



FACT SHEET: AIR QUALITY IN THE UINTAH BASIN

BACKGROUND INFORMATION

- Because of its impacts on health (see below), EPA regulates ozone in ambient air. Current EPA standards limit ambient ozone to 70 ppb (calculated as the daily maximum 8-hour average).
- Ozone concentrations have exceeded the EPA standard during some winters in the Uintah Basin. The number of ozone exceedance days and concentrations of ozone that occur each year are closely tied to meteorology. Years with persistent snow cover and high barometric pressure tend to have more days with strong winter inversions and high ozone.
- During inversion episodes, ozone concentrations tend to be higher at lower elevations where inversion conditions are stronger and last longer. For example, during an inversion episode in February 2017, Ouray (4803 ft. above sea level) registered 10 exceedance days and up to 111 ppb of ozone, while Vernal (5268 ft. above sea level) had no exceedance days and a maximum of 69 ppb.
- Ozone is formed from chemical reactions involving pollutants emitted to the atmosphere. Winter inversions are extremely effective at trapping locally emitted pollution within the Uintah Basin, making external sources of pollution less important. The Basin has about 10,000 oil and gas wells, and the oil and gas industry is the largest local contributor of ozone-forming emissions.
- In the absence of winter inversions, winter and summer ozone concentrations in the Basin are similar to those in other rural, high-elevation locations around the western United States.
- Portions of the Uintah Basin below an elevation of 6,250 feet have been declared in non-attainment of the EPA ozone standard, leading to increased regulation and emissions control requirements, especially for the oil and natural gas industry.
- Exceedances of the EPA standard for particulate matter (i.e., PM_{2.5}) have occasionally been observed in the Uintah Basin during winter inversions, but the region is currently not a non-attainment area for particulate matter.

AIR QUALITY AND HEALTH

- Ozone negatively impacts respiratory health, especially for those with lung diseases. Children, the elderly, and those with respiratory diseases are most vulnerable. For detailed information about the health impacts of impaired air quality, see <https://www.epa.gov/air-research/research-health-effects-air-pollution>.
- USU and other groups have measured concentrations of organic compounds in the Uintah Basin atmosphere for more than a decade. Oil and natural gas consist of organic compounds, and volatile organic compounds are emitted into the air during processes related to oil and gas exploration and production. Concentrations of many organic compounds in the Basin are higher than in areas distant from oil and gas activity.
- Benzene, toluene, ethylbenzene, and xylenes are toxic organic compounds. Concentrations of these compounds are higher in the Basin than in remote environments. Concentrations of benzene in the

Uintah Basin, including in some populated areas, are higher than EPA's one-in-a-million benchmark for elevated cancer risk, which means that the risk of a resident contracting cancer as the result of benzene exposure is greater than one in a million. For perspective, the level of cancer risk from benzene in the Uintah Basin is similar to large urban areas in the United States.

- The Utah Department of Health conducted a study of stillbirths and infant mortality in the Uintah Basin. This study found that the rates of several adverse birth outcomes in the Uintah Basin were not different from the rest of the state and were lower than the national rate. The study also stated that “the low amount of [adverse birth outcome] risk that can be attributed to air pollution exposure, compared to intrinsic, extrinsic, and medical risk factors suggests that these environmental risk factors are not likely to be very important to overall community health with respect to [adverse birth outcome] rates.”

NEED FOR AIR QUALITY RESEARCH

- Wintertime ozone is a unique phenomenon, and the Uintah Basin is one of only two areas in the world where wintertime ozone is known to occur with any regularity (the other is Wyoming's Upper Green River Basin). Because of this, many aspects of the meteorology, chemistry, and emissions that allow ozone to form during winter are still poorly understood.
- Federal and state agencies are required by law to promulgate regulations that reduce ozone-forming emissions in the Uintah Basin. These regulations will mostly target the local oil and gas industry, which is the basis for the majority of the Basin's economy.
- Scientific research to better elucidate the causes and characteristics of winter ozone formation can help industry and regulators craft emissions reductions that maximize effectiveness and minimize costs to the local industry and economy.

WHAT IS BEING DONE

- Utah State University is carrying out a comprehensive research program to understand and provide solutions for the Basin's air quality problems. This is a cooperative effort that involves Uintah and Duchesne Counties, local industry, the Utah Division of Air Quality, the Ute Indian Tribe, the TriCounty Health Department, research teams at other Utah universities and around the nation, and several federal agencies (BLM, EPA, DOE).
- Government agencies and industry have enacted a number of science-based environmental controls to reduce the amount of air pollution in the Uintah Basin. These include:
 - New regulations by the Utah Division of Air Quality and EPA to reduce emissions from the oil and gas industry.
 - Increased focus on air quality in oil and gas permitting processes carried out by land management agencies.
 - Increased focus on air quality by the Ute Indian Tribe.
 - Voluntary efforts by industry to install equipment and adopt practices that reduce emissions to the atmosphere.
- Because of these actions, air quality in the Uintah Basin has improved. For a given set of meteorological conditions, we now have lower winter ozone than we did a decade ago. These improvements have occurred because emissions from the oil and gas industry have declined. Oil and gas activity have increased in the Basin since 2021, but available evidence suggests that winter ozone has continued to improve over that time.