

Marine Pollution

ABSTRACT

There has been a manifold increase of dangerous trends in our marine ecosystem due to pollutant inputs and human interference. One of the vital steps required to counteract this dangerous situation is the collection of information on marine environmental damage created by various sources of pollution and human interference and its analysis to find an optimum solution. It helps us to formulate effective strategies to control the influx of pollutants as well as heal the ecosystem in future. Water quality is a vital aspect for the survival and well-being of the living resources, especially in the coastal and estuarine areas. Some of these areas are now under direct threat from the increasing load of various types of pollution.

INTRODUCTION

The sea, which covers around 70 per cent of the earth's surface, is home to millions of fish, crustaceans, mammals, microorganisms, and plants. It is a vital source of food for both animals and people. Thousands of birds rely on the sea for their daily food supplies. Fishermen throughout the world catch over 90 million tonnes of fish every year, and in many developing countries, fish is the principal source of protein.

Oceans are the large area on the planet that covers more than one-third of the earth's total surface. However, the increasing human activities have affected them greatly and lead to the ocean or **marine pollution**. In this article, we will explain this term in detail.

Defining Marine Pollution

For close to thirty years, most academics studying the phenomena of marine pollution have adhered to a definition developed by a UN body, the Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), who define it as the...

"Introduction of man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities including fishing, impairment of quality for use of sea-water, and reduction of amenities."

The definition has two important qualities:-

First, it is action oriented. Marine pollution is conceptualized as a human activity, thereby omitting all natural activities that could potentially have damaging effects on the ocean eco-system. So, for example, earth quakes or volcanic eruptions that emanate from the ocean floor and subsequently damage or change already existing ocean eco-systems would not be considered pollution.

Second, the definition is amenable to measurement. Marine pollution is harmful, and its danger can be identified in a variety of ways. For example, it is easy to see the deleterious effects that oil spills have on the sea birds and mammals that happen to run into them. Scientists likewise can readily identify various toxic substances found in the marine environment, measure their quantities, and provide estimates of their potential danger for the health of both marine life and humans

Marine pollution is the harmful entry into the ocean of chemicals or particles. A big problem is that many toxins adhere to tiny particles which are taken up within a few days

by plankton¹ and benthos animals, most of which are filter feeders, concentrating upward within ocean food chains.

Environment Protection Act 1986

Environment protection act was umbrella legislation and it covered almost every area of pollution, and mechanism to control the pollution

Environment as defined under this Act includes air, water land and its interrelationship with human beings and living creatures.

2 (a) “Environment” includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, microorganism and property;

2 (b) “Environmental pollutant” means any solid or gaseous substance present in such concentration as may be, or tend to be, injurious to environment;

2 ©“Environmental pollution” means the presence in the environment of any environmental pollution;

2 (e) “Hazardous substance” means any substance or preparation which, by reason of its chemical or physico-chemical properties or handling, is liable to cause harm to human beings, other living creatures, plant, micro-organism, property or the Environment;

This case brought into force for the first time the non-implementation of the CRZ notification. Though the notification was enacted, it was never brought into force and the petitioner filed this writ for stoppage of intensive and semi-intensive type of prawn farming in the ecologically fragile coastal areas and for prohibiting use of wastelands and wetlands for prawn farming. The petitioner also sought for the constitution of a National

Coastal Zone Management Authority to safeguard the marine and coastal areas. The allegation of the petitioner was that the coastal states were allowing big business houses to develop prawn farms on a large scale in the coastal States in violation of the EPA, 1986 and various other provisions of law.

The Court ordered NEERI to visit the coastal states of Andhra and Tamil Nadu and give its report on the status of farms set up in the said areas. The report submitted indicated that due to the impact of aquaculture, the environment was adversely degraded. The impact was on surface water, contamination of soil and ground water and destruction of mangrove vegetation.

The Court order the following:

1. no part of the agricultural land and salt farms could be converted into aqua culture farms
2. an authority shall be constituted by the Central Government under sec. 8 (3) of the EPA, 1986.
3. the authority so constituted shall implement the precautionary principle and polluter pays principle;
4. no shrimp culture ponds should be constructed within the CRZ;
5. all the infrastructure set up within the CRZ such as shrimp culture farms should be demolished and removed;
6. aquaculture industry functioning at present within one km of the Chilika and Pulicat lakes must compensate the affected persons;
7. all employees/workmen engaged in the shrimp culture industry for less than one year should be retrenched and those

employed for more than one year paid compensation.

aquaculture industry functioning outside the CRZ should obtain clearance from the authority within a specified period failing which they must stop their operations

Main causes of Marine Pollution

There are many different sources of **marine pollution** and we have mentioned some of them in detail:

- **Land Runoff**

Land runoff occurs when the excess water from melting, rain, and floods flows towards the ocean. Generally, this water picks up the harmful contaminants, such as petroleum, fertilizers and other forms of soil contaminants that pollute the sea.

- **Toxic Chemicals**

There are many toxic chemicals that runoff from industry and enter the ocean. These chemicals can endanger the marine creatures living in the sea. Some of the examples of toxic chemicals entering the sea include industrial waste transferred into the sea, pollution through chimneys, etc.

- **Sewage**

There are many polluting substances that flow through drainages, sewage or rivers directly into the sea. These substances lead to the **marine pollution**. This way the substances and minerals from the mining camps enter the ocean.

- **Ocean Mining**

Over the years, the ocean mining has increased in the deep sea that creates **ocean pollution**. The miners drill inside the ocean for silver, copper, and zinc that results in depositing sulfide way down into the ocean.

- ***Ship pollution***

The ship pollution has increased the marine pollution and the most devastating source of this type is oil spills. These contaminants last for years in the ocean and affecting the marine life by suffocating the animals living there.

