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Ocean Pollution: Its Meaning, Causes and Effects on Marine Animals

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Abstract: Ocean pollution can be defined as anything that contaminates the sea. Common pollutants include chemicals, small plastic beads in exfoliants and also toxic bio-matter (such as sewage). But, noise – due to excessive traffic around the ocean – can also be defined as pollution if it disrupts marine life. Pollution can vary depending on the context and the purpose for which seawater is being used. Oceans and seas form an indispensable part of our existence. This factor of indispensability has not only helped us tremendously but has also led to us exploiting the oceanic resources without any second thoughts. The microscopic forms of animal and plant life, which are the basic food upon which higher forms depend, thrive in this very province and damage done to the marine eco-system by the wastes disposed is too much. When heavy sediments settle on the ocean floor can bury fish and other delicate species such as coral reefs. These sediments can also clog fish gills and smother a large part of the marine ecosystem. Small plastic fragments can be mistaken as food by fish or other sea life which can kill them by filling up or damaging their stomach or other digestive organs. An attempt was made in this article to discuss the causes and effects of ocean pollution on marine *animals*.

Key words: microscopic forms, Small plastic fragments, effects of ocean

Introduction

Oceans are the largest water bodies on the planet Earth. Over the last few decades, surplus human activities have severely affected the marine life on the Earth's oceans. Ocean pollution, also known as marine pollution, is the spreading of harmful substances such as oil, plastic, industrial and agricultural waste and chemical particles into the ocean. Marine pollution occurs when harmful, or potentially harmful, effects result from the entry into the ocean of chemicals, particles, industrial, agricultural and residential waste, noise, or the spread of invasive organisms. Since oceans provide home to wide variety of marine animals and plants, it is responsibility of every citizen to play his or her part in making these oceans clean so that marine species can thrive for long period of time. Mining for materials such as copper and gold is a major source of contamination in the ocean. For example, copper is a major source of pollutant in the ocean and can interfere with the life cycles of numerous marine organisms and life. There are many of types of ocean pollutants that endanger marine life. Some of them are more obvious than others, but all contribute to an unhealthy ocean and many times, the death of its creatures. Although the big oil spills from offshore drilling get a lot of attention, there are millions of gallons of oil dumped into the world's oceans every year from other sources.

Causes of Ocean Pollution

Marine pollution includes a range of threats including from land-based sources, oil spills, untreated sewage, heavy siltation, eutrophication (nutrient enrichment), invasive species, persistent organic pollutants (POP's), heavy metals

from mine tailings and other sources, acidification, radioactive substances, marine litter, overfishing and destruction of coastal and marine habitats (McCook 1999, Nyström et al. 2000, Bellwood et al. 2004). Overall, good progress has been made on reducing Persistent organic pollutants (POP's), with the exception of the Arctic. Some progress on reducing emissions of heavy metals is reported in some regions, while increased emissions are happening in others. Electronic waste and mine tailings are included amongst the sources of heavy metal pollution in Southeast Asia. Sedimentation has decreased in some areas due to reduced river flows as a result of terrestrial overuse for agricultural irrigation, while increasing in other regions as a result of coastal development and deforestation along rivers, water sheds and costal areas, and clearing of mangroves (Burke et al., 2002; McCulloch et al., 2003; Brown et al., 2006).

Toxic Materials:

Industrial and agricultural waste are most common form of wastes that are directly discharged into the oceans, resulting in ocean pollution. The dumping of toxic liquids in the ocean directly affects the marine life as they are considered hazardous and secondly, they raise the temperature of the ocean, known as thermal pollution, as the temperature of these liquids is quite high. Animals and plants that cannot survive at higher temperatures eventually perish.

