XOURNALS

Academic Journal of Ocean Sciences

ISSN UA | Volume 01 | Issue 01 | June-2018

Marine Pollution and Its Impact on Humans and Animals

Anil Kumar Nair[1]

Available online at: www.xournals.com

Received 8th January 2018 | Revised 12th February 2018 | Accepted 15th May 2018

Abstract:

The presumption that money can compensate everything is wrong because of the ever increasing pollution in the sea which destroys the marine life and also disturbing the whole ecological balance. Oceans are the main source for dumping many types of waste in present eras such as plastic, oil waste, waste water etc. For many years, these dumping of the trashes is now leading to the death of variety of aquatic flora and fauna and also causing the extinction of many species of fishes. Due to the direct consequences of pollution, millions of animals, including birds and fishes which are completely dependent on the water are being killed. Many other types of oceanic pollution such as radioactive and industrial waste, pollution due to festivals, oil spills are just as costly and can contaminate the oceans for thousands of years to come. This paper gives a brief discussion about the marine pollution and also its impact on human and the aquatic life.

Keywords: *Marine Pollution, Festivals, Humans, Oil spills, Dumping*

Authors:

1. *Kerala University of Fisheries and Ocean Studies, Kochi, Kerala, INDIA*

Introduction

Marine pollution us caused by the number of factors caused mainly by the humans such as festivals like Narali Pournima, Ganesh Visarjan, deposition of waste water into the sea without treatment and many other reasons. The marine pollution become a major issue of present era, as being ignored for many years. Prior, people thought that the pollutants will become diluted due to the vastness of the ocean and their impacts will be eliminated but due to these pollutants, the balance of ecosystem became altered. Many variety of ways such as tourism revenue, coastal economic activities and lost resources have to pay the costs of this pollution. The pollution causes very dangerous effects on marine animals and plants which now resulting in the extinction of many species of animals and plants. Ocean is the home for variety of living being and therefore people should be responsible towards the motive to avoid pollution in the sea and to help the marine life to bloom for long. The origin of pollution came from both land (e.g., via rivers and wind) and sea (e.g., through marine dredging, mining, dumping and shipping). The threat to marine life came from many forms, such as harvesting, overexploitation, dumping of waste, pollution, land reclamation, alien species, global climate change, and degrading. The natural events in future may be analyzed by the issue of pollution and for the purpose of simulation models which anticipates the effects of contamination on marine population that requires the consideration of all sources of pollution over the total orbit of the species.

Figure 1: Deposition of Waste Water into the Sea

Cause of Ocean Pollution

There are number of factors which are responsible for the ocean pollution. There are some of the major components contributing towards the sea pollution. The prominent marine pollutants are discussed below along with their significance of marine disposals.

1. Oil Pollution

The pollution by crude petroleum or refined petroleum products is termed as Oil pollution in the context of environment. Oil pollution is an inevitable consequence of the dependence of a rapidly growing population on oil based technology. There is 15 tanker disasters and 3 blow outs from 1970- 1982 is the total record of accidental oil spills in Indian Ocean. The main source of the oil contamination in the Indian Ocean is the oil originating from the ballast, bilge and cooling water of the tankers. Other sources which cannot be ignored are industrial and domestic· discharges.

2. Heavy Metal Pollution

Pollution of the sea caused by the oil attracts the immediate attention because it is visible. But there are also some types of pollutants which does not visualizes and only can be understand by their damaging effects. Toxic metals are one of the most significant pollutants. Heavy metals pollution can be caused by both naturally and by human activities. A considerable amount of the metal is added by the natural processes of submarine volcanic activity, weathering etc. These considerable amount of metals are released by each of the above mentioned processes to the marine environment or rejects where there prolonged stability makes them bio available for a very long time. For the biological processes, these metals can be classified as essential and non-essential elements. Most of the metals comes under the category of essentials but some of them such as Mercury, Cadmium and Lead comes under the non-essential category for example in Japan, Minamata and Itai- Itai diseases are caused by the consumption of fish infected by Hg and Cd respectively.