Effects of Marine Pollution on Living Marine Resources

Tens of thousands of chemicals are used to meet society's technological and economic needs. Marine pollution is not only attributed to oil and chemical spills, but much of the debris and toxic substances affecting marine animals, in actual fact, originate on land. Pesticides, plastic bags, balloons, cigarette butts, motor oil, fishing line, find their way into local waterways either through direct dumping, through storm drains (whatever is left on streets, parking lots, can be washed into storm drains which lead directly to local waters), or through sanitary sewers, affecting living marine resources.

Two basic ways by which chemical contaminants can affect living marine resources:

1. *By directly affecting the exposed organism's own health and survival, and*
2. *By contaminating those fisheries resources that other species, including humans, may consume.*

Researchers have been studying this dual impact of contaminants using a variety of marine organisms ranging from bottom-dwelling invertebrates and fish to pelagic² species such as salmon and marine mammals. Below are examples of several multi-year, interdisciplinary field and laboratory studies that demonstrate links between observed biological effects in marine biota and chemical pollutants.

These biological effects include:

1. Diseases such as liver lesions in bottom fish;
 2. Decreased reproductive success in bottom fish;
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3. Impaired immune competence in anadromous fish³, and
4. Growth impairment in invertebrates.

Impact on coastal activities

Contamination of coastal amenity areas is a common feature of many spills leading to public disquiet and interference with recreational activities such as bathing, boating, angling and diving. Hotel and restaurant owners and others who gain their livelihood from the tourist trade can also be affected.

Oil and chemical spills can adversely affect industries that rely on a clean supply of seawater for their normal operations. If substantial quantities of floating or sub-surface pollutants are drawn through intakes, contamination of the condenser tubes may result, requiring a reduction in output or total shutdown.

The main threat posed to living resources by the persistent residues of spilled oils and water-in-oil emulsions (“mousse”) is one of physical smothering. The animals and plants most at risk are those that could come into contact with a contaminated sea surface:

1. Marine mammals and reptiles;
 2. Birds that feed by diving or form flocks on the sea;
 3. Marine life on shorelines and
 4. Animals and plants in Mari culture facilities.
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REMEDIES UNDER THE INDIAN LEGAL SYSTEM

Indian shipping policy is not isolated or any different from the global maritime environment. The main source of maritime law, besides domestic law, has been international conventions to which India is a signatory. Under the Constitution of India, merchant shipping is dealt with by the Ministry of Surface Transport. The principal legislation dealing with the combating of oil pollution is;

- The **Merchant Shipping Act** of 1958 (MS Act)
- The **Marine Insurance Act** of 1963
- The **Merchant Shipping (Prevention of Pollution of the Sea by Oil) Rules**, 1974.

PREVENTION

As hard as people might try, accidents do occur inevitably. However, there are ways to limit such accidents and spills and avenues to ensure that response is immediate.

What's Being Done to Make Shipping Safer?

Double hulls or double bottoms are being introduced and, since 1993, is a requirement for all new tankers. Ships' crews must be well trained and experienced. Electronic charting is being introduced. It is a computer-based video display that allows navigators to track the ship's course in relation to hazards, and warns the navigator of potential danger, both visually and audibly. All ships must have radar systems to improve navigation. A technology known as "load-on-top" allows oil and water mixtures from cleaning to separate, resulting in less pollution. Strict fire safety regulations apply on board.

There are a few common designs for large ships, including double hulls and double bottoms. Each design has its advantages and drawbacks. Although structural improvements to ships make tanker traffic safer, recent advances like double hulls will not eliminate spillage under all circumstances.

Oil Storage and Handling

As much as 92 percent of all oil spills involving tankers happen at a terminal when oil is being loaded or discharged. Precautions at terminals include monitoring oil flows, regular inspections of hoses and connections, and routine checks of tank levels. Weather conditions are monitored closely. Dikes around storage tanks prevent oil from escaping if an accident does occur.

Marine Traffic Control

Marine traffic control systems are in place in many major shipping areas. The systems can be as simple as traffic lanes in heavily traveled waters or they can be very sophisticated networks. Governments are introducing control systems for which branched out, in a different direction by addressing vessel design. Unfortunately this part of this amendment has not been ratified by any maritime nations.

Marine operations similar to those we take for granted at airports. But no matter how simple or complex, traffic control greatly minimizes collisions and the risk of ships running aground.

Controlling Pollutants by Taxation

Taxation can be utilized to encourage or discourage certain activities in addition to raising funds to support government programs. Pollution would be allowed, but it would be taxed at a rate proportional to the environmental insult. This general philosophy is followed at the present time by requiring that polluters pay fines roughly proportional to the amount of pollution.

CONCLUSION

Humans depend largely on the ocean for their food source, pharmaceutical products, economy, recreation and transportation. Unfortunately many of human's acts are causing more harm than good to this vast piece of resources. Pollution comes in many ways. From little thoughtless acts of individuals littering into the sea to big oil leaks and even countries trying out nuclear bombs all contribute to marine pollution.

All waters in this world are affected by pollution, which comes mainly from land-based activities rather than from sea-based activities.

Ironically, man-made toxics such as mercury, dioxins, PCBs and PAHs which are meant to assist man in advancing technology and advancing our society has now been proven to do us much harm. These effects not only affect man, but also change the original behavior of our sea ecology. Impacts on coastal activities, biological changes causing mutations on aquatic animals and also destroy our mother nature.

Many countries have voiced out their protests at the incident whereby a certain country has tested out their nuclear bomb but everything is done after it has been tested and damage had been done. Repercussions proved much more harm then the county had ever anticipated.

Lastly, what we can do as people on this planet is to be conscious of our small little acts so as to protect and sustain our Earth. Little thoughts can make a difference, as we will also educate our next generation to care for our Earth.

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