
Marine Pollution
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Definition of Marine pollution as per UN (United Nations):

The introduction by man, directly, or indirectly, of substances or energy to the marine environment resulting in deleterious effects such as: hazards to human health, hindrance to marine activities, impairment of the quality of seawater for various uses and reduction of amenities.

- The pollution often comes from nonpoint sources such as agricultural runoff, wind-blown debris, and dust.
- Pollution in large bodies of water can be aggravated by physical phenomena like wind driven Langmuir circulation and their biological effects.
- Nutrient pollution, a form of water pollution, refers to contamination by excessive inputs of nutrients.

Types of Marine Pollution

- Sedimentation
- Agricultural runoff (herbicides, pesticides and nutrients)
- Energy (thermal and light)
- Sewage (Faecal Coliform and nutrients)
- Solid Waste
- Chemicals, Metals and Radioactive Substances
- Oil
- Biological
- Under water noise

Pathways of pollution

- Direct discharge of waste into the oceans

(Pollutants enter rivers and the sea directly from urban sewerage and industrial waste discharges, sometimes in the form of hazardous and toxic wastes, or in the form of plastics.)

- Runoff into the waters due to rain

(Surface runoff from farming, as well as urban runoff and runoff from the construction of roads, buildings, ports, channels, and harbours, can carry soil and particles laden with carbon, nitrogen, phosphorus, and minerals.

This nutrient-rich water can cause fleshy algae and phytoplankton to thrive in coastal areas; known as algal blooms, which have the potential to create hypoxic conditions by using all available oxygen.)

- Pollutants released from the atmosphere

(Wind-blown dust and debris, including plastic bags, are blown seaward from landfills and other areas)

Major marine pollutants

Metals:

Introduced dangerous metals include mercury, lead, and copper

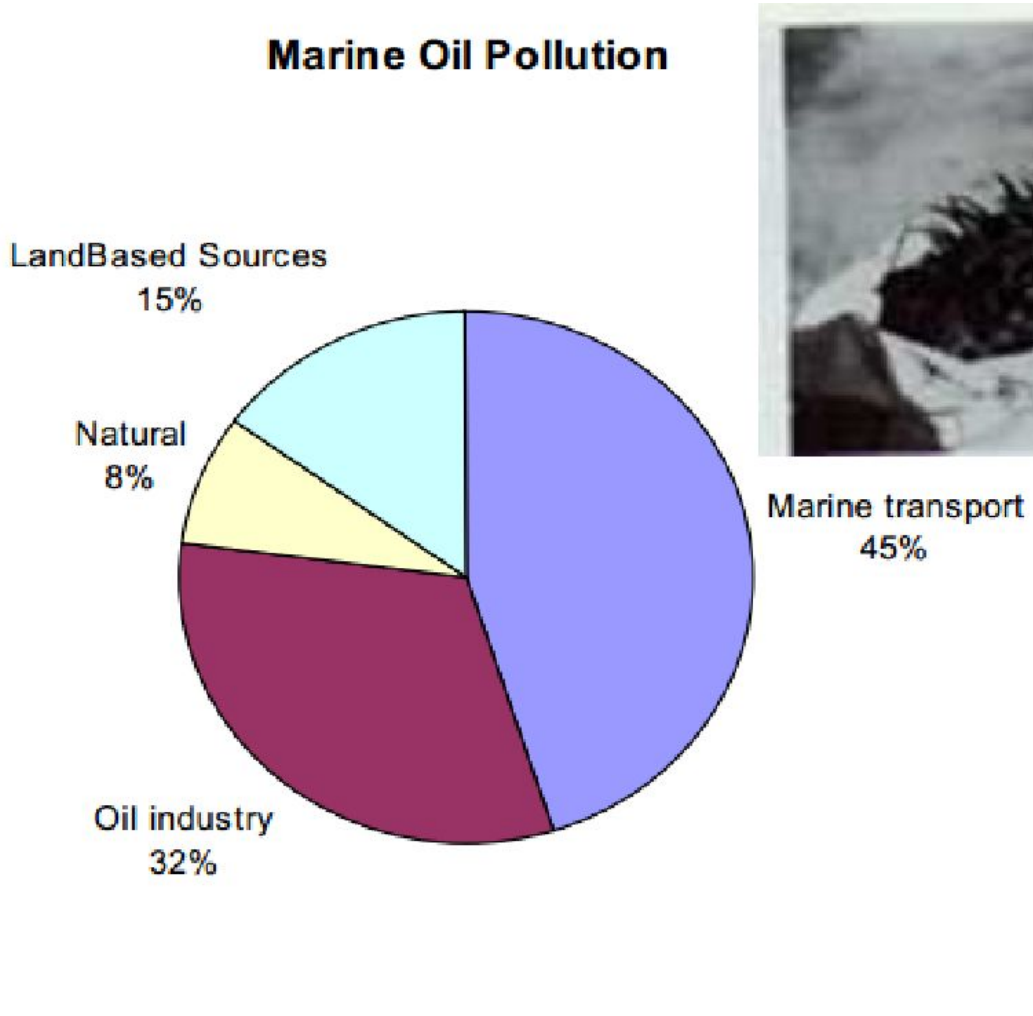
- Heavy Metals are a great concern because they enter the food chain
- Fuel combustion, electric utilities, steel and iron manufacturing, fuel oils, fuel additives and incineration of urban refuse are the major sources of oceanic and atmospheric contamination by heavy metals
- Copper is dangerous to marine organisms and has been used in marine anti-fouling paints

- Mercury and lead poisoning cause brain damage and behavioral disturbances in children
- Contaminated land runoff, rain of pollutants from the air, and fallout from shipwrecks pollute the ocean with dangerous metals
- Human activities release 5 times as much mercury and 17 times as much lead as is derived from natural sources.

