

Environmental Problems & Solutions

The planet faces a variety of troubling issues that stem from man-made contamination. Many of these lead to environmental problems that are causing long-term damage to the earth's ecosystem.

Some man-made problems threaten wildlife and the ecosystem. Although these problems are relatively rare because of increased safety procedures, accidents still occur, sometimes with devastating effects. Examples include oil spills, radioactive leaks, tanker spills, pipeline bursts and drilling accidents. The best solution for accidental spills and leaks is to create additional safety protocol using both computerized and human detection systems.

Water Pollution

Water pollution is a growing problem globally. Large industries including those that make chemicals and plastics dump a large amount of waste into the water. Human waste and rubbish also ends up in the oceans and lakes. The Clean Water Act of 1972 allows the U.S. government to enforce restrictions on those who dump trash and waste. To address the problem, individuals can improve recycling and waste disposal, and they can volunteer to clean up shorelines and nearby public locations. Businesses should develop ongoing protocols to reduce the amount of chemicals and other waste they put into the water supply.

Hazardous Waste

The mishandling of hazardous waste materials poses immediate and long-term risks to plants, animals, humans and the environment. Hazardous waste is any liquid or solid that contains carcinogenic or teragenic compounds, including pesticides, paint strippers, solvents, paint, gasoline, bleach, ammonia, industrial cleaning agents and drain cleaners. Individuals and businesses should make sure that hazardous-waste disposal experts handle all hazardous waste, and should never dump hazardous waste with regular trash or into rivers or ditches.

Ozone Depletion

According to the Environmental Protection Agency, or EPA, there are several airborne materials that can lead to ozone pollution. Ground-level ozone, particulate matter, lead, sulfur dioxide, nitrogen oxide and carbon monoxide are all dangerous when released into the air. These pollutants can cause human health problems and damage to plants and animals. The EPA enforces laws controlling the release of these substances into the atmosphere. Controlled air quality leads to less stress on the outer ozone layer of the planet that helps protect us from the sun.

Soil Contamination

According to the Science man-made chemicals released into the dirt either by accident or through poor disposal techniques causes soil contamination. Rupture of underground storage tanks, acid rain, leaching of hazardous waste from a landfill, pesticides and herbicides, and discharge from industrial chemical wastes all can contaminate the soil in which farmers grow crops or graze livestock that people eventually eat. Laws against such contamination need to be stringent, and the appropriate agencies have to be tough in the enforcement of those laws to help keep soil safer for humans and animals..

Types of Industrial Pollutants

For nearly 200 years, American consumers have relied on industrial processes to create the products we use every day. From the smallest electronic devices to the largest vehicles, industrial methods of production have revolutionized modern life. Unfortunately, a major side effect of increased industrial production is *pollution*. Industrial pollution can affect the air we breathe, the water we drink, the ground we walk on and even the light we see and sounds we hear.

Air Pollutants

The image of smokestacks belching black, noxious fumes into the air often comes to mind when people think of industry. While visible air pollutants are dangerous, industrial processes also create invisible gasses that can pollute our air supply. Carbon monoxide is a colorless, odorless, tasteless gas used in the production of polyurethane and other plastics. Even "light" industry can emit toxic gasses; dry-cleaning plants, for example, use perchlorethylene, a chemical linked to liver damage, skin irritation and respiratory failure. Perchloroethylene can leak into the atmosphere when dry-cleaner workers transfer clothes from the washer to the dryer and when the dryer exhaust is vented into the air outside.

Water Pollutants

Industrial processes can also contribute to water pollution. Since many industrial methods use fresh water for various purposes, industrial facilities must dispose of the toxic runoff from these methods. The runoff frequently flows into other fresh water sources, such as rivers, lakes and groundwater wells, which local residents use for drinking and bathing. Phosphorus runoff from fertilizers used by farmers near Lake Champlain in Vermont prompted the Environmental Protection Agency to react to water pollution problems there in 2015 –and the cleanup is still in progress.

