

Nitrogen Dioxide Monitoring

Nitrogen Dioxide (NO₂) air pollution is primarily emitted from fuel burning emission sources including cars, trucks, buses, power plants, and off-road equipment. Nitrogen dioxide and other highly reactive oxides of nitrogen react with other chemicals in the air to form both particulate matter and ozone pollution downwind from emission sources. An increase in vehicle miles traveled, especially in urban areas with higher population densities, typically correspond to increased, on-road mobile source emissions and increased risks to human health and welfare.

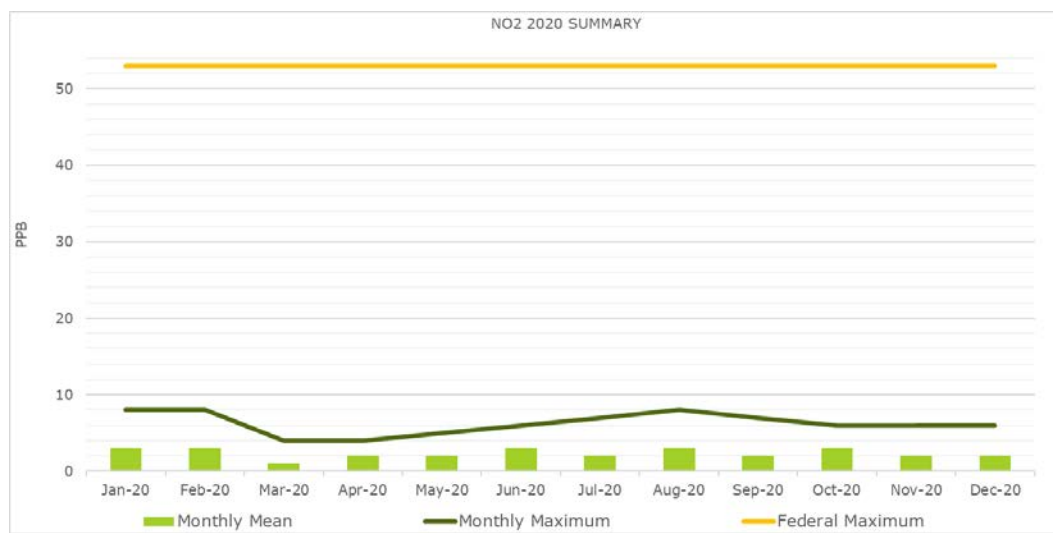
Those who live, work, or go to school near major roads are most at risk. Breathing air with high concentrations of NO₂ can cause respiratory irritation (coughing, wheezing, difficulty breathing) and aggravates existing respiratory conditions such as asthma. Oxides of nitrogen in the atmosphere also contribute to environmental degradation through the formation of acid rain, hazy air, and the deposition of nitrogen pollution in soil and waterways.

National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS) establish maximum pollutant levels to protect public health and the environment. An area that has pollutant levels in exceedance of the standard are designated as 'nonattainment'. These areas require regulatory programs to limit pollutant emissions. Once a nonattainment area achieves the standard, the area is designated as 'maintenance'. Areas with pollutant levels below the standard are designated as in 'attainment'.

To protect public health, the 1-hour pollution concentration of Nitrogen Dioxide cannot exceed 100 parts per billion (ppb) of the ambient air. To determine whether an area has attained the standard, the three-year average of 98th percentile of the daily maximum 1-hour concentrations is calculated and the average cannot exceed 100 parts per billion. Also, to protect public health and the environment, the annual average pollution concentration of nitrogen oxides cannot exceed 53 parts per billion (ppb) of the ambient air.

Graph 1.
Nitrogen Dioxide
monthly pollution
concentrations
compared to the
NAAQS of 53
parts per billion
(PPB)





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The Morongo Indian Reservation, for the purposes of NO₂ planning, is included in the South Coast Air Basin which has achieved the standard and is designated as 'Maintenance' for the NO₂ NAAQS. Maintenance indicates the area at one time did not meet the standard, actions were taken to control and limit emissions, and now the area has achieved and is maintaining compliance with the standard.

NO₂ Monitoring Efforts on the Morongo Indian Reservation

The Morongo Environmental Protection Department has received funding from the Environmental Protection Agency (EPA) Region 9 to develop and implement a nitrogen dioxide air monitoring program at the Morongo Air Monitoring Station, located directly south of the Little Creators School, and has collected nitrogen dioxide pollutant concentration data since 2015.

Nitrogen Dioxide measurements have been collected with the intent to:

- quantify ambient NO₂ concentrations at selected monitoring sites throughout the Reservation,
- establish historical baseline concentration of air pollutants,
- observe pollution trends throughout the region and observe the correlation between NO₂ and ozone pollution, and
- based on the NO₂ measurements, determine compliance at each site with respect to the applicable NO₂ NAAQS.

What have we learned?

Monitoring Technology - The standard technology for monitoring for nitrogen oxides is challenging to implement. The equipment requires on-going maintenance, calibrations, repairs, and technical support at levels above and beyond the current staff availability and abilities. Equipment is frequently down for repairs, creating large data gaps and limiting the usability of the data for anything other than informational. The goal to achieve data of superior quality to be used for regulatory decision making is far from achievable with the current technology and department capabilities.

Community Risks - Risks of ambient air concentrations of nitrogen dioxide to the community are low. Based on the quality assured and quality control checked data recorded for the Morongo Air Monitoring Station, air quality within the reservation community is well below both the primary and secondary National Ambient Air Quality Standard (NAAQS) levels for nitrogen dioxide (See *Graph 1.*)

Monitor Location - Location of the current monitor at the Morongo Air Monitoring Station is not collecting data related to the Interstate 10 traffic and California Department of Transportation





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(CalTrans) Truck Weigh Station and is instead collecting background nitrogen oxide air concentration levels. The Morongo Air Monitoring Station is located 4,700 feet north of the interstate and 5,685 feet northeast from the Banning West CalTrans Truck Weigh Station. As such, the monitoring station is too far to collect peak NO₂ concentrations in the near road environment. NO₂ concentrations tend to decrease back to background levels at distances of 500-600 feet from roads. In addition, typically winds travel through the San Geronio Pass in a westerly or easterly direction, further preventing the monitor from collecting NO₂ data from the freeway mobile sources.

Other Options for Monitoring NO₂ - Morongo Environmental Protection Department has other methods for informational monitoring of ambient air levels of Nitrogen Dioxide. Nitrogen Dioxide is currently monitored by the Morongo Community Air Monitoring Network with low-cost sensors, which provide accurate informational data and the equipment significantly easier to maintain. Data is currently available in real-time at www.MorongoAir.com and funding has been extended for the project through 2025. In addition, the South Coast Air Quality Management District maintains an air monitoring station within the San Geronio Pass (Banning Airport) which monitors for NO₂ in the area.

Resources

EPA. Basic Information about NO₂. <https://www.epa.gov/no2-pollution/basic-information-about-no2>

EPA. Setting and Reviewing Standards to Control NO₂ Pollution. <https://www.epa.gov/no2-pollution/setting-and-reviewing-standards-control-no2-pollution>

EPA. 2014. Near Roadway Air Pollution and Health: Frequently Asked Questions (EPA-420-F-14-044) https://www.epa.gov/sites/default/files/2015-11/documents/420f14044_0.pdf

