

How have emissions changed over time?

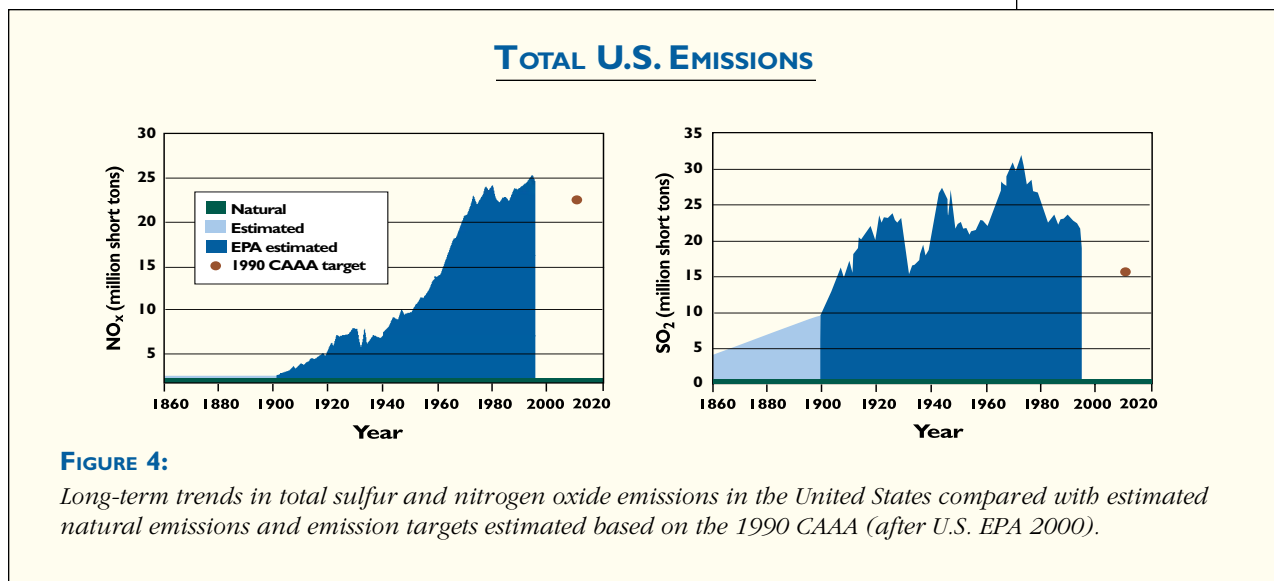
Some emissions that cause acid deposition have decreased, but overall acid and acidifying emissions remain high compared to background conditions.

SUMMARY: Although regulatory controls in the 1970s and 1990s decreased sulfur dioxide emissions, levels remain high compared to background conditions. Controls on nitrogen oxides and ammonia were not fully addressed during the same period; consequently, emissions of these compounds remain high and have gone largely unchanged in recent years (see Figure 4). Importantly, emissions and deposition of base cations (i.e., elements such as calcium and magnesium that help counteract acid deposition) have declined substantially since the early 1960s with the enactment of pollution controls to reduce particulate matter.

DETAILS: Total sulfur dioxide emissions in the United States peaked in the early 1970s at approximately 32 million short tons annually. The 1970 and 1990 CAAA led to a 38 percent decrease in sulfur dioxide emissions nationwide, in turn causing them to drop from 32 million short tons annually in 1973 to approximately 20 million short tons in 1998. The 1990 CAAA set a cap of 15.4 million short tons of total annual sulfur dioxide emissions to be achieved by 2010 (see Figure 4). The cap on electric utilities is set at 8.9 million short tons and the cap on industrial sources is 6.2 million short tons to be reached by 2010.

Controls on nitrogen oxide were not fully addressed in 1990.

Consequently, emissions remain high and largely unchanged in recent years.



In contrast to sulfur dioxide, nitrogen oxide emissions increased more slowly through most of the last century, peaking at nearly 25 million short tons in 1990. The 1990 CAAA resulted in a nominal 4 percent decrease in total nitrogen oxide emissions between 1994-1998. The 1990 CAAA calls for an additional reduction that will result in the emission of two million fewer tons of nitrogen oxide than the level that would have occurred without the CAAA. However, no cap on total annual emissions of nitrogen oxides was set. It is therefore expected that nitrogen emissions will increase gradually in the future as both the U.S. population and fossil fuel consumption increase.

Ammonia emissions play an important role in the acidification of soil and surface waters. Deposition of ammonium accounts for approximately 30 percent of the total nitrogen deposition measured at the HBEF and has not changed appreciably over the past 30 years. Trends in national ammonia emissions are consistent with this pattern and show little change over the past 10 years.