

Nitrogen Dioxide / Oxides of Nitrogen

Nitrogen dioxide (NO₂) is a highly toxic, reddish brown gas that is formed through the oxidation of nitric oxide (NO) emitted primarily from the combustion of fuels in stationary or transportation sources. It can cause an odorous, brown haze that irritates the eyes and nose, shuts out sunlight, and reduces visibility. NO₂ acts as a precursor to acidic precipitation and plays a key role in nitrogen loading of forests and ecosystems. NO₂ has been associated with acute effects in individuals diagnosed with respiratory disease.

Oxides of nitrogen (NO_x) are a class of pollutants formed when fuel is burned at a very high temperature (above 1200° F), such as in automobiles and power plants. For air pollution purposes, it is composed primarily of nitric oxide (NO), nitrogen dioxide (NO₂) and other oxides of nitrogen. Although there is no air quality standard for NO_x, it plays a major role in the formation of ground-level ozone in the atmosphere through a complex series of reactions with volatile organic compounds (VOCs). Nitrogen oxides also contribute to deposition of nitrogen in soil and water through acid rain.

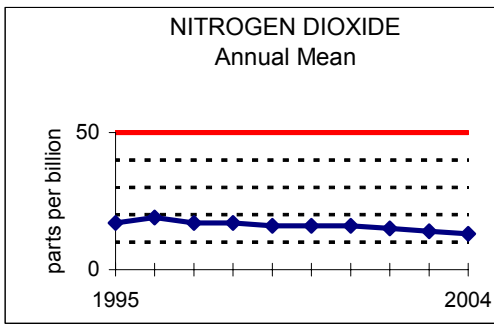


Figure 2-27. Trend in annual NO₂ concentrations, 1995-2004.

The trend in annual mean NO₂ concentrations statewide between 1995 and 2004 is shown in Figure 2-27. In 1995, the statewide average concentration was 17 parts per billion (ppb) and in 2004 the statewide average concentration was 13 parts per billion (ppb), representing a statewide decrease of 24% for this period. All areas of the Commonwealth continue to be well below the air quality annual standard of 53 parts per billion (ppb), which is indicated by the solid line in Figure 2-27.

Figure 2-29 on the following page indicates the 10-year trend of nitrogen dioxide annual mean levels from 1995 to 2004 in 12 air basins and the Altoona non-air basin. Nitrogen dioxide levels have remained relatively constant over the last 10 years. All areas are at or below 50 percent of the annual air quality standard.

Nitrogen dioxide data for 2004 is summarized in Appendix A, Table A-18. No site exceeded the annual primary air quality standard for nitrogen dioxide in Pennsylvania in 2004.

Historical trend data for those sites that monitored nitrogen dioxide in 2004 is presented in Appendix A, Table A-19 for 1995 to 2004. Data is shown for those sites with at least 50 percent valid data. The annual arithmetic mean is shown so that a comparison to the air quality standard can be made for the individual sites.

