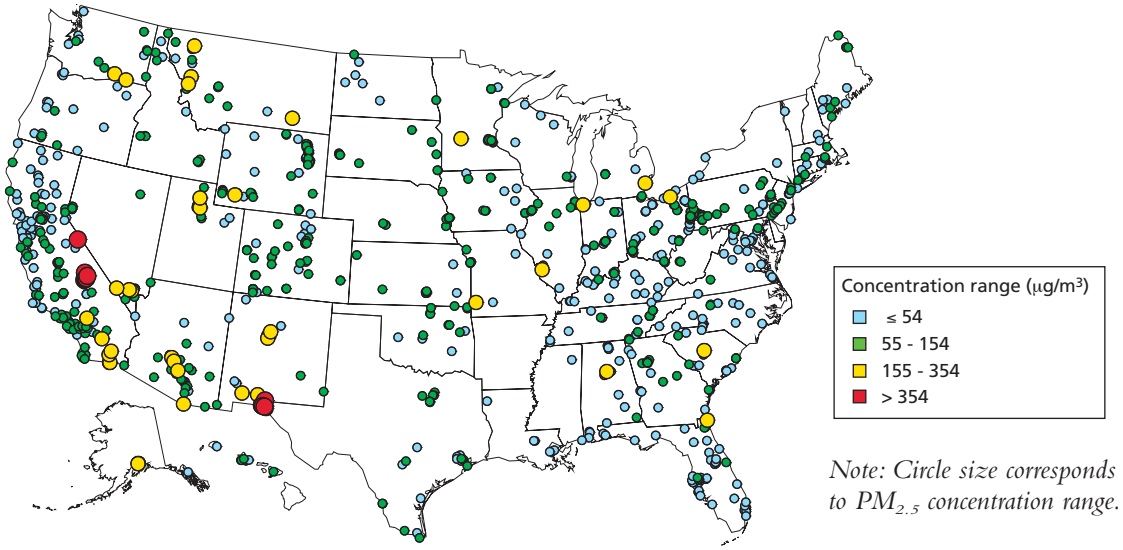
Particle Pollution in 2003

Nationally, fine particle concentrations in 2003 were the lowest since nationwide $PM_{2.5}$ monitoring began in 1999. Compared with 2002, the biggest decreases occurred in the Industrial Midwest and parts of California — areas with relatively high $PM_{2.5}$ concentrations. PM_{10} concentrations were slightly higher in 2003 than the previous year, but they are still the second lowest since nationwide PM_{10} monitoring began in 1988.

Although average concentrations have declined nationally, many areas still exceed the level of the PM standards. In 2003, monitors in 97 counties (home to 62 million people) showed concentrations greater than the PM_{10} or $PM_{2.5}$ national air quality standards. Thirty-seven counties (21 million people) measured concentrations in excess of the national PM_{10} standards, and 72 counties (53 million people) exceeded the national $PM_{2.5}$ standards. These numbers do not include other areas outside of these counties that might *contribute* to levels above the standards.

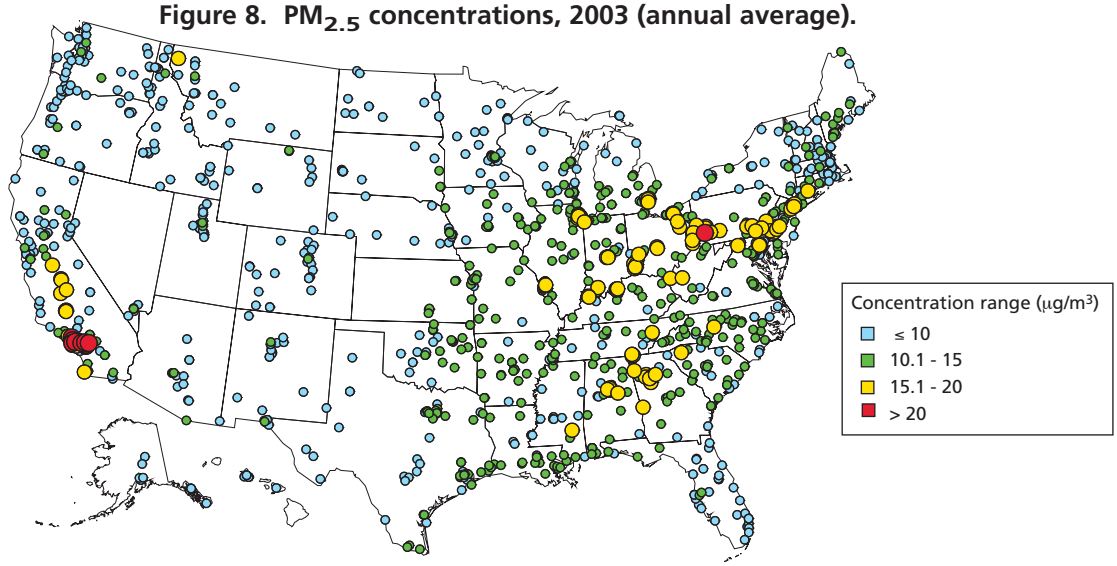
Figure 7 shows the range of PM_{10} concentrations across the country in 2003. The highest concentrations were recorded in Inyo and Mono counties, California; El Paso County, Texas; and Dona Ana County, New Mexico. Figure 8 shows the

