Under Water and Soil Contamination

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Abstract

In this paper, we can discuss about Groundwater represents a very significant source of fresh water for irrigation and drinking purposes and therefore preserving the availability and quality of this resource is extremely important. Contaminated soils can be remediated by leaching, venting or vapor extraction, microbial decomposition, composting, vegetative uptake and removal, and by soil removal. Leaching of soluble contaminants is done by flushing the soil with water and safely draining away the diluted leachate. Microbial decomposition is carried out by organisms in the soil capable of decomposing organic contaminants (e.g., oils), rendering them harmless.

Keywords: Groundwater, Contaminated soils, Pollution

Introduction

Water pollution is a major global problem which requires ongoing evaluation and revision of water resource policy at all levels. It has been suggested that water pollution is the leading worldwide cause of deaths and diseases, and that it accounts for the deaths of more than 14,000 people daily. An estimated 580 people in India die of water pollution related illness every day. About 90 percent of the water in the cities of China is polluted. As of 2007, half a billion People had no access to safe drinking water. In addition to the acute problems of water pollution in developing countries, developed countries also continue to struggle with pollution problems. Water is typically referred to as polluted when it is impaired by anthropogenic contaminants and either does not support a human use, such as drinking water, or undergoes a marked shift in its ability to support its constituent biotic communities, such as fish. Natural phenomena such as volcanoes, algae blooms, storms, and earthquakes also cause major changes in water quality and the ecological status of water.

Objectives of Water Pollution Monitoring

Water pollution monitoring has been implemented by the national government, prefectures, factories and business establishments to examine the water quality of public water areas and waste waster discharged from factories and establishments. The data collected by water pollution monitoring may also be used as reference data to examine the pollution cause by volcanic eruption and factory explosion. Water pollution monitoring is classified into "public water area monitoring" and stationary pollution source monitoring" according to the locations to be monitored.

Public Water Area Monitoring

Water in public water areas such as rivers and coastal water areas and underground is used for various purposes such as natural environment conservation, tap water, agriculture and fishery, and is closely related with human health and living environment. The main purpose of environmental water pollution monitoring is to continuously monitor the water pollution of water areas affecting the human health and living environment.

Stationary Pollution Source Monitoring

Wastewater discharged from factories and establishments is often discharged into public water areas such as rivers, and sometimes reaches underground water. The main purpose of stationary pollution source monitoring is to preserve water quality of the water areas by confirming that the wastewater discharged from factories and establishments complies with the effluent standards and total pollutant load standards.

Methodology

The environmental management class (EMC) should be based on existing empirical relationships between flow changes and ecological status/conditions, which are associated with clearly identifiable thresholds. Therefore, EMC is a management concept that has been developed and used in the world because of a need to make decisions regardless of the limited lucid hydro-ecological knowledge available.

- Presence of rare and endangered aquatic biota
- Presence of unique (e.g., 'endemic') aquatic biota
- Diversity of aquatic habitats
- Presence of protected areas, areas of natural heritage and pristine areas, which are crossed by the main water course in the basin
- Sensitivity of aquatic ecosystems to flow reduction

Sources and Types of Groundwater Contamination

- Residential Sources And Types Of Contamination.
  These include any substances you use in and around your home that could cause damage when they seep into the soil in your yard. Lawn care chemicals are one of the major causes of residential groundwater contamination, as are chemicals used to clean the outside of your home. Swimming pool treatment chemicals, septic systems and sewer lines, and gasoline and oil used on vehicles at home are all other possible areas of concern.
- Agricultural Sources And Types Of Contamination.
  Many chemicals used in agricultural practices can quickly and easily find their way into groundwater in and around these sites. This can further cause problems by contaminating drinking water given to animals or by infecting plants with diseases. These issues can be carried over to humans quickly. Agricultural sources of groundwater contamination include places where dead animals are buried, fertilizer and manure storage, and pesticide use.
- Commercial Sources And Types Of Contamination.
  Many types of commercial locations contribute to groundwater contamination. Dry cleaners and car washes are some of the bigger problems, but construction areas also significantly add to the possibility of groundwater contamination with chemicals. Paint shops, junkyards, and gas stations are also areas of concern, and cemeteries may even spread disease into the groundwater nearby.
- Industrial Sources And Types Of Contamination.
  Of course, industries contribute greatly to groundwater contamination on a daily basis. Oil spills and chemical leaks remain the biggest concerns from these sites, but chemical storage and drainage can also be a problem. The mining industry has a major effect on groundwater contamination, as well.

Containment

Situations exist in which technologies are not available or practical to remove or convert contaminants. In those situations, it is often possible to contain the contamination as a final solution or as an interim measure until appropriate technologies become available.

