

## Environmental Degradation caused by Chemical Pollution

The following is a list of some of the major forms of environmental degradation resulting from chemical pollution, as well as the activities that result in the release of those pollutants into the environment. The list is not meant to be comprehensive. It is divided into degradation due to air and water pollution, bearing in mind that some forms of pollution are multiphase (eg, burning coal directly releases air pollution, but water pollution results after atmospheric deposition).

| Degradation                         | Major Chemical Pollutants  | Major Source Activities  |
|-------------------------------------|--|--|
| <i>Air Pollution</i>                |  |  |
| depletion of the ozone layer        | CFCs, HCFCs, halons, CCl <sub>4</sub> , CH <sub>3</sub> Br                                 | Use in: refrigerators, air conditioners, as fire retardants, as chemical pesticides, as industrial solvents  |
| climate change (eg, global warming) | GHGs (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, CFCs, HFCs, some others; soot) | Burning fossil fuels in electrical power plants and in motorized vehicles; cement production; deforestation; domestic and industrial uses of CFCs, halons, HCFCs, HFCs |
| acid rain                           | SO <sub>2</sub> , NO <sub>x</sub> (ie, NO+NO <sub>2</sub> )                                | burning fossil fuels (esp coal-burning power plants)   |
| photochemical smog                  | reactive VOCs, NO <sub>x</sub> (produces O <sub>3</sub> , PAN, organic PM, nitrate PM)     | transportation in motorized vehicles   |
| particulate matter                  | SO <sub>2</sub> , NO <sub>x</sub> , soot, PAHs, fly ash, production of smog, others        | combustion (fossil fuels, biofuel, waste incineration, etc)  |
| air toxics                          | CO, Pb, Hg, PAHs, many others  | many sources   |
| <i>Water Pollution</i>              |  |  |
| harmful algae blooms ('red tides')  | nutrients (inorganic N and P)  | domestic and agricultural use of chemical fertilizers; activities that generate acid rain; discharge of untreated sewage; large-scale livestock operations             |
| oxygen depletion                    | nutrients; high-BOD (ie, biodegradable) pollution; thermal pollution                       | chemical fertilizers; acid rain generation; sewage discharges; livestock operations; power plants  |
| cultural eutrophication             | nutrients  | see above  |
| acidification                       | SO <sub>2</sub> , NO <sub>x</sub> , FeS <sub>2</sub>                                       | generation of acid rain; drainage of mine waste  |
| increase in salinity                | inorganic salts  | urban runoff, industrial discharges, irrigation  |
| siltation                           | particulates of any kind (may also have adsorbed toxic chemicals)                          | landscape alteration (e.g. deforestation) causing increased erosion  |
| toxic metals                        | Hg, Pb, Cd, As, Cr, Se, Tl, Ni, Ag, Mn, Ba, etc  | many industrial and domestic uses; power plant emissions   |
| radioactivity                       | Sr-90, I-129, Ra-226, U-238, Rn-222, etc   | medical uses, coal power plants, nuclear fuel cycle  |
| synthetic organic pesticides        | DDT, atrazine, parathion, aldicarb, many others  | pest control (agricultural, municipal, and household use)  |
| petroleum products                  | various hydrocarbons, including BTEX and PAHs; gasoline additives such as TEL and MTBE     | leaks during storage (above and under ground), spills during transport, urban runoff   |
| other toxic organic pollutants      | PCBs, dioxins, furans, many others   | industrial and combustion by-products, industrial discharges, etc  |