Figure 7. PM_{10} concentrations, 2003 (second maximum 24-hour).



Note: Circle size corresponds to $PM_{2.5}$ concentration range.

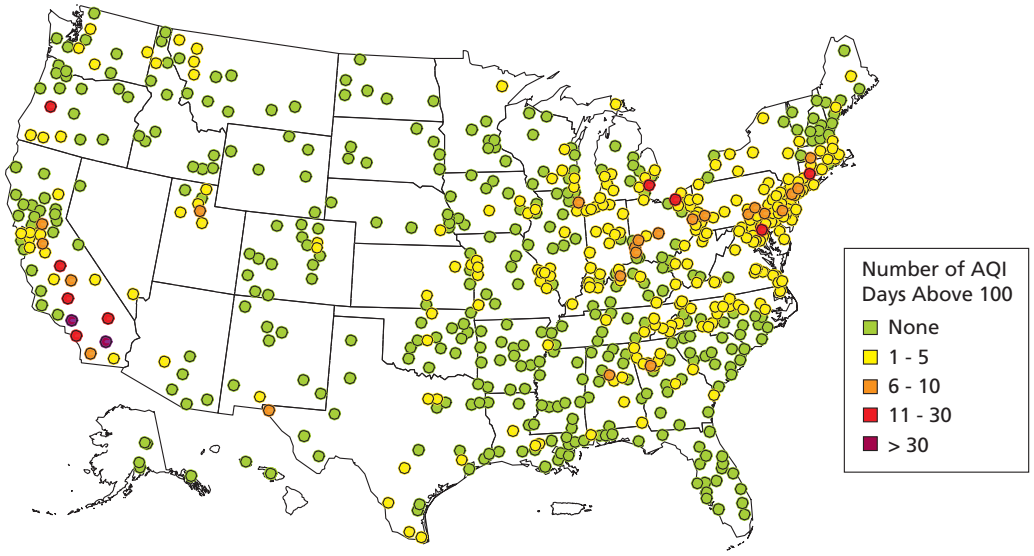
Figure 8. $PM_{2.5}$ concentrations, 2003 (annual average).



range of 2003 $PM_{2.5}$ annual averages across the country. The highest annual averages occurred in southern California and Pittsburgh. High levels are also seen in many urban areas in the Southeast, Northeast, and Industrial Midwest. See www.epa.gov/airtrends/pm.html for county-level maps of PM.

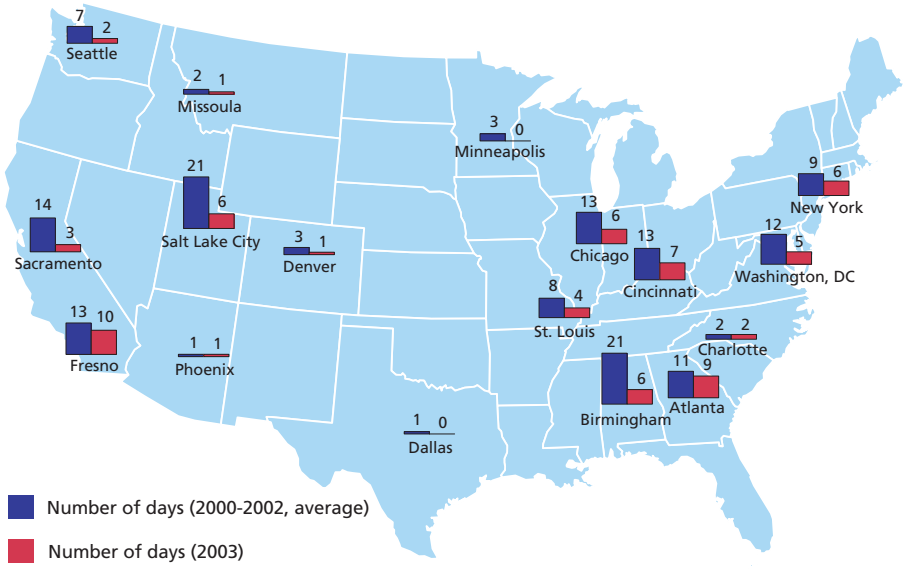
$PM_{2.5}$ concentrations can reach unhealthy levels even in areas that meet the annual standard. In 2003, there were 277 counties with at least 1 unhealthy day based on $PM_{2.5}$ AQI values, as shown in Figure 9. Nearly two-thirds of those counties had annual averages below the level of the standard. Figure 10 shows how several major metropolitan areas fared in 2003 relative to previous years. Most metropolitan areas had fewer unhealthy $PM_{2.5}$ days in 2003 compared to the average from the previous 3 years, which reflects the improvements observed in 2003.

