

engines will reduce total NO_x emissions by 831,000 tons in 2030. The NO_x reductions will reduce the airborne nitrogen deposition that contributes to eutrophication of watersheds, particularly in aquatic systems where atmospheric deposition of nitrogen represents a significant portion of total nitrogen loadings.

4. Polycyclic Organic Matter Deposition

EPA's Great Waters Program has identified 15 pollutants whose deposition to water bodies has contributed to the overall contamination loadings to the these Great Waters.⁹⁷ One of these 15 pollutants, a group known as polycyclic organic matter (POM), are compounds that are mainly adhered to the particles emitted by mobile sources and later fall to earth in the form of precipitation or dry deposition of particles. The mobile source contribution of the 7 most toxic POM is at least 62 tons/year and represents only those POM that adhere to mobile source particulate emissions.⁹⁸ The majority of these emissions are produced by diesel engines.

The PM reductions from this proposed action will help reduce not only the PM emissions from nonroad diesel engines but also the deposition of the POM adhering to the particles, thereby helping to reduce health effects of POM in lakes and streams, accelerate the recovery of affected lakes and streams, and revive the ecosystems adversely affected.

5. Plant Damage From Ozone

Ground-level ozone can also cause adverse welfare effects. Specifically, ozone enters the leaves of plants where it interferes with cellular metabolic processes. This interference can be manifest either as visible foliar injury from cell injury or death, and/or as decreased plant growth and yield due to a reduced ability to produce food. With fewer resources, the plant reallocates existing resources away from root storage, growth and reproduction toward leaf repair and maintenance. Plants that are stressed in these ways become more susceptible to disease, insect attack, harsh weather and other environmental stresses. Because not all plants are equally sensitive to ozone,

ozone pollution can also exert a selective pressure that leads to changes in plant community composition.

Since plants are at the center of the food web in many ecosystems, changes to the plant community can affect associated organisms and ecosystems (including the suitability of habitats that support threatened or endangered species and below ground organisms living in the root zone). Given the range of plant sensitivities and the fact that numerous other environmental factors modify plant uptake and response to ozone, it is not possible to identify threshold values above which ozone is toxic and below which it is safe for all plants. However, in general, the science suggests that ozone concentrations of 0.10 ppm or greater can be phytotoxic to a large number of plant species, and can produce acute foliar injury responses, crop yield loss and reduced biomass production. Ozone concentrations below 0.10 ppm (0.05 to 0.09 ppm) can produce these effects in more sensitive plant species, and have the potential over a longer duration of creating chronic stress on vegetation that can lead to effects of concern such as reduced plant growth and yield, shifts in competitive advantages in mixed populations, and decreased vigor leading to diminished resistance to pests, pathogens, and injury from other environmental stresses.

Studies indicate that these effects described here are still occurring in the field under ambient levels of ozone. The economic value of some welfare losses due to ozone can be calculated, such as crop yield loss from both reduced seed production (e.g., soybean) and visible injury to some leaf crops (e.g., lettuce, spinach, tobacco) and visible injury to ornamental plants (i.e., grass, flowers, shrubs), while other types of welfare loss may not be fully quantifiable in economic terms (e.g., reduced aesthetic value of trees growing in Class I areas).

As discussed above, nonroad diesel engine emissions of VOCs and NO_x contribute to ozone. This proposed rule would reduce ozone and, therefore, help to reduce crop damage and stress from ozone on vegetation. See the draft RIA for a more detailed discussion of the science of these effects.

D. Other Criteria Pollutants Affected by This NPRM

The standards being proposed today would also help reduce levels of other pollutants for which NAAQS have been established: carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Currently every area in the United States has been designated to be in attainment with the NO₂ NAAQS.

As of November 4, 2002, there were 24 areas designated as non-attainment with the SO₂ standard, and 14 designated CO non-attainment areas.

The current primary NAAQS for CO are 35 parts per million for the one-hour average and 9 parts per million for the eight-hour average. These values are not to be exceeded more than once per year. Over 22 million people currently live in the 14 non-attainment areas for the CO NAAQS. See the draft RIA for a detailed discussion of the emission benefits of this proposed rule.

Carbon monoxide is a colorless, odorless gas produced through the incomplete combustion of carbon-based fuels. Carbon monoxide enters the bloodstream through the lungs and reduces the delivery of oxygen to the body's organs and tissues. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina or peripheral vascular disease. Healthy individuals also are affected, but only at higher CO levels. Exposure to elevated CO levels is associated with impairment of visual perception, work capacity, manual dexterity, learning ability and performance of complex tasks.

Land-based nonroad engines contributed about one percent of CO from mobile sources in 1996. EPA previously determined that the category of nonroad diesel engines cause or contribute to ambient CO and ozone in more than one non-attainment area (65 FR 76790, December 7, 2000). In that action EPA found that nonroad engines contribute to CO non-attainment in areas such as Los Angeles, Phoenix, Spokane, Anchorage, and Las Vegas. Nonroad land-based diesel engines emitted 927,500 tons of CO in 1996 (1% of mobile source CO).

E. Emissions From Nonroad Diesel Engines

Emissions from nonroad diesel engines will continue to be a significant part of the emissions inventory in the coming years. In the absence of new emission standards, we expect overall emissions from nonroad diesel engines subject to this proposal to generally decline across the nation for the next 10 to 15 years, depending on the pollutant.⁹⁹ Although nonroad diesel engine emissions will decline during this period, this trend will not be enough to adequately reduce the large amount of emissions that these engines contribute. For example, the declines are insufficient to prevent significant

⁹⁷ Deposition of Air Pollutants to the Great Waters-Third Report to Congress, June, 2000, Office of Air Quality Planning and Standards Deposition of Air Pollutants to the Great Waters-Second Report to Congress, Office of Air Quality Planning and Standards, June 1997, EPA-453/R-97-011. Available in Docket A-99-06, Document No. IV-A-06.

⁹⁸ The 1996 National Toxics Inventory, Office of Air Quality Planning and Standards, October 1999.

⁹⁹ As defined here, nonroad diesel engines include land-based, locomotive, commercial marine vessel, and recreational marine engines.