Soils. Radionuclides from historical weapons production and nuclear testing, as well as from industrial uses of radiation, appear to be a good match for developing containment technologies. For example, containment is a promising technology for the management of radioactively contaminated soils beneath the large high-level radioactive waste storage tanks at the U.S. Department of Energy Hanford site in Washington State. Removing radioactive contamination from soil is problematic from a worker-safety standpoint, and it may create further contamination of equipment, containers, and surrounding areas. Efforts to develop effective physical containment technologies for soil contaminants are continuous.

Groundwater. Groundwater is not generally suitable for absolute containment; however, between containment and conversion is a technology known as reactive barriers. Reactive barriers intercept contaminated groundwater **plumes** and are constructed of chemically reactive materials (e.g., iron) that bind or convert dissolved contaminants. Reactions between the contaminant and the iron either immobilize or degrade the contaminant by altering its chemical form (redox manipulation).

Health effects

Contaminated or polluted soil directly affects human health through direct contact with soil or via inhalation of soil contaminants which have vaporized; potentially greater threats are posed by the infiltration of soil contamination into groundwater aquifers used for human consumption, sometimes in areas apparently far removed from any apparent source of above ground contamination. This tends to result in the development of pollution-related diseases.

Health consequences from exposure to soil contamination vary greatly depending on pollutant type, pathway of attack and vulnerability of the exposed population. Chronic exposure to chromium, lead and other metals, petroleum, solvents, and many pesticide and herbicide formulations can be carcinogenic, can cause congenital disorders, or can cause other chronic health conditions. Industrial or man-made concentrations of naturally occurring substances, such as nitrate and ammonia associated with livestock manure from agricultural operations, have also been identified as health hazards in soil and groundwater.

Chronic exposure to benzene at sufficient concentrations is known to be associated with higher incidence of leukemia. Mercury and cyclodienes are known to induce higher incidences of kidney damage and some irreversible diseases. PCBs and cyclodienes are linked to liver toxicity. Organophosphates and carbonates can induce a chain of responses leading to neuromuscular blockage. Many chlorinated solvents induce liver changes, kidney changes and depression of the central nervous system. There is an entire spectrum of further health effects such as headache, nausea, fatigue, eye irritation and skin rash for the above cited and other chemicals. At sufficient dosages a large number of soil contaminants can cause death by exposure via direct contact, inhalation or ingestion of contaminants in groundwater contaminated through soil.

Prevent Groundwater Contamination

- Do not use pesticides or heavy toxic chemicals at home. Since these products can easily seep into groundwater around your home and yard, you can do yourself and your whole family a favor by never using them on your property. In some extreme circumstances, these chemicals can even get directly into your water lines, which means the water in your home may be affected even if your neighbors' water seems to be fine.

- Do not store chemicals at home.Chances are good that you won't have the proper equipment to store harsh chemicals, and if you don't, the possibility of leaks is very high. Even if you do have the right equipment, the chance for spilling these chemicals is still high, and it isn't a risk you should take on your own property. If you have to use chemicals for something around the house, such as treating your pool water, either call a professional to do it for you or be sure to only purchase as much of that chemical as you need at a time to cut back on the risk of spills or damage.
- Do not bury dead animals on your property.While it may feel like a good way to give yourself and your family closure when the family pet passes on, burying animals in your backyard often contributes to bacteria in your soil and in your groundwater as well. If you must do this, be sure to use a container that won't allow seepage into the soil, and never bury the animal directly in the soil. If you have an agricultural practice, talk to your livestock veterinarian to find out proper ways to take care of deceased animals.
- Dispose of all medications properly.Dispose of any medication properly and don't just throw it away. Most types of medications have certain ways in which they need to be disposed of, and if you aren't sure, you can always contact your doctor's office or drug store to find out more. Throwing away medication may cause it to seep into groundwater as well, and this can further cause contamination. Sometimes, harsh prescription-only medications can cause a lot of serious damage if they happen to reach drinking water supplies for humans or animals.

Conclusion

It should be clear that there is a lot to be learned about the topic of groundwater contamination. This is a part of water pollution that many people often overlook, simply because they don't know it exists or aren't aware of what it is exactly. However, the more you learn and educate yourself on the subject, the better you will be able to inform other people and companies in your community, and the easier it will be for you to reach out and take a stand against this type of pollution.Remember that there are many different ways you can get involved, and the best option for one area might not work as well for another. Don't be afraid to get out there and talk to the people in charge in your city, county, or municipality, and don't be afraid to reach out to corporations in your area as well. The more you talk to the people who have direct effects on groundwater contamination, the less pollution you will see in your area over time.

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