Figure 9. $PM_{2.5}$ AQI days above 100 (≥40.5 µg/m³) in 2003.



Note: This map represents data from Federal Reference Method monitors. It does not show data from all monitors that report the Air Quality Index. As such, it may not provide a complete picture of days above the AQI in some cities.

Figure 10. Number of days with $PM_{2.5}$ AQI levels above 100, 2003 versus average 2000–2002.

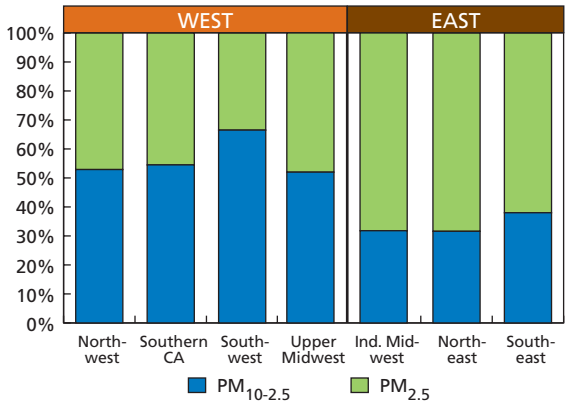


PM_{10} – $PM_{2.5}$

Particulate matter varies greatly in size. "Coarse" particles can be as large as 40 micrometers (μm) in diameter or even larger. EPA's National Ambient Air Quality Standards (NAAQS) for particulate matter, however, have focused on particles that are 10 μm in diameter or smaller. These particles are the most likely to be inhaled and can penetrate into the lower respiratory tract. EPA has had air quality standards for particles 10 μm and smaller since 1987. In 1997, EPA also established an NAAQS for fine particles — those particles 2.5 μm in diameter or smaller. EPA is now in the process of reviewing the PM NAAQS.

As shown in Figure 11, the size distribution of particles smaller than 10 μm but larger than 2.5 μm varies by geographic location. Levels of $PM_{10-2.5}$ are generally higher in the West, particularly the Southwest. $PM_{10-2.5}$ typically comprises more than half of the PM_{10} mass in the West. Data also suggest that concentrations of particles between 2.5 and 10 μm in size are lower in the mid-Atlantic and Southeast. Overall, while directly emitted $PM_{2.5}$ and its precursors can come from both local and regional sources, the larger particles that are part of PM_{10} tend to come from local sources.

Figure 11. Percent of 2003 annual average concentration of particles smaller than 10 μm but larger than 2.5 μm, by region.



National Standards for Particulate Matter

EPA first established National Ambient Air Quality Standards (NAAQS) for total suspended particulate (TSP) in 1971. When the standards were revised in 1987, TSP was replaced by PM_{10}. In 1997, EPA revised the primary (health) and secondary (welfare) PM NAAQS by adding standards for $PM_{2.5}$. EPA added $PM_{2.5}$ standards because fine particles are more closely associated with serious health effects.

The NAAQS for PM_{10} and $PM_{2.5}$ include both short-term (24-hour) and long-term (annual) standards:

NAAQS	$PM_{2.5}$	PM_{10}
Short-term (24-hour average)	65 μg/m³	150 μg/m³
Long-term (annual average)	15 μg/m³	50 μg/m³

Compliance

Each PM standard carries a separate threshold for compliance:

- For the long-term standards for both $PM_{2.5}$ and PM_{10}, compliance is determined based on the average of three consecutive annual average values.
- Compliance with the short-term $PM_{2.5}$ standard is determined by the 3-year average of the annual 98th percentile of 24-hour concentrations.
- The short-term standard for PM_{10} is not to be exceeded more than once per year, averaged over 3 years.

EPA reviews the NAAQS on a regular basis. The standards for PM_{10} and $PM_{2.5}$ are currently under review, to be completed in 2006.

Note: μg/m³ = micrograms per cubic meter.