Pesticides, Air emissions, Plutonium processing, Nuclear power plants, Nuclear waste dumps, Nuclear submarines, Household cleaning products, etc. are the water pollutants. Pollutants find their way into the ocean and sink to the bottom. Bottom feeding organisms ingest these chemicals and contaminates the food chain. The smaller fish is eaten by the larger fish, which is then eaten by a human. Toxins build up in the tissues of the people who eat the contaminated fish and may lead to illnesses like cancer, reproductive disorders, birth defects, and other long-term health problems. Environmental toxins are spread by wind, rain and currents. Thus, the toxic waste of one area, such as the United States and now Asia, where industrialized development and contamination are growing rapidly, become the toxic problems of the world.

Oil Spills:

Oil is dangerous to marine life in several ways. The oil washes up on beaches and contaminates nesting areas and feeding grounds. As marine mammals try to clean themselves, they may ingest oil which can poison them. Although fish and shellfish aren't impacted immediately, long-term exposure may lead to organ damage, reduced growth, reduced respiration, and may adversely impact reproduction and larva development and survival.

Ship pollution:

Ship pollution is a huge source of ocean pollution, the most devastating effect of which is oil spills. Crude oil lasts for years in the sea and is extremely toxic to marine life, often suffocating marine animals to death once it entraps them. Crude oil is also extremely difficult to clean up, unfortunately meaning that when it is split; it is usually there to stay. In addition, many ships lose thousands of crates each year due to storms, emergencies, and accidents. This causes noise pollution (excessive, unexpected noise that interrupts the balance of life, most often caused by modes of transportation), excessive algae, and ballast water.

Trash and Debris:
Plastic bags, balloons, medical waste, soda cans, and milk cartons all find their way into the oceans of the world. These items float in the water and wash up on beaches. According to the Environmental Protection Agency, marine debris creates health hazards for marine life. Ocean mammals get entangled in old nets and drown because they cannot get to the surface for air. Birds, turtles, and fish ingest a variety of plastic items and their digestive systems become clogged. Sea turtles are attracted to floating plastic bags which appear to be jellyfish, one of their favorite treats. The plastic bags block their digestive system and cause a slow and painful death. Various pieces of trash cause entanglement, starvation, drowning, and strangulation.

Land Runoff:
Land runoff is another source of pollution in the ocean. This occurs when water infiltrates the soil to its maximum extent and the excess water from rain, flooding or melting flows over the land and into the ocean. Often times, this water picks up man-made, harmful contaminants that pollute the ocean, including fertilizers, petroleum, pesticides and other forms of soil contaminants. Fertilizers and waste from land animals and humans can be a huge detriment to the ocean by creating dead zones.

Ocean Mining:
Ocean mining in the deep sea is yet another source of ocean pollution. Ocean mining sites drilling for silver, gold, copper, cobalt and zinc create sulfide deposits up to three and a half thousand meters down in to the ocean. While we have yet the gathering of scientific evidence to fully explain the harsh environmental impacts of deep sea mining, we do have a general idea that deep sea mining causes damage to the lowest levels of the ocean and increase the toxicity of the region.

Littering:
Pollution from the atmosphere is, believe it or not, a huge source of ocean pollution. This occurs when objects that are far inland are blown by the wind over long distances and end up in the ocean. These objects can be anything from natural things like dust and sand, to man-made objects such as debris and trash. Most debris, especially plastic debris, cannot decompose and remains suspended in the oceans current for years. Animals can become snagged on the plastic or mistake it for food, slowly killing them over a long period of time. Animals who are most often the victims of plastic debris include turtles, dolphins, fish, sharks, crabs, sea birds, and crocodiles.

