



Air Quality Monitoring

*in the Northern Colorado
Plateau Network*



Changes in air quality can affect many park resources, including vegetation, water, soils, fish, wildlife, and viewshed—as well as human health.



PHOTOS

FROM TOP: ARCHES NATIONAL PARK (NPS/K. THOMAS), HORSE FIRE, ZION NATIONAL PARK (NPS), NIGHT SKY, NATURAL BRIDGES NATIONAL MONUMENT (NPS).

Why Monitor Air Quality?

Park resources affected by air quality include scenic views, night skies, vegetation, water, and wildlife. Understanding changes in air quality can help us to interpret changes in other monitored vital signs and help park managers to evaluate compliance with legislative requirements. Both the Clean Air Act and the National Park Service (NPS) Organic Act protect air resources in national parks. Six Northern Colorado Plateau Network (NCPN) parks are designated as Class I areas under the Clean Air Act, providing special protection for air quality; sensitive ecosystems; and clean, clear views in these areas: Arches, Black Canyon of the Gunnison, Bryce Canyon, Canyonlands, Capitol Reef, and Zion national parks.

What's the Most Recent News?

In the past, the NCPN compiled information from the National Park Service's Air Resources Division (ARD) and the websites of several cooperating programs to produce an air-quality monitoring report for network parks. However, recent improvements to the [ARD website](#) have made it easier than ever for park managers to access air-quality information (see page 2). The website centralizes much of the information that the network used to assemble for reporting purposes.

Park-specific data (and often, graphics) on condition and trends for the air-quality indicators of ozone, visibility, and deposition are available at the website, along with a wide variety of other information. Given the ease with which park managers can now access this material, the NCPN

plans to suspend its regular reporting on air quality, except in special circumstances.

How is the Information Used?

The overarching goal of NCPN air-quality monitoring is to apply air-quality data in a way that helps us to understand the reasons for trends seen in other network vital signs. Park staff should also be able to use the [ARD website](#) to answer many resource-related questions.

Where is Air Quality Monitored?

In the NCPN, air quality is actively monitored at Arches NP, Bryce Canyon NP, Canyonlands NP, Capitol Reef NP, Colorado NM, Dinosaur NM, Timpanogos Cave NM, and Zion NP. However, the ARD website interpolates more distant data to provide information on [air-quality condition and trends](#) for all network park units.

How is the Monitoring Done?

Over the past three decades, the NPS has developed a comprehensive air-quality monitoring program through participation in cooperative national monitoring networks. These include the [Interagency Monitoring of Protected Visual Environments](#) (visibility), the [Gaseous Pollutants Monitoring Network](#) (ozone), the [Clean Air Status and Trends Network](#) (ozone/deposition), the [National Atmospheric Deposition Program](#) (deposition), and the U.S. Environmental Protection Agency's [Air Quality System](#).

How Can I Learn More?

Visit <http://www.nature.nps.gov/air/index.cfm>, or contact dustin_w_perkins@nps.gov.



What's in the Air?

The NPS Air Resources Division Can Provide Clear Answers

At the website of the National Park Service (NPS) [Air Resources Division](#) (ARD), any user can find [information on air quality for more than 350 NPS units](#). At a minimum, this consists of a summary table showing current conditions based on the latest and best available data.

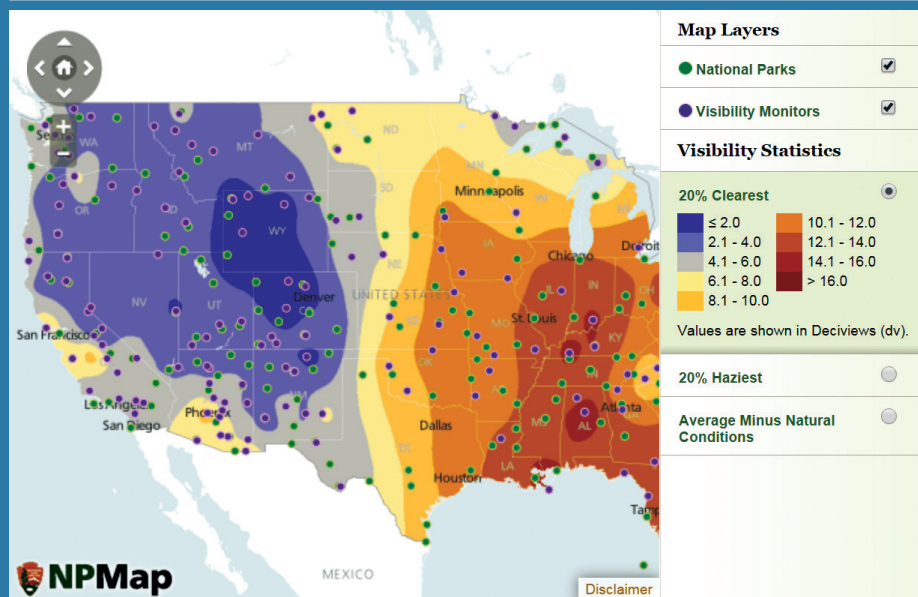
Dinosaur NM - Air Quality

This table summarizes conditions and trends for ozone, visibility, nitrogen, and sulfur. Monitoring data and risk assessments are used to identify the air quality condition status in each category as good, or of moderate or significant concern. Trends are calculated from data collected over a ten-year period at on-site or representative nearby monitors where available. [more >>](#)

