thorough monitoring of all shipments and cargo arriving at the ports and setting limits on the amount of waste allowed to be released a day. Cooperation with land-based waste management can also help manage



Waste being dumped at UAE seaports

waste carried by ships without having to release them fully into the ocean. Additionally, the securing of cargo on relatively smaller boats is seen to minimize waste unintentionally being dumped into the oceans when the shipments are accidentally blown off by the wind. Seaports should provide and check secure fastening of any shipment on all boats to minimize accidental ocean dumping.

Fishing Gear Management

As one of the main consequences of ocean dumping comes from plastic waste and irresponsibly disposed fishing gear, regulating fishermen on management may be a solution to decrease the amount of “ghost fishing nets” floating around at sea. A system for checking out with fishing gear before leaving the ports for fishing and re-checking all the material that had been taken along after return could be implemented with the help of technology to provide an efficient and effective means of enhancing the sense of responsibility among fishermen. The governments could subsidize the provision and management of a disposal site at seaports for old fishing gears to further prevent the intentional disposal of such gears. Most fundamentally, the best method to diminish the harm that unleashed fishing nets pose on marine animals would be to manufacture such nets using biodegradable material, which can then break down completely in the oceans, not lasting forever to harm the animals.

Glossary

Bioaccumulation

Bioaccumulation is when substances (mainly chemicals) become concentrated inside the body of living things.

Biodegradable

Biodegradable means being capable of being decomposed by bacteria or other living organisms or being able to be slowly destroyed into minimal parts through natural processes.

Biomagnification

Biomagnification is when the concentration of toxins in an organism that ingested another organism is higher than that of the ingested organism. The concentration of toxins increases going up the trophic food pyramid.

Dredged Material

Dredged material is the residue from dredging water sources. Dredging is the act of removing silt and other material from bottoms of bodies of water. This is done because sand and silt that flowed downstream gradually causes sedimentation to fill up channels and harbors.

Sewage Sludge

Sewage sludge is the semi-liquid (semi-solid) waste obtained from the processing of municipal sewage (municipal wastewater). When the sewage sludge is not contaminated by oils, organic chemicals, and metals, it can be recycled as fertilizer as it has nutrients helpful for plant growth. This, however, when released into water, may accelerate the proliferation of algae, causing algal blooms and eutrophication.

Sources

- “Causes, Effects and Solutions to Ocean Dumping.” *Conserve Energy Future*, 17 July 2020, www.conserve-energy-future.com/causes-effects-solutions-ocean-dumping.php#1_Management_and_Minimization_of_Waste_Dumping_at_the_Port.
- “Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.” *International Maritime Organization*, www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx.
- “Disposal of Dredged Material at Sea.” *Department of Agriculture, Water, and the Environment*, www.environment.gov.au/marine/marine-pollution/sea-dumping/dredged-material.
- “Does Eutrophication Cause Algae Blooms?” *Probiotic Solutions®*, 12 Oct. 2019, probiotic.com/2019/08/eutrophication-and-algae/.
- “Learn About Ocean Dumping.” *EPA, Environmental Protection Agency*, www.epa.gov/ocean-dumping/learn-about-ocean-dumping#MPRSA.
- Mambra, Shamseer, et al. “Ocean Pollution - 6 Things That Make It Worse.” *Marine Insight*, 29 Jan. 2021, www.marineinsight.com/environment/causes-and-effects-of-ocean-dumping/.
- “Managing the Impacts of Abandoned, Lost, or Discarded Fishing Gear: Marine Stewardship Council.” *Managing the Impacts of Abandoned, Lost, or Discarded Fishing Gear | Marine Stewardship Council*, www.msc.org/en-us/media-center/blog/2018/10/31/managing-impacts-of-abandoned-lost-or-discarded-fishing-gear.
- National Geographic Society. “Marine Pollution.” *National Geographic Society*, 27 June 2019, www.nationalgeographic.org/encyclopedia/marine-pollution/.
- “Ocean Dumping: International Treaties.” *EPA, Environmental Protection Agency*, www.epa.gov/ocean-dumping/ocean-dumping-international-treaties.
- “Ocean Dumping” Pollution A to Z.. *Encyclopedia.com*. 16 Jun. 2021.” *Encyclopedia.com*, www.encyclopedia.com/earth-and-environment/geology-and-oceanography/geology-and-oceanography/ocean-dumping.
- “Ocean Pollution ~ MarineBio Conservation Society.” *MarineBio Conservation Society*, 12 June 2021, www.marinebio.org/conservation/ocean-dumping/#:~:text=Waste%20in%20the%20Ocean&text=The%20most%20toxic%20waste%20material,of%20material%20dumped%20each%20year.
- Team, Mfame. “Commercial Ships Dump Waste into Sea, Say Maritime Officials.” *Mfame.guru*, 30 Mar. 2018, mfame.guru/commercial-ships-dump-waste-into-sea-say-maritime-officials/.
- US Department of Commerce, National Oceanic and Atmospheric Administration. “What Is Dredging?” *NOAA's National Ocean Service*, 6 Sept. 2013,



oceanservice.noaa.gov/facts/dredging.html#:~:text=Dredging%20is%20the%20act%20of,be%20periodically%20removed%20by%20dredging.

“What Are Ghost Nets?” *Olive Ridley Project*, 29 June 2021, oliveridleyproject.org/what-are-ghost-nets.

“What Happens When Raw Sewage Is Dumped into Water.” *UNC*,

science.unctv.org/content/reportersblog/sewage#:~:text=Microorganisms%20Feast%20on%20Sewage%2C%20Creating,chemical%20elements%20required%20for%20life.&text=So%2C%20the%20contamination%20of%20sewage,causes%20a%20detrimental%20chain%20reaction.