Solid waste:

- A large portion and great danger is non-biodegradable plastic
- 46,000 pieces of floating plastic/sq mile of ocean surface off the N.E U.S. coast.
- Sea turtles mistake plastic bags for jellyfish and die from internal blockages.
- Seals and sea lions starve after being entangled by nets or muzzled by six-pack rings (decomposition time 400 years).(six pack ring are a set of connected plastic rings that are used in multi-packs of beverage, particularly six packs of beverage cans)
- Plastic debris kills 100,000 marine mammals and 2 million sea birds die annually

Oil:


Marine Oil Pollution
LandBased Sources
15%
Natural
8%
Marine transport
45%
Oil industry
32%

Ships can pollute waterways and oceans in many ways. Oil spills can have devastating effects. While being toxic to marine life, polycyclic aromatic hydrocarbons (PAHs), found in crude oil, are very difficult to clean up, and last for years in the sediment and marine environment.

Biological:

Biological pollutants include bacteria, viruses, and parasites that are responsible for waterborne diseases, such as typhoid fever, cholera, dysentery, polio, hepatitis, and schistosomiasis. The presence of Coliform bacteria is indicator of recent fecal pollution.

Sources of pollution

From Land

- 80% of non-biological marine pollution comes from land based activities
- Most obvious inputs via pipes discharging directly into marine waters(sewage,industrial, chemical and food processing wastes)
- Riverine flows into the sea carry pollutants from the entire catchment area.

From Air

- Global atmospheric inputs to the sea from air discharges

Maritime

- Oily discharges from ballast water and bilge water during routine ship operations and illegal dumping of solid waste.
- Designated dumping grounds at sea (dredged spoil, old munitions, sewage sludge, fly ash, oil based drilling muds)
- Accidental spills from Ships carrying hazardous substances, oil, gas etc.

Impacts of Marine Pollution

Generally marine pollution affects ecosystem health, public health, recreational water quality and economic viability.

- The overabundance of pollution has a variety of consequences. One of these is excess nitrogen and phosphorous.
- Although plants require these to grow, too high a concentration can cause algal blooms, in which algae overrun the ecosystem.

- Once these organisms start to sink and decompose, oxygen is depleted.
- Dead zones are created because marine life cannot survive in that environment.
- Fish and other forms of life that can swim away leave; other species that cannot move die off.
- Debris in the water, whether or not chemically harmful, can be hazardous. It can kill all kinds of marine life.
- Discarded metal cans and plastic, broken glass, fishing gear, and parts of ships can harm people who come in contact with them.

- Beaches can become littered with trash that came from thousands of miles away, affecting human health and recreation.
- If there is enough debris in the water, it can even make it dangerous for ships to navigate.
- Once the smallest organisms consume pollutants, their predators consume them as well.
- Plastics, garbage, heavy metals, and chemicals make their way up the food chain, ultimately accumulating in seafood that people catch and eat.
- Coastal pollution contaminates mussels and other shellfish that seafood industries rely on.

Solutions to Marine Pollution

Two main methods

- Correction – costly and time intensive
- Prevention – requires attitude changes

Coastal Scientists believe that prevention is better than cure since the effects of marine pollution may be irreversible and we may therefore be creating everlasting damage to the marine ecosystem.

“An ounce of prevention is worth a pound of cure”

Steps to Prevent Marine Pollution

- Stop using plastic and littering garbage as they not only choke up the drains but also releases into the oceans.
- Try cutting down on the usage of harmful chemicals.
- For farmers, they need to switch from chemical fertilizers and pesticides and move towards the usage of organic farming methods.

- Use public transport and reduce the carbon footprint by taking small and substantial measures that will not help in reducing the pollution from the environment but will ensure a safe and healthy future for the upcoming generations.
- Prevent from any oil or chemical spill in the oceans and if in case there is an oil or chemical spill near you volunteer and help in cleaning out the ocean water.
- Volunteer or initiate beach clean up activities and spread awareness about the same in the nearby vicinity.

Marine Pollution Conventions

There are no less than 6 international marine pollution conventions.

Some are listed below:

- Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircarft (1972) The Oslo Convention
- Convention for the prevention of pollution from ships (1973)MARPOL
- Convention for the Prevention of Marine Pollution from Land-based Sources (1974) The Paris Convention
- Convention for the Protection of the Marine Environment of the North-East Atlantic (1992) The OSPAR Convention.

Thank you!