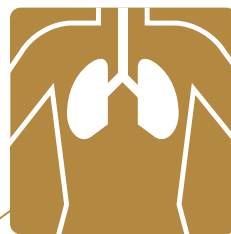


Health and Environmental Impacts of NO_x

NO_x causes a wide variety of health and environmental impacts because of various compounds and derivatives in the family of nitrogen oxides, including nitrogen dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide.

Ground-level Ozone (Smog) - is formed when NO_x and volatile organic compounds (VOCs) react in the presence of heat and sunlight. Children, the elderly, people with lung diseases such as asthma, and people who work or exercise outside are susceptible to adverse effects such as damage to lung tissue and reduction in lung function. Ozone can be transported by wind currents and cause health impacts far from the original sources. Millions of Americans live in areas that do not meet the health standards for ozone. Other impacts from ozone include damaged vegetation and reduced crop yields.

Acid Rain - NO_x and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow, or dry particles. Some may be carried by the wind for hundreds of miles. Acid rain damages forests; causes deterioration of cars, buildings, and historical monuments; and causes lakes and streams to become acidic and unsuitable for many fish.



Particles - NO_x react with ammonia, moisture, and other compounds to form nitric acid vapor and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease, such as emphysema and bronchitis, and aggravate existing heart disease.

Water Quality Deterioration

- Increased nitrogen loading in water bodies, particularly coastal estuaries, upsets the chemical balance of nutrients used by aquatic plants and animals. Additional nitrogen accelerates "eutrophication," which leads to oxygen depletion and reduces fish and shellfish populations. NO_x emissions in the air are one of the largest sources of nitrogen pollution to the Chesapeake Bay.

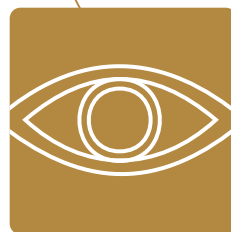


Global Warming - One member of the NO_x family, nitrous oxide, is a greenhouse gas. It accumulates in the atmosphere with other greenhouse gases causing a gradual rise in the earth's temperature. This will lead to increased risks to human health, a rise in the sea level, and other adverse changes to plant and animal habitat.

NO_x



Toxic Chemicals - In the air, NO_x reacts readily with common organic chemicals, and even ozone, to form a wide variety of toxic products, some of which may cause biological mutations. Examples of these chemicals include the nitrate radical, nitroarenes, and nitrosamines.



Visibility Impairment - Nitrate particles and nitrogen dioxide can block the transmission of light, reducing visibility in urban areas and on a regional scale in our national parks.