

Unit – III

Marine Pollution



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Marine Pollution

“Introduction of substances to the marine environment directly or indirectly by man resulting in adverse effects such as hazards to human health, obstruction of marine activities and lowering the quality of sea water”

Causes:

- **Municipal waste** and **sewage** from residences and hotels.
- **Agricultural runoff** - Pesticides and fertilizers.
- **Storm water**/ Street run off take Petroleum and oil to seas through sewage system and rivers.
- **Ship accidents** and spillage - oil, liquefied natural gas, pesticides, industrial chemicals, etc.
- **Ship dredging** dump metals and contaminants into sea.
- Offshore **oil exploration** and extraction.

<https://www.youtube.com/watch?v=dron6aW4UKk>

Oil Pollution of Sea

- **Ballast water** (balance ship for return journey) containing contaminants is discharged into the sea.
- **Dry docking** - servicing, repairs, cleaning the hull, etc.
- **Tanker accidents** - Exxon Valdez Offshore oil production & Drilling muds.
- **Regular leakage** – Oil Tankers



<https://oceantoday.noaa.gov/oilintheoccea>

Control Measures for Oil Pollution

- The natural process of **emulsification of oil** in the water can be accelerated through the use of **chemical dispersants** which can be sprayed on the oil.
- **Slick-lickers** in which a continuous belt of absorbent material dips through the oil slick and is passed through rollers to extract the oil.
- Rocks, harbour walls can be cleaned with **high pressure steam**.

Effects of Marine Pollution

- **Eutrophication**
- **Red tides** (**phytoplankton blooms**)
 - ✓ Area is discolored
 - ✓ Many important marine species are also killed due to clogging of gills.
- **Oil slick** (Thin film over water)
 - ✓ Damage marine life
 - ✓ **Salt marshes** and **mangrove swamps** trap oil and plants suffer - flowering, fruiting and germination.
 - ✓ If liquid oil contaminates a **bird's plumage** its water repellent properties are lost. Plumage becomes water logged and birds may sink.
 - ✓ Loss of **thermal insulation** results in exhaustion of food reserves in an attempt to maintain body temperature often followed by death.
 - ✓ Birds often **consume oil** which can lead to intestinal, renal or liver failure.
 - ✓ **Drill cuttings** on seabed create anoxic conditions by production of sulphides which eliminate the benthic fauna.
 - ✓ **Unpleasant flavour** to fish and seafood reduces the market value of **seafood**.



Harmful to Fish, Harmful to You

Red Tides and Algae Blooms



Ann Shippy MD

Red Tide



Plastic Pollution of Marine Habitats



Case Study: <https://www.worldbank.org/en/news/video/2019/05/30/marine-pollution-threatens-the-caribbean-sea>





PREVENTION & CONTROL :

- SPILLS – DETECTION AND CLEANUP
 - STRICT DISCIPLINE
 - EMERGENCY CONTINGENCY PLAN
 - OIL SPILL CLEAN UP EQUIPMENT

➤ INDUSTRIAL WASTEWATER
TREATMENT

- **DOMESTIC SEWAGE**

- GREEN INFRASTRUCTURE
APPROACH
- SEPTIC TANK

- URBAN RUNOFF

- BEST MANAGEMENT



Further Readings

- Marine pollution, 1st theme of the 2017 [#OurOcean](https://www.youtube.com/watch?v=dron6aW4UKk) conference, <https://www.youtube.com/watch?v=dron6aW4UKk>
- Marine Pollution Threatens the Caribbean Sea, <https://www.worldbank.org/en/news/video/2019/05/30/marine-pollution-threatens-the-caribbean-sea>
- Ocean Pollution: Causes, Effects & Solutions, <https://www.environmental-awareness.com/ocean-pollution-causes-effects-solutions/>
- **Oil in the Ocean**, <https://oceantoday.noaa.gov/oilinocean/>

Look Mom,
I can stand on water now !



Thank You