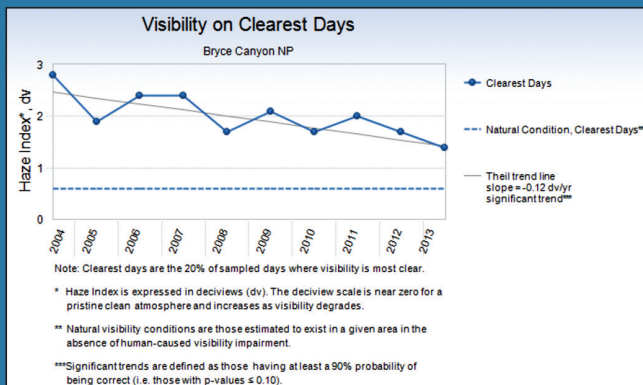
2013 Air Quality Summary

Air Quality Indicator	Specific Measure	Condition Status/Trend*	Rationale
Ozone	Human Health: Annual 4th-highest 8hr concentration	↓	Condition: Human health risk from ground-level ozone warrants significant concern at Dinosaur NM. This status is based on NPS Air Resources Division benchmarks and the 2009-2013 estimated ozone of 82.3 parts per billion (ppb). Trends: For 2004-2013, the trend in ozone concentration at Dinosaur NM degraded (AQIS Monitor ID: 490471002, UT). Confidence: The degree of confidence at Dinosaur NM is high because there is an on-site or nearby ozone monitor.
	Vegetation Health: 3-month maximum 12hr W126	↔	Condition: Vegetation health risk from ground-level ozone warrants moderate concern at Dinosaur NM. This status is based on NPS Air Resources Division benchmarks and the 2009-2013 estimated W126 metric of 12.1 parts per million-hours (ppm-hr). The W126 metric relates plant response to ozone exposure. A risk assessment concluded that plants in at Dinosaur NM were at low risk for ozone damage (Aghajani 2007; Aghajani 2004). See list of ozone-sensitive plant species . Trends: For 2004-2013, the trend in the W126 metric at Dinosaur NM remained relatively unchanged (no statistically significant trend) (AQIS Monitor ID: 490471002, UT). Confidence: The degree of confidence at Dinosaur NM is high because there is an on-site or nearby ozone monitor.
Visibility	Haze Index [§]	●	Condition: Visibility warrants moderate concern at Dinosaur NM. This status is based on NPS Air Resources Division benchmarks and the 2009-2013 estimated visibility on mid-range days of 2.9 deciviews (dv) above estimated natural conditions. [¶] Trends: No trend information is available because there are not sufficient on-site or nearby visibility monitoring data. Confidence: The degree of confidence at Dinosaur NM is medium because estimates are based on interpolated data from more distant visibility monitors.
Nitrogen	Wet Deposition	●	Condition: Wet nitrogen deposition warrants significant concern at Dinosaur NM. This status is based on NPS Air Resources Division benchmarks and the 2009-2013 estimated wet nitrogen deposition of 1.4 kilograms per hectare per year (kg/ha/yr), a level that normally warrants moderate concern. However, the status has been elevated to significant concern because ecosystems at Dinosaur NM may be very highly sensitive to nitrogen-enrichment effects relative to all Inventory & Monitoring parks (Gulliver et al. 2011a; Sullivan et al. 2011b). Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of some plant communities, including and semi-arid, grassland, and wetland. Trends: No trend information is available because there are not sufficient on-site or nearby deposition monitoring data. Confidence: The degree of confidence at Dinosaur NM is medium because estimates are based on interpolated data from more distant deposition monitors.
Sulfur	Wet Deposition	●	Condition: Wet sulfur deposition is in good condition at Dinosaur NM. This status is based on NPS Air Resources Division benchmarks and the 2009-2013 estimated wet sulfur deposition of 0.7 kilograms per hectare per year (kg/ha/yr). Ecosystems in the park were rated as having high sensitivity to acidification effects relative to all Inventory & Monitoring parks (Gulliver et al. 2011a; Sullivan et al. 2011b). Acidification effects can include changes in water and soil chemistry that impact ecosystem health. Trends: No trend information is available because there are not sufficient on-site or nearby deposition monitoring data. Confidence: The degree of confidence at Dinosaur NM is medium because estimates are based on interpolated data from more distant deposition monitors.

The ARD [Air Atlas](#) provides national maps of ozone, visibility, and deposition condition. Users can zoom in on areas of interest. [Live data](#) show current air-quality conditions at more than 30 parks, including Canyonlands, Dinosaur, and Zion.



For many parks, far more information is available—including graphs showing 10-year and long-term trends in ozone, visibility, and deposition. In the past, users had to go to the websites of the programs that collect the air-quality data to obtain these charts. It is now possible to get them [directly from ARD](#).



The website also hosts many other resources—from [interactive simulations](#) of various haze levels to [conceptual diagrams](#) of the nitrogen cycle to [general information](#) about air pollution and the [laws and policies](#) that address it. Links to [studies](#) and [publications](#) are also available.

The wealth of information provided by the site, and its user-friendly interface, make it easy for park managers and members of the public to find the answers they need about air quality in the national parks. Questions that can't be answered at the website may be directed to the NPS [Air Resources Division](#) or the [Northern Colorado Plateau Network](#).

