Physical Pollution of Water

The physical pollution of water brings about changes in water with regard to its color, odor, density, taste, turbidity and thermal properties etc.

Color: - Color change is not harmful unless it is associated with a tonic chemical, but it may affect the quality of sunlight that penetrates to a given depth inhibiting plant and animal metabolism.

Turbidity: - Turbidity in water mainly arises from colloidal matter; fine suspended particles and soil erosion. Generally greater the turbidity stronger is the sewage and industrial effluent concentrations and worst are the effects. The turbidity due to bacterial sewage contamination is most serious.

Odor: - Odor pollution of water is caused both by chemical agents (like H_2S, Cl_2, NH_3) and biological agents (such as algae, fungi, microorganisms etc.) Lower the pH, higher will be the amount of H_2S produced and greater will be the odor nuisance.

Foam: - Foam is produced by soaps, detergents, and untreated organic effluents from paper and pulp industries.

Thermal Pollution of Water: - *It mainly arises by the discharge of unutilized heat produced in various thermal power plants. The heated waters have reduced the amount of dissolved oxygen (DO) content due to which organic matter degrades faster.*

Chemical Pollution of Water

The chemical pollution of water is due to the presence of inorganic and organic chemicals such as acids, alkalies, toxic inorganic compounds, dissolved inorganic compounds & dissolved organic compounds.

The chemical pollution of water causes changes in acidity, alkalinity or pH, dissolved oxygen (DO) and other gases in water. It may be caused either by organic pollutants or inorganic pollutants or by both.

The organic pollutants can be biodegradable or non-biodegradable.

Non-biodegradable Organic Pollutants

These pollutants are those, which persist, in the aquatic system for a long time. For example pesticides, fungicides, bactericides, nuiticides etc. Several gases, toxic metals and compounds have been included in inorganic pollutants because they also degrade water quality seriously

Biological Pollution of Water

Bacteriological pollution of water is due to the presence of pathogenic bacteria, certain fungi, pathogenic protozoa, viruses, parasitic worms etc. The important sources of bacteriological pollution are domestic sewage and industrial wastes. Solid excreta from human bodies and decomposable organic matter of sewage are the best medium for the development of bacteria in water.

Bacterial pollution in water is caused by the excretory products of warm-blooded mammals including man, wild and domestic animals. The main pollutants belong to coliform group and certain subgroups, streptococci and miscellaneous organisms.

Physiological Pollution of Water

Physiological pollution of water is caused by several chemical agents such as chlorine, sulphur dioxide, hydrogen sulphide, mercaptions, phenols and hydroxy benzene.

Water pollution may be divided into five categories on the basis of sources and storages of water.

1. Ground water pollution
2. Surface water pollution
3. Lake water pollution
4. River water pollution
5. Sea water pollution

1. Ground Water Pollution

Ground water, is about 210 billion m^3 including recharge through infiltration, seepage and evapotranspiration. Out of this nearly one-third is extracted for irrigation, industrial and domestic use, while most of the water is regenerated into rivers.

Sources of Contamination in Ground Water

Underground sources of drinking water, especially in outskirts of larger cities and villages are highly polluted. Ground water is threatened with pollution from following sources.

1. Domestic wastes
2. Industrial wastes
3. Agricultural wastes
4. Runoff from Urban Areas
5. Soluble Effluents

2. Surface Water Pollution

The nature and extent of surface water pollution depends on following factors:

(i) Hydrological characteristics of diluting biocides and the extent of self-purification.
(ii) Vegetation, soil type and degree of weathering rocks.
(iii) Physical, chemical and biological characteristics of wastewater entering the surface waters.
(iv) Waste water disposal systems and techniques for treatment of domestic and urban sewage.

Sources of surface water pollution

Surface water comes in direct contact with the atmosphere, seasonal, streams and surface chains. So there is a continuous exchange of dissolved and atmospheric gases while the wastes are added through water conveyances.

3. Lake Water Pollution

The rapid pace of industrialization and urbanization has posed a serious threat to these vast varieties of water resources.

Sources of pollutants in lakes

(i) The discharge of organic wastes from hills and toxic effluents from urban areas.
(ii) Waste sludges from factories as well as washings and dumping of tailings.
(iii) Sewage treatment plants also contribute to toxic organic matters in the lake water.
(iv) Toxic and hazardous effluents from industries pose serious pollution of lake water.

4. River Water Pollution

Pollution of water resources has been most exploited due to increasing population, industrialization, urbanization and broad spheres of human activities.

The following important inferences can be drawn from the river water pollution: -

(i) Water quality is deteriorated everywhere.

(ii) Rivers are severely polluted during the monsoon periods and minimum during winter.

(iii) The effect of effluents and discharge varies with the distance and nature.

5. Sea Water Pollution

Oceans cover more than two thirds of the Earth's surface and they play a crucial and important role in the chemical and biological balance of life on the planet.

Marine pollution is defined as the discharge of waste substances into the sea resulting harm to living resources, hazards to human health, hindrance to fishery and impairment of quality for use of seawater. Marine pollution is associated with the changes in physical, chemical and biological conditions of the seawater. This water is also unfit for human consumption and industrial purposes because of high salt content.

Oil Pollution of Water

The greatest damage to water is inflicted by petroleum and its products. Oil and its products endanger the aquatic life in the surface layers and also the coastal flora and fauna. One drop of petroleum spreads over great area to isolate the water from contact with atmospheric oxygen.