3. Agricultural Wastes

It is necessary to pay a battle against natural pests like insects, weeds and molds for the human survival. In agriculture, tons of fertilizers and pesticides are being used every year for the pest control and disease vector control. On the basis of target, the chemical composition and structure, pesticides can be frequently classified. Nearly 25% out of the total quantity of pesticides can be expected to reach the marine environment through atmosphere, river runoff and direct discharges. Some of these pesticides are distributed through various segments of the marine environment and are persistent with 'half-life' of nearly a decade.

4. Domestic Wastes

A high load of organic matter including N and P is owned by the domestic waste and sewage which can enrich the coastal environment in small quantities generally create imbalances in large amounts. Undesirable species of organisms are multiplied by these organic compounds especially pathogenic bacteria. Domestic wastes also includes several other

inorganic constituents which causes damage to the environment by adding in uncontrolled amount.

5. Sensitive/Fragile Environments

Spawning grounds and nurseries are made by the some sensitive and fragile environments such as coral reefs, mangroves and sea grass beds, which deserve special mention for a number of commercially important fishes, gastropods and crustaceans. A wide variety of flora and fauna is harbored by these sensitive and fragile elements. For the purpose of domestic and industrial uses, they can be the source of drugs and raw material. They are facing a great deal of pressure as being closer to the human habitation which results in considerable environmental stress.

6. Ocean Mining

Ocean mining in the deep ocean is another major source of ocean pollution. The inorganic elements found equal to three and a half thousand meters down under ocean, and these mining sites are drilled for these elements such as copper, gold, cobalt, silver and zinc. It causes damage to the lowest level of the ocean and also increase the toxicity of that region.

Nature of the Marine Environment

The characterization and description of the marine environment can be done at number of scales which ranges from the genetic level that occurs at species to the ocean level processes. The scales of significance here are marine landscapes, habitats and species and their inter-relationship can be expressed as follows:

- The globally accepted original classification of biological diversity is provided by the species also provide the difference between different types by establishing rules of taxonomy. Genera, families, orders, classes and phyla are the hierarchy in which their classification is arranged.
- Sets of species are included in the habitations (communities or assemblages) that regularly occur together, but which are resulting from different parts of the taxonomic hierarchy (e.g. molluscs, kelps, and fish in a kelp forest habitat). Degree of similarities are reflected by their classification and can also be structured in a hierarchy (biotope complexes, biotopes, and broad habitats).
- The classification hierarchy of different parts of the habitat (e.g. saltmarsh, intertidal mudflats, rocky shores and sub-tidal mussel beds in an estuary) derives the Marine Landscapes which comprises sets of habitats that constantly occur together.

The approach to classification or characterization differs at each scale, each adopting differing factors to suit the requirements at that scale.

Sources of Marine Pollution from Ships

There are many sources of pollution occurring from ship are:

- Oily-water discharge from ships
- Wastewater discharged from ships
- Tanker accidents
- Accidental spillage during terminal loading
- Garbage and Other Solid waste
- Marine Machinery Exhaust
- Sound pollution
- Ballast-water discharged from ships at ports
- Anti-fouling Paints

Impact of Pollution on Marine Bio-system

Fresh water and marine environment are being affected by spilled oil in the terms of surface resources and a wide range of subsurface organisms linked with a complex food chain and also includes human food resources. The physical damage may cause by the spilled oil and can harm the environment in several ways which directly affects the wildlife and their habitats (such as coating birds or mammals with a layer of oil) and the toxicity of the oil itself which can be the poison exposed organisms.

The fur of seals and feathers of seabirds are contaminated by the drifting oils and destroys the waterproofing and insulating properties of the feather by clogging in it. The birds exhaust their fat reserves and become weakened when tries to maintain its body temperature. The replacements of these reserves are almost impossible because whenever the birds tries to fly in its weakened condition, bird has to carry as much as 20% extra body-weight in soaked feathers. Oil reduces the hatchability of the eggs when transferred to the surface of their eggs.

