

## **Marine Pollution**

**Dr. Bijan Saha, School of Oceanographic Studies, JU**

**E-mail:** sahabijankr@yahoo.co.in

Oceans are huge storehouse of resources like minerals, food and energy. Oceans are used for transporting goods and for recreation purposes. Oceans controls weather and climate. The health of the ocean is deteriorating, mostly due to anthropogenic interventions. Marine pollution occurs when harmful effects, can result from the entry into the ocean of chemicals, particles, industrial, agricultural and residential waste, or the spread of invasive organisms. The oceans are getting polluted in several ways through discharge of industrial and urban wastes, harbour activities, oil slicks, land run-off etc. Toxic metals like cadmium, copper, lead, mercury, nickel, zinc etc reach the oceans through industrial discharges. Most sources of marine pollution are land based. The pollution often comes from nonpoint sources such as agricultural runoff and wind blown debris. Point source pollution occurs when there is a single, identifiable, and localized source, directly discharging sewage and industrial waste into the ocean. Natural causes like volcanoes, fissures, sediments, decomposition of organism can add heavy metals, radioactive materials to the ocean system. Deep sea area normally remains unpolluted. Near coastal sea including estuaries, creeks and bays are mostly affected.

Many potentially toxic chemicals adhere to tiny particles which are then taken up by plankton and benthos animals. In this way, the toxins are concentrated upward within ocean food chains. When pesticides are incorporated into the marine ecosystem, they quickly become absorbed into marine food webs. Toxic metals can also be introduced into marine food webs and suppress growth in marine life. In this way, marine toxins can be transferred to land animals, and appear later in meat and dairy products. Ships can pollute oceans in many ways like Oil spills. While being toxic to marine life, polycyclic aromatic hydrocarbons (PAHs), the components in crude oil, are very difficult to clean up, and last for years in the sediment and marine environment. Discharge of cargo residues from bulk carriers can pollute ports, waterways and oceans. Ships create noise pollution that disturbs marinelife. Water from ballast tanks can spread harmful algae and other invasive species to the areas where they never existed before. Some of these alien organisms have threatened the survival of native species, damaged fisheries and aquaculture and significantly modified local ecology. Discarded plastic bags and other plastic waste which finish up in the ocean present dangers to marine life and fisheries. Aquatic life can be threatened through entanglement, suffocation, and ingestion. Fishing nets, usually made of plastic, lost in the ocean entangle fish, dolphins, sea turtles, sharks, dugongs, crocodiles, seabirds, crabs, and other creatures, restricting movement, causing starvation, laceration and infection. Many animals consume flotsam by mistake, causing death due to blocking the passage of food. The land runoff also carries a variety of other trace constituents including heavy metals, making the seas the ultimate dumping ground for these materials. These metals are largely of lithogenic origin and may contain a small fraction of the anthropogenic load. Heavy metals are toxic or poisonous at low concentrations. Examples are mercury, lead, nickel, arsenic and cadmium. Another major issue is the possibility of eutrophication of coastal water due to incremental increase in the fluxes of nutrients (nitrogen and phosphorus) through terrestrial runoff and sewage. The sustained increase in phytoplankton due to high concentration of nutrients and their decay near the seabed in shallow waters can deplete DO over large areas and dramatically alter the marine ecology. These encourage the growth leading to explosive blooms of toxic/ otherwise algae and the bacteria, which used up the oxygen in the water, making it uninhabitable for fishes and other animal life. Toxic algae can also harm other marine life and cause severe damage to commercial fisheries and aquaculture. The biggest ways are rivers that carry with it many chemicals, used as fertilizers in agriculture as well as waste from livestock and human. Sewage, another source of nutrients to the sea, also contaminates the receiving water with pathogens and viruses. Estuaries tend to be naturally eutrophic. Atmospheric anthropogenic fixed nitrogen can enter the open ocean. The oceans are normally a natural carbon sink, absorbing carbon dioxide from the atmosphere. Because the levels of atmospheric carbon dioxide are increasing, the oceans

are becoming more acidic. There are concerns that structures made of calcium carbonate may become vulnerable to dissolution, affecting corals and the ability of shellfish to form shells. Near-shore mining has potentially more likelihood of causing observable environmental damage than in the deep ocean. Mining of sand, gravel and minerals in the immediate offshore area or on beaches could lead to the erosion of the adjacent coastal areas, disturbances of fish breeding grounds etc. Manganese nodule mining in deep water may cause some disturbances of the bottom environment leading to the re-suspension of sediments and increased turbidity in the surface waters. For remedy, there must be social and political will, together with awareness campaign. At an operational level, rules and regulations are needed. Perhaps, the most important strategy is education.

