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Short Communication - Review

Damaging Effects of Overall Water Pollution

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Abstract

Water pollution presents itself under three major shapes: municipal, industrial and agricultural, having major harmful effects on ecosystems. While trying to reduce the impact pollution has on the environment humans are challenged to their limits. No one can predict the future, but water pollution can be considered damaging to all living organisms from planet earth.

Keywords: pollution, waste, municipal, agriculture, sewage, agents

1. Backgrounds

Occupying over 70% of earth surface, water is undoubtedly the most precious natural resource that exists on our planet. Without the seemingly invaluable compound of hydrogen and oxygen, life on Earth would be non-existent: it is essential for everything on our planet to grow and prosper.

Although we as humans recognize this fact, we disregard it by polluting our rivers, lakes, and oceans. Subsequently, we are slowly but surely harming our planet to the point where organisms are dying at a very alarming rate. In addition to this, our drinking water has become affected as is our ability to use water for recreational purposes. In order to combat water pollution, we must understand the problems and become part of the solution.

Water pollution occurs when a body of water is seriously affected due to the addition of large amounts of materials to the water. When it is unfit for its intended use, water is considered polluted.

Two types of water pollution exist:

1. *point source*
2. *non point source*

Point sources of pollution occur when harmful substances are emitted directly into a body of water. A non point source delivers pollutants indirectly through environmental changes.

An example of this type of water pollution is when fertilizer from a field is carried into a stream by rain and it affects aquatic life.

Many causes of pollution including sewage and fertilizers contain nutrients such as nitrates and phosphates. In excess levels, nutrients over stimulate the growth of aquatic plants and algae. Excessive growth of these types of organisms consequently clogs waterways, use up dissolved oxygen as they decompose, and block light to deeper waters.

Pollution is also caused when silt and other suspended solids, such as soil, destroy plowed fields, construction and logging sites, urban areas, and eroded river banks when it rains. When sediments enter various bodies of water, fish respiration becomes impaired, plant productivity and water depth become reduced and aquatic organisms and their environments become reduced.

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Pollution in the form of organic material enters waterways in many different forms as sewage, as leaves and grass clippings. When natural bacteria and protozoan in the water break down this organic material, it begins to use the oxygen dissolved in the water. Many types of fish and bottom-dwelling animals cannot survive when levels of dissolved oxygen drop below to the five parts per million. When this occurs, it kills aquatic organisms in large numbers which leads to disruptions in the food chain.Three last forms of water pollution exist in the forms of petroleum, radioactive substances and heat. Petroleum often pollutes water bodies in the form of oil, resulting from oil spills. The supertankers and off shore drilling operations contribute a large share of pollution. One estimate is that one ton of oil is spilled for every million tons of oil transported. This is equal to about 0.0001 percent.

Radioactive substances are produced in the form of waste from nuclear power plants, and from the industrial, medical, and scientific use of radioactive materials. Specific forms of waste are uranium and thorium mining and refining.

The last form of water pollution is heat. Heat is a pollutant because increased temperatures result in the deaths of many aquatic organisms. These decreases in temperatures are caused when a discharge of cooling water by factories and power plants occurs.

2. Sources of water pollution

The major sources of water pollution can be classified as:

1. *municipal*
2. *industrial*
3. *agricultural*

Serious pollution problems are often created by the disposal of **municipal waste water** into surface waters. An obvious alternative method is diversion of these waste waters to the land. Such non-aqueous methods of disposal might eliminate many water pollution problems and in some cases, could even provide secondary benefits such as recharge of ground-water reservoirs and increased production of crops and wood fiber. In addition, secondary benefits such as increased tree growth, increased site productivity and site amelioration have also been obtained.

The deliberate reclamation of waste water for potential reuse is one of the keys to optimum utilization of our water resources. Such reclamation for reuse will receive increased attention in the future as we struggle to improve our environment and maintain a balance with nature.

Increasing volumes of municipal waste water usually correlated with increasing demands on the local water supply which in times of drought can cause serious water shortages. It is paradoxical that communities while experiencing water shortages will at the same time discharge gallons of effluent into local streams for rapid removal from the area.

Wastes from commercial feeders are contained and disposed of on land; their main threat to natural waters, therefore, is from runoff and leaching. Control may involve settling basins for liquids, limited biological treatment in aerobic and anaerobic lagoons, and a variety of other methods.

The characteristics of **industrial waste waters** can differ considerably both within and among industries. The impact of industrial discharges depends not only on their collective characteristics, such as biochemical oxygen demand and the amount of suspended solids, but also on their content of specific non organic and organic substances.

Agriculture, including commercial livestock and poultry farming, is the source of many organic and non organic pollutants in surface waters and groundwater. These contaminants include both sediment from erosion cropland and compounds of phosphorous and nitrogen that partly originate in animal wastes and commercial fertilizers. Animal wastes are high in oxygen demanding material, nitrogen and phosphorous, and it often harbors pathogenic organisms.

3. Polluting agents

1. The combustion of coal leads to the release of mercury in the atmosphere. This enters the rivers, lakes and groundwater, resulting as hazardous for pregnant women and infants.
2. Cattle and pig rearing causes a significant amount of nutrient-filled waste so that virulent toxins collect in the water masses.
3. Fertilizers having a large quantity of nitrogen and phosphorus cause a high biological oxygen demand in the water so that only anaerobic life-forms prosper.
4. Human settlement along the banks of rivers causes human, animal and industrial waste to be discharged into it. In the developed world, sewage treatment plants are used to treat waste. However, in developing nations, the rivers are similar to open sewers.

Apart from shorter term effects on aquatic ecosystems, and the palatability of water, water pollution has several other detrimental impacts. For one, the air contains a certain amount of water vapor which is in a constant cycle of rain and evaporation

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from bodies of water. The more polluted water becomes, the more likely that harmful pollutants will evaporate into the air along with the water, increasing air pollution and causing rainwater to become acidic. Thermal heating is also a potential long term problem: global warming as it is conceived of today primarily deals with a rise in air temperature which in turn warms waters and melts the ice caps, but water is a much better conductor of heat than air, so heated water runoff raises the temperature of water much faster than hot air can.

Additionally, water pollutants can easily find their way into aquatic creatures, which are in turn, eaten by land animals, and somewhere down the line, ingested by humans.

So not only does tainted drinking water pose potential heath threats, but so does food which comes from animals that have been affected by water pollution somewhere down the line.

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