Oil pollution also affects the other marine lives such as it disrupts the cycle of coral reefs, causes clogging of the gills of fishes thereby resulting in their death and hindering the process of photosynthesis of marine plants leading to their end.

Figure 2: Penguins Covered in Oil

Impact of Marine Pollution on Public Health

Volatile chemicals airborne toxins causes the most immediate health concerns that leave people complaining of symptoms like headaches and nausea and worrying about long-term problems like cancer when oil is spilled into a residential neighborhood. The crude oil rarely evaporate into the air as they contain small amounts of heavy metals an satay with the oil as it spills onto the waterways. These compound are toxic at high doses and can damage the nervous system even at low doses because it contain mercury, manganese, nickel, chromium, arsenic and lead.

World Health Organization (WHO) recommends a maximum tolerable consumption of mercury in food of 0.3 mg as Mercury is now recognized as a potential hazard on a regional scale. Mercury gets accumulated in the meat of the fish which cannot be avoided by cutting off the skin or other parts and they cannot be easily detected as it is odorless, invisible and. It acts as a neurotoxins in the human body and interfering with the brain and nervous system. Contact to mercury can be particularly dangerous for pregnant women and small children. In low doses, mercury may affect the development of a child, may cause delay in walking and talking of the child, shortening attention span and causing learning incapacities. Less frequent, high dose of mercury and its exposure to prenatal and infants can cause cerebral palsy, mental retardation, deafness and blindness because, during the initial stages of life, brain of a child is still developing and absorbs nutrients. Fertility and blood pressure regulation can adversely affected by the mercury poisoning in adults and can cause memory loss, tremors, vision loss and numbness of the fingers and toes. Heart diseases may also be the main damage because of the exposure to the mercury.

The Threats from Plastics Pollution to marine biota

The information related to the impact of plastics pollution on the ocean's ecosystems is still very less. However, the knowledge related to their deleterious impacts on marine biota is increasing. Primary threats for the marine life is mechanical due to the entanglement of the packaging bands, synthetic ropes and lines, or drift nets and ingestion of plastic debris. The amount of plastic pollutants in the marine environment is increasing as the use of plastics continues to increase. Plastic particles in the stomachs of 8 of the 11 seabird species caught as bycatch, according to the study done in North pacific. Marine debris are affecting a significant number of species is indicated by the list of affected species. Almost 267 species are affected by this worldwide, which comprises of 44% of all seabird species, 86% of all sea turtle species, 44% of all seabird species, and 43% of all marine mammal species. Since most of the victim are likely to go undiscovered over vast ocean areas, as they either sink or are eaten by predators, therefore the problem remain highly underestimated.

Review of Literature

Derraik, (2002) reviewed the previous study about the deleterious effects of plastic debris on the marine environment by bringing together most of the literature published so far on the topic. Overwhelming evidence that plastic pollution is a threat to marine biodiversity, already at risk from overfishing, climate change and other forms of anthropogenic disturbance have been shown by this study. They suggested that there is a need for more research (especially long term monitoring) to assess the actual threat posed by plastic debris to marine species. This research provides information about input for conservation management and strengthen the basis for educational campaigns. They and also provide marine scientists with better evidence that could be used to demand from the authorities more effort to diminish the problem.

Habib, (2014) examined the role of oil pollution liability conventions in the protection of marine environment through compensation and challenges facing the conventions in the process of application in relevant oil pollution incidents. He also discussed and analyzed the relevant issues. His study focused on international legal framework for prevention of vessel-source oil pollution. He concluded that for the promotion of the international co-operation between well developed and less developed countries, there is a need of more efforts by the international maritime community especially in technical and financial support for the less developed states, to achieve international success in the prevention and control of vessel source pollution. He also suggested the establishment of a centralized authority whose responsibilities are clearly defined.

Sarić and Radonja, (2014) examined and analyze the causes of marine pollution by noise in order to achieve better understanding, awareness of the general public by recognizing its effects. They also synthesize protection options to prevent further pollution of the Adriati Sea. Increase effort to investigate new feeds are caused by the increased consumption of fossil fuels which are the basis of modern technological development and its inability of sustainability on known sources and resources. The spreading pressure waves from a particular source that flickers within different types of substances, produces sound. Sound waves moving through different media with different speed and the density and plays an important role because in dense media sound has a lower consumption, decrease its density slowly sound spreads faster.