Toxic Waste

Many industrial processes also produce waste products that can have devastating effects on the health of those exposed to them. Toxic waste can be difficult to recycle and poses serious problems for disposal. Such waste products can include substances that pose biological hazards, risk exposure to radioactivity or contain chemicals that can contaminate soil and water supplies. An ongoing river dredging project in New York's Hudson Valley seeks to remove soil contaminated with toxic PCBs, or polychlorinated biphenyls, generated by a General Electric plant

Noise-Related Industrial Pollution

Industrial pollutants are not strictly limited to the solid, liquid and gaseous states of matter. Industrial processes can also cause loud noises. Noise pollution occurs when the sounds of industrial tasks impair the hearing of workers, bystanders or residents in nearby neighborhoods. Twenty-four percent of those with hearing difficulties suffered after they were exposed to occupational noise pollution. Local residents can also be affected by noise pollution from machinery, safety alarms and heavy truck traffic at industrial facilities.

Examples of Secondary Pollutants

Secondary pollutant form when primary pollutants emitted directly from a combustion process react in the atmosphere. Primary pollutants include ammonia, sulfur dioxide, nitrogen dioxide and carbon monoxide. Secondary pollutants include ground-level ozone, acid rain and nutrient enrichment compounds.

Ground-Level Ozone

Ozone forms when hydrocarbons and nitrogen oxides combine in the presence of sunlight and stagnant air. It is a colorless, highly irritating gas with a sweet smell that forms just above the Earth's surface.

Burning coal, gasoline and oil in homes, motor vehicles, power plants and industries creates nitrogen oxides. Gasoline combustion, oil and gas production, wood combustion, and the evaporation of liquid fuels and solvents create hydrocarbons. They also come from natural sources such as coniferous forests.

Ozone exposure may cause premature mortality and major health issues. It also affects vegetation, hinders crop productivity and damages synthetic materials and textiles such as cotton and polyester.

Acid Rain

Acid rain, which is made up of several acidic compounds, forms when sulfur dioxide and nitrogen dioxide react in the air with water, oxygen and other chemicals. The wind

carries the acidic compounds into the air, and they later fall to the ground in either dry or wet form.

On the ground, acid rain damages plants and trees and increases the acidity levels of soils and bodies of water, causing damage to ecosystems. Acid rain also causes decay to buildings and can irritate the eyes and airways.

Nutrient Enrichment Compounds

Nutrient enrichment compounds contain nitrogen and phosphorus. While these nutrients often come from natural sources, human activities such as agriculture, urbanization and industry create excessive nitrogen and phosphorus in the environment. Most of the air we breathe is made up of nitrogen, and both nitrogen and phosphorus occur naturally in aquatic ecosystems.

Nutrient enrichment compounds cause air and water pollution, which leads to the rapid growth of algae. The algae growth affects water quality, food supplies and habitats and decreases oxygen supply to fish and other aquatic life. Large algal blooms may release toxins and bacteria, making water and sometimes the fish and shellfish in it unsafe for human consumption.

High levels of nitrogen in the atmosphere also produce pollutants such as ammonia and ozone, which affect your ability to breathe.

The Effects of Soil Pollution on the Environment

There are many potential causes of soil pollution. Industrial chemicals, lead contamination, radioactive metals, leaking underground fuel tanks, improper disposal of hazardous materials, agricultural chemicals, salts, sewage, all are among the causes of modern soil pollution. It can even be caused by natural sources. Ground pollution effects vary based on the specific type of soil pollution as each one causes a wide variety of harmful environmental effects. If you are considering buying a home, get your soil tested to make sure there are no problems in the land itself.

Dangers of Fertilizers

Nutrients added to the soil by agricultural interests to increase crop yields pose one of the largest sources of soil pollution. Rain can wash these nutrients out of the soil into lakes and ponds. There they promote the growth of algae and other harmful plants. They increase microbe levels, and reduce the oxygen content of the whole body of water. On land, fertilizer-based soil pollution causes a wide variety of problems due to poisoning, such as burned roots, stunted growth, and mineral deficiencies.

