**Water pollution COURS N°06**

* **Definition**

**Water pollution occurs when** **harmful bodies degrading water quality and rendering it toxic to humans and the environment.**

**When the substances contaminate water, they alter the nature of the water in such a manner that negatively affects its legitimate uses**

**Water bodies:**

**A/ Surface water: rivers, lakes, oceans, seas, streams, wetlands …**

**b/ Groundwater is water that exists underground:** **The risk of groundwater pollution depends on local conditions such as the type of soil, the amount of moisture in the area, and the depth of the groundwater**

* **Types of pollutants:**

**Water bodies can be polluted by a wide variety of substances, including:**

* **Pathogenic microorganisms,**
* **Putrescible organic waste,**
* **Fertilizers and plant nutrients,**
* **Toxic chemicals,**
* **Sediments, heat, petroleum (oil), and radioactive substances.**
* **Sources of water pollution**

**Water pollutants come from:**

 **Point sources or**

**Dispersed sources (nonpoint sources)**

 **A / Point source**

* **Is a pipe or channel used for discharge from an industrial facility or a city sewerage system.**
* **Point sources of water pollution are easier to control because the contaminated water can be collected and conveyed to one single point where it can be treated.**

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**b/Dispersed (or nonpoint) source**

* **Dispersed points from which a variety of pollutants enter the water body, such as the runoff from an agricultural area**
* **Pollution from dispersed sources is difficult to control and continue to cause a large fraction of water pollution problems.**
* **Sources of water pollution**

**Domestic sewage**

* **Domestic sewage is the primary source of**

**pathogens (disease-causing microorganisms) and putrescible organic substances.**

* **Pathogens are excreted in feces and they potentially present a direct threat to public health.**
* **Putrescible organics present a threat to water quality. As organics are decomposed by bacteria and other microorganisms, the dissolved oxygen content of the water is depleted. This endangers the living conditions of aquatic organisms.**
* **Domestic sewage is a major source of plant nutrients, mainly nitrates and phosphates.**
* **Excess nitrates and phosphates in water promote the growth of algae.**
* **When the algae die, oxygen dissolved in the water declines because microorganisms use oxygen to digest algae during the process of decomposition.**
* **Anaerobic organisms: bacteria (organisms that do not require oxygen to live) metabolize the organic wastes, releasing gases such as methane and hydrogen sulfide, which are harmful to the aerobic forms of life.**
* **Solid waste**
* **The improper disposal of solid waste is a major source of water pollution.**
* **Solid waste pollution is damaging the health of aquatic ecosystems and can harm wildlife directly.**
* **Many solid wastes, such as plastics and electronic waste, break down and leach harmful chemicals into the water, making them a source of toxic or hazardous waste.**
* **Toxic waste**

**Waste is considered toxic if it is poisonous, radioactive, explosive, carcinogenic (causing cancer), mutagenic (causing damage to chromosomes), teratogenic (causing birth defects),**

**Sources of toxic chemicals include improperly disposed wastewater from industrial plants and chemical process facilities (lead, mercury, chromium) as well as surface runoff containing pesticides used on agricultural areas.**

* **Sediment**
* **Sediment resulting from soil erosion or construction activity can be carried into water bodies by surface runoff.**
* **Suspended sediment interferes with the penetration of sunlight and upsets the ecological balance of a body of water.**
* **Also, it can disrupt the reproductive cycles of fish and other forms of life.**

**Thermal pollution**

* **Heat is considered to be a water pollutant because it decreases the capacity of water to hold dissolved oxygen in solution**
* **Fish cannot survive in water with very low levels of dissolved oxygen.**
* **A major source of heat is the practice of discharging cooling water from power plants into rivers; the discharged water may be as much as 15 °C (27 °F) warmer than the naturally occurring water.**
* **The rise in water temperatures because of global warming can also be considered a form of thermal pollution.**
* **Petroleum (oil) pollution**
* **Petroleum (oil) pollution occurs when oil from roads and parking lots is carried in surface runoff into water bodies.**
* **Accidental oil spills are also a source of oil pollution. Oil slicks eventually move toward shore, harming aquatic life and damaging recreation areas.**