Vikas and Dwarakish, (2015) discussed a review on definition of coastal pollution, cause of coastal pollution, its impact and preventive measures. They also reviewed, the harmful effects of various substances on the marine environment by collecting and studying relevant literature. There are some substances which are biodegradable and some are not. Several laws and policies are taken for preventing marine pollution at the national and international levels. They concluded that, awareness must be created among the people about the impact of pollution.

Wilcox *et al*., (2015) worked to point out towards a number of opportunities both for policy-based and consumer-driven changes in plastics use that could have demonstrable affects for a range of ecologically important taxa that serve as indicators of marine ecosystem health. Their results represented demonstrate the value of expert elicitation techniques in providing insights where field experiments are difficult to undertake. Identified Variable impacts of common debris items on the health of marine wildlife, with entanglement by fishing-related gear, balloons and plastic bags emerging as the greatest threat to seabirds, sea turtles and marine mammals.

Onwuegbuchunam *et al*., (2017) conducted a physico-chemical and microbiological analysis of samples of ships' wastewater to determine the status of marine pollution in the port environment. The physico-chemical and microbiological analysis were based on samples from two ports namely Apapa and Calabar ports. They also discussed the policy implications of the developed model. They found evidence to propose the use of an integrative model that combines a judicial agenda with input from constant scientific analysis.

Conclusion

Due to the ocean pollution, lots of complicated problems are highlighted and caused problems to the human as well as animals. Ocean is the main part of the ecological cycle and therefore human should be understand the value and importance of the ocean. As we know that we the humans are the main factors for polluting the ocean, therefore, we have to be involved to get the solution by curtailing our way of living. It is important to preserve and protect the coastal environment legal and responsible applications of scientific knowledge on all aspects.

References:

Derraik, José G.b. "The Pollution of the Marine Environment by Plastic Debris: a Review." *Marine Pollution Bulletin*, vol. 44, no. 9, 2002, pp. 842–852.

Eriksen, Marcus, *et al*. "Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea." *PLoS ONE*, vol. 9, no. 12, Oct. 2014.

Gupta, R. Sen, and S Y.S. Singbal. "Marine Pollution in the Indian Ocean - Problems, Prospects and Perspectives." *Journal of the Indian Fisheries Association*, vol. 18, 1988, pp. 333–356.

Habib, A. Z. M. Arman. "Prevention of Oil Pollution of the Marine Environment by Ocean Vessels: Compliance and Enforcement of International Law." *IOSR Journal of Environmental Science, Toxicology and Food Technology*, vol. 8, no. 9, 2014, pp. 11–21.

Onwuegbuchunam, D., *et al*. "An Analysis of Ship-Source Marine Pollution in Nigeria Seaports." *Journal of Marine Science and Engineering*, vol. 5, no. 3, 2017, p. 39.

Sarić, Ivan, and Radoslav Radonja. "Noise as a Source of Marine Pollution." *Scientific Journal of Maritime Research*, vol. 28, 2014, pp. 31–39.

Shinde, Ruchira, and Sagar Gawande. "An Overview of Ocean Pollution." *International Journal of Science and Research*, vol. 5, no. 3, Mar. 2016, pp. 337–341.

Todd, Peter A., *et al*. "Impacts of Pollution on Marine Life in Southeast Asia." *Biodiversity and Conservation*, vol. 19, no. 4, Feb. 2010, pp. 1063–1082.

Vikas, M., and G.s. Dwarakish. "Coastal Pollution: A Review." *Aquatic Procedia*, vol. 4, 2015, pp. 381–388.

Wilcox, Chris, *et al*. "Using Expert Elicitation to Estimate the Impacts of Plastic Pollution on Marine Wildlife." *Marine Policy*, vol. 65, 2016, pp. 107–114.