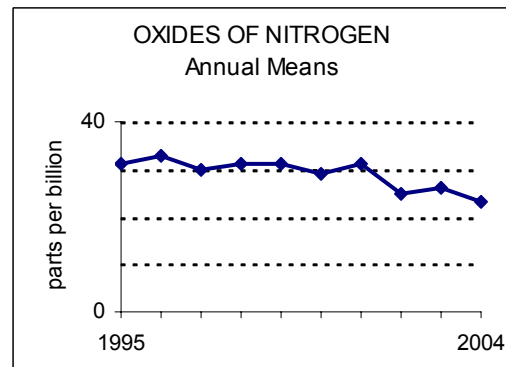
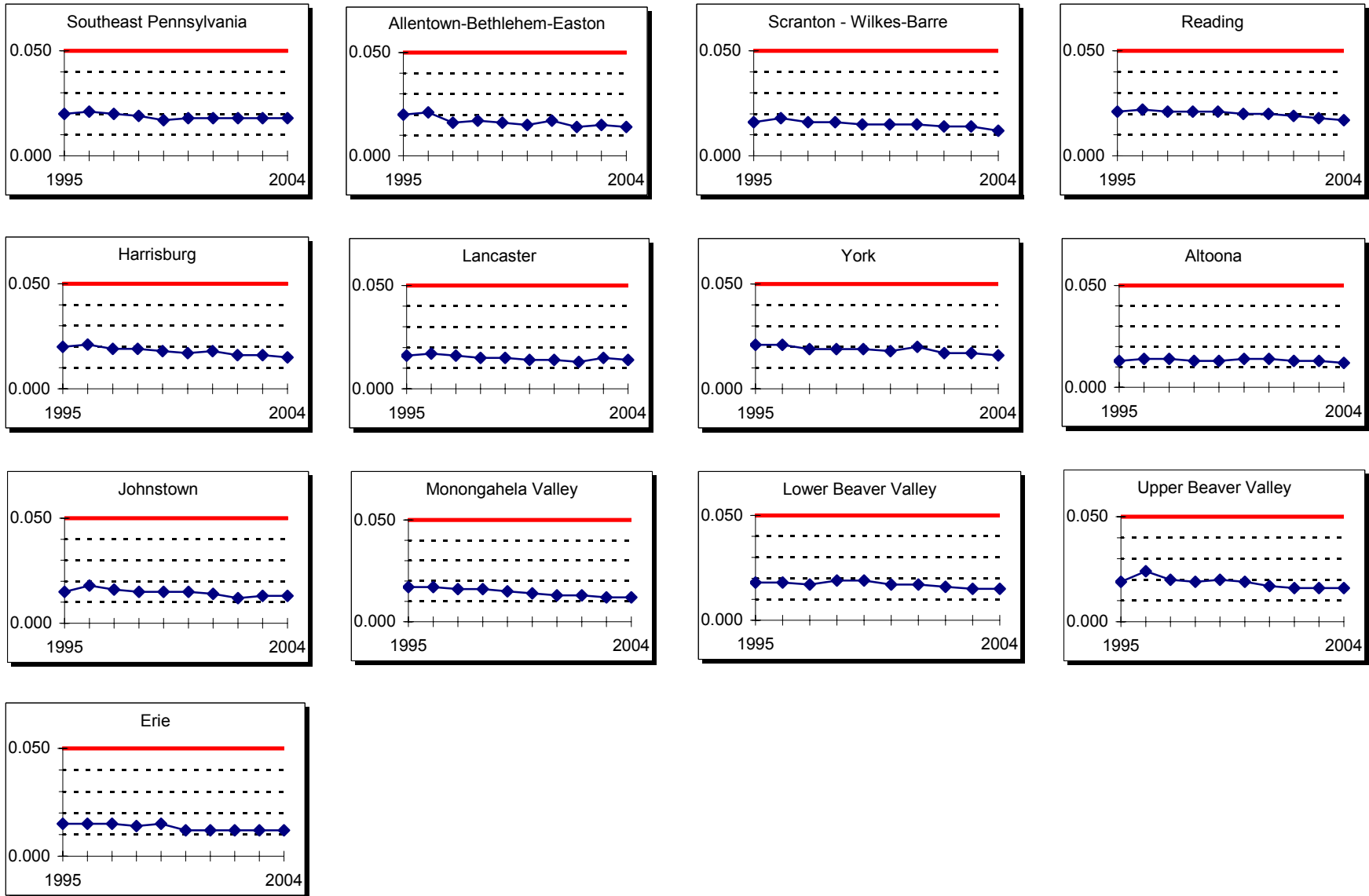


Figure 2-28. Trend of nitrogen oxides annual means, 1995-2004.

Appendix A, Table A-20 summarizes data for oxides of nitrogen (NO_x) in 2004. Figure 2-28 represents the statewide trend of oxides of nitrogen by using the arithmetic mean from all monitoring sites over the last 10 years with at least 50 percent data capture. Since 1995, average NO_x concentrations have declined by 26 percent.

Figure 2-29. 10 – Year Nitrogen Dioxide Trend in Pennsylvania 1995 to 2004
Annual Arithmetic Means (parts per million)



The Nitrogen Dioxide Annual National Ambient Air Quality Standard is 0.053 ppb