Salt Contamination in Soil

Salinization of the soil is a common pollution problem caused by irrigation in arid and semi-arid climates. This irrigation causes salts to build up in the soil. This eventually makes the soil unable to grow most crops. Salts are very difficult to remove from soil, so this is a pernicious problem.

Groundwater Pollution Effects

Soil pollutants eventually leach their way through the soil and into groundwater. This pollutes local water sources, including wells and springs, making the water dangerous to drink and for local wildlife and plants.

Heavy Metal Pollution

Radioactive heavy metals such as uranium, radium and plutonium pollute the soil in some places, either naturally or because of human activity. Other heavy metals, such as lead, mercury, arsenic, and chromium rise to dangerous concentrations in the soil as a result of mining activities, industrial activity, and automobile use. These metals in the soil can cause plant fertility problems, and many of them, such as lead and arsenic, are poisonous to animals and people. The radioactive metals also cause damage to the chromosomes of animals and people, leading to mutations, cancer, and a variety of other problems.

Pesticides and Soil Pollution

Pesticides also cause soil pollution. They can poison plants. Soil contamination caused by pesticides can also decrease the fertility of the soil, making it less able to support plant life. They also can cause toxic reactions in people and animals

How to Control Land Pollution

Land pollution is a great concern for many parts of the world. The Earth's surface is contaminated by industrial waste, soil pollution caused by pesticides, and decomposable waste such as glass, cloth, plastic, paper, and metal. The control of land pollution is necessary in order to save the Earth from degradation. There are many things each individual can do to prevent this from happening.

Recycle to help control land pollution. Items such as aluminum cans, paper, glass bottles, and objects made of plastic can be recycled and reused to make new products. When you purchase products, look for the recycling label on them.

Follow instructions carefully when using pesticides and chemicals to prevent air, soil, or water pollution. When disposing of pesticides or chemicals, do not put them down household drains.

Dispose of litter in the appropriate way. Use trash containers that have tightly fitted lids. Call your local disposal department for details about how to dispose of hazardous materials such as medical waste.

Prevent livestock from coming in contact with drainage ditches, streams, and creeks. Collect and dispose of wastes for your livestock to prevent water supply contamination.

Pump your septic tank at least every three years, which will help control groundwater pollution.

The Harmful Effects of Petrochemicals on the Environment

Petrochemicals are found in a wide array of household items, from plastic wrap and trash bags to plastic bottles. Because humans rely so heavily on petrochemicals, their production is high, affecting the environment via oil spills on land and sea and fossil fuel combustion emissions.

Petrochemicals at Sea

Large oil spills cause widespread damage in the marine environment. Intertidal habitats including rocky coasts, sand flats, mudflats and salt marshes are particularly vulnerable according to the U.K. Marine Special Areas of Conservation website. Oil coats the surface of the water as well as the sediment surfaces and vegetation surfaces, smothering plant life and microbial life, which affects the rest of the food chain. Ocean animals are poisoned and smothered as well. Large spills are lethal to coral reefs as well, according to the National Oceanic and Atmospheric Administration.

Petrochemicals in the Atmosphere

Petrochemicals are created through the manipulation of fossil fuels. The burning of fossil fuels and petrochemicals has significant negative impact on the environment. When burned, petrochemicals release ash, nitrogen, sulfur and carbon into the atmosphere, contributing to smog and pollution, according to the Environmental Literacy Council. When these chemicals combine with water vapor, they can cause acid rain.

Petrochemicals and Climate

According to the United States Environmental Protection Agency, greenhouse gases created by the burning of petrochemicals, which includes carbon dioxide, warm up the Earth by trapping heat in the atmosphere. The effects of climate change and the possible warming of the planet include the rise of sea levels through the melting of ice caps and glaciers, as well as potentially dramatic weather changes.