Effects of Ocean Pollution
Animals from impacted food chain are then eaten by humans which affects their health as toxins from these contaminated animals gets deposited in the tissues of people and can lead to cancer, birth defects or long term health problems. More Than a Million Sea Birds and Mammals Are Killed Each Year By Ingestion of Plastic. Around 100 million tons of plastic is produced every year, of which 1o percent ends up in the sea. Ocean litter comes from many sources, including trash that washes off city streets, waste blown in from landfills and containers that fall off ships during heavy storms. Once in the water, the debris accumulates in large patches, travels with currents and washes up onshore. This litter is frequently consumed, often with fatal effects, by marine mammals, fish and birds who mistake it for food. The use of pesticides and fertilizers on farms has increased an

alarming 26 fold over the last 50 years, causing serious environmental consequences. Chemical runoff from farms is leaching into nearby streams, waterways and groundwater, killing thousands of insects and fish. The presence of fertilizers in the water alters nutrient systems, resulting in explosive growths of algae that produce harmful toxins and deplete the water of oxygen, and as a result little or no marine life can exist. Scientists have recorded an estimated 400 such dead zones around the world. Because marine mammals are at the top of their food chain, the toxins in their food sources accumulates in their bodies, especially in their fatty tissues and breast milk. Toxins in plankton are consumed by small fish, which are in turn eaten by larger fish, which are eaten by even larger fish. Eventually marine mammals and humans, each higher up the food chain, eat the now-toxic fish, further concentrating the toxins. This bio-concentration is what causes high levels of toxins in dolphins, whales, and other marine mammals.

Nine of the 10 species with the highest polychlorinated biphenyl (PCB) levels are marine mammals. The declining health of ocean-going mammals, especially the increase in various cancers, sends an undeniable message to humans. Thus dolphins and other marine mammals are showing us our future – unless we change our ways. Marine mammals are sending an unambiguous message to humankind: clean up the toxic soup we live next to, swim in, and draw fish from, or pay a very high price in human lives. Due to lax laws, cruise ships have been operating with little to no environmental regulations, and as a result have caused a great deal of damage to sensitive marine life. Current regulations allow cruise ships to legally dump untreated sewage and other waste once the ships are three miles from shore. This toxic waste is discharged directly into the ocean and contains bacteria, pathogens, medical waste, oils, detergents, heavy metals and other harmful substances, all of which are putting aquatic life at risk.

Effect of Toxic Wastes on Marine Animals:

Oil spill is dangerous to marine life in several ways. The oil spilled in the ocean could get on to the gills and feathers of marine animals, which makes it difficult for them to move or fly properly or feed their children. The long term effect on marine life can include cancer, failure in the reproductive system, behavioral changes, and even death.

Disruption to the Cycle of Coral Reefs:

Oil spill floats on the surface of water and prevents sunlight from reaching to marine plants and affects in the process of photosynthesis. Skin irritation, eye irritation, lung and liver problems can impact marine life over long period of time.

Depletes Oxygen Content in Water:

Most of the debris in the ocean does not decompose and remain in the ocean for years. It uses oxygen as it degrades. As a result of this, oxygen levels go down. When oxygen levels go down, the chances of survival of marine animals like whales, turtles, sharks, dolphins, penguins for long time also goes down.

Failure in the Reproductive System of Sea Animals:

Industrial and agricultural wastes include various poisonous chemicals that are considered hazardous for marine life. Chemicals from pesticides can accumulate in the fatty tissue of animals, leading to failure in their reproductive system.

Effect on Food Chain:

Chemicals used in industries and agriculture get washed into the rivers and from there are carried into the oceans. These chemicals do not get dissolved and sink at the bottom of the ocean. Small animals ingest these chemicals and are later eaten by large animals, which then affects the whole food chain.

Ocean pollution is a serious issue, and it comes in many forms. Nevertheless, there are several ways that we can take positive action right now to solve this problem of marine pollution. We should never think that our individual actions do not count when it comes to caring for the environment: they do! If we refrained from dumping rubbish in the ocean, for instance, every single individual on this earth could prevent several tonnes of trash from spoiling the habitats of marine animals – this is no small achievement! And, when we club together with other people, our ability to fight marine pollution becomes even bigger. So why not start today? Write to your local authority, organize a beach cleanup, research environmentally friendly household cleaning products and stop using exfoliating products containing plastic beads.

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