Petrochemicals and Local Ecosystems

Local ecosystems can be harmed by the extraction, utilization and transportation of petrochemicals, according to the Environmental Literacy Council. By digging for coal and oil, large amounts of salt water are often brought to the surface, causing potentially severe damage to the natural flora and fauna. Extraction can also significantly change the environment itself through digging and exploration.

What Are the Sources of CFCs?

Chlorofluorocarbons, also known as CFCs, consist of chemical compounds made up of chlorine, fluorine and carbon. CFCs are particularly harmful when released into the atmosphere because of their destructive reaction with O₃ particles, which provide the Earth with a protective layer against UV radiation. Since 1995 most countries have virtually eliminated CFC production, but a few specialized products still contain CFCs.

The most common source of CFCs are refrigerants, but fire suppression systems for aircraft and aerosols also emit CFCs into the atmosphere.

Refrigerators and Air Conditioners

The most common emitter of CFCs are refrigerants. When the coolant used in old refrigerators, cars, air conditioners and other machines is not properly disposed of, it leaks CFCs into the atmosphere as liquids evaporate or work their way into the soil.

Aircraft Halon

Aviation regulations in some countries still require fire suppression systems outfitted with Halon, a coolant containing CFCs. As of 2011, there is no safe, effective alternative. The industry must follow certain safety measures to dispose of this dangerous chemical responsibly and to recycle the material when possible.

Aerosol Sprays

Aerosol cans and propellant liquids used gasses containing CFCs for a long time. They were phased out of aerosol production in 1999 in favor of less harmful hydrocarbon alternatives. However, since CFC molecules have a lifetime of 20 to 100 years in the stratosphere, the damage done in previous decades continues to make an impact.

How to Prevent Land Pollution

Land pollutants can be solid, liquid or gaseous. They deteriorate the quality and mineral content of soil and disturb the biological balance of organisms in the soil. Causes of land pollution include an increase in urbanization, domestic waste, dumping industrial waste on land and improper agricultural activities. You can prevent land pollution by minimizing or eliminating waste at the source and substituting nontoxic options for hazardous materials.

Reducing Chemical Fertilizers and Pesticides

Plants require soil nutrients such as nitrogen, calcium and phosphorous for growth and development. Also, crops come under attack from rodents, insects and bacteria, so farmers require pesticides to protect the plants.

The use of fertilizers and pesticides in agriculture, however, leads to other problems. Some raw materials can contaminate the soil. For instance, copper and boron in fertilizers, and organochlorine in pesticides, can harm the environment and create health risks when products are used in wrong proportions or over a long period of time.

To prevent such damage, farmers should use composted manure and bio-fertilizers -- biologically active products such as algae and bacteria that can help initiate nitrogen fixation in soil. Biological methods of pest control such as importation -- introducing a pest's natural enemy in a location where they do not naturally occur -- also minimize soil pollution.

Reforestation

Forests and grassland vegetation bind soil to keep it intact and healthy. They also support many habitats that contribute to a complete ecosystem. Construction, cutting of timber and mining, on the other hand, leave the soil bare and expose land to contaminants. Restoring forests by planting more trees protects the land from floods and soil erosion. It also improves the fertility of the land and increases biodiversity.

Solid Waste Treatment

Dumping solid waste such as domestic refuse, garbage and industrial materials on land increases the level of toxicity and hazardous substances in soil. Waste also alters the chemical and biological properties of soil such as its alkalinity levels. Through chemical treatment methods such as acid-base neutralization, municipalities can alter the pH level of solid waste before dumping it in landfills. Degrading insoluble waste by using methods such as adding chemicals or enzymes under a controlled environment before disposing of it also reduces land pollution.

Recovering and Recycling Material

To reduce solid waste pollution on land, you can reuse materials such as cloth, plastic bags and glass in your home rather than disposing of them. By recycling, you reduce the amount of solid refuse going to landfills and also make a contribution toward saving natural resources. For example, according to the U.S. Environmental Protection Agency, when a company recycles 1 ton of paper, it saves